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THE ANTS OF NEW MEXICO (HYMENOPTERA: FORMICIDAE)

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Preface

Little is known about the natural history of ants, although they are among the most common terrestrial insects. Much of the work that remains can be done by amateurs, or by individuals with interests other than ants. We are providing this book for you, to allow you to identify ants that you can find in the state of New Mexico (as well as eastern Arizona, southern Colorado, western Texas and northern Chihuahua). We will try to keep the terminology as simple as possible, and provide illustrations for the diagnostic features of most of the species. Hopefully this book will assist in providing hours of pleasure for those of you with interests in these fascinating group of animals, pleasures which we have enjoyed for over 30 years. This book is also designed for ecologists and behaviorists, as well as other biologists, who would like to use ants as experimental animals.

We dedicate this book to Walt and Linda Whitford, our dearest friends, who have stood by us through many trials and tribulations. Without them, we are not sure we would have survived the death of our son, Joseph Luis. Walt is the major ant ecologist in the state of New Mexico, and has published a multitude of papers on our favorite animals.

We would like to thank a number of individuals who have assisted us in one way or another. Our daughters, Mary and Linda, have accompanied us on nearly all of our field trips. They have not only tolerated our frequent stops, and camping in the rain and snow and other experiences, but also joined in to help us collect our specimens, since they were about 3 years old. David Richman suggested we publish this book. James Cokendolpher, Richard Fagerlund, David Richman, Donald Lowrie, and Elizabeth Milford sent us a multitude of ant specimens. Richard Fagerlund (University of New Mexico) & Stefan Cover (Museum of Comparative Zoology, Harvard) critically reviewed the manuscript and tested the keys. We would like to thank all of these individuals, because without them, this book would have never been completed.

El Paso, TX
Wednesday, February 05, 2014

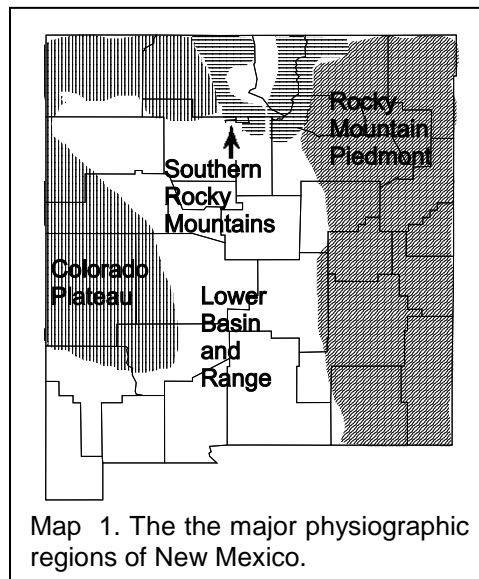
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ABSTRACT

We report a total of 227 species [note there are 236 maps, double check numbers] and subspecies of ants from New Mexico, USA, with a listing of another 66 that probably occur in the state. This is about 39% of the species that occur in the United States. The subfamilies and genera include: PONERINAE: *Amblyopone*, *Hypoponera*, *Odontomachus*, CERAPACHYINAE: *Acanthostichus*, *Cerapachys*, PSEUDOMYRMECINAE: *Pseudomyrmex*, ECITONINAE: *Neivamyrmex*, MYRMICINAE: *Aphaenogaster*, *Cephalotes*, *Crematogaster*, *Cyphomyrmex*, *Formicoxenus*, *Leptothorax*, *Manica*, *Monomorium*, *Myrmecina*, *Myrmica*, *Pheidole*, *Pogonomyrmex*, *Rogeria*, *Solenopsis*, *Stenamma*, *Strumigenys*, *Tetramorium*, *Trachymyrmex*, *Tranopelta*, DORYLINIDAE: *Dorymyrmex*, *Forelius*, *Linepithema*, *Liometopum*, *Tapinoma*, FORMICINAE: *Acanthomyops*, *Brachymyrmex*, *Camponotus*, *Formica*, *Lasius*, *Myrmecocystus*, *Paratrechina*, *Polyergus* and *Prenolepis*. We include keys to the species, distribution maps, discussions of the habitats and natural history of each species.

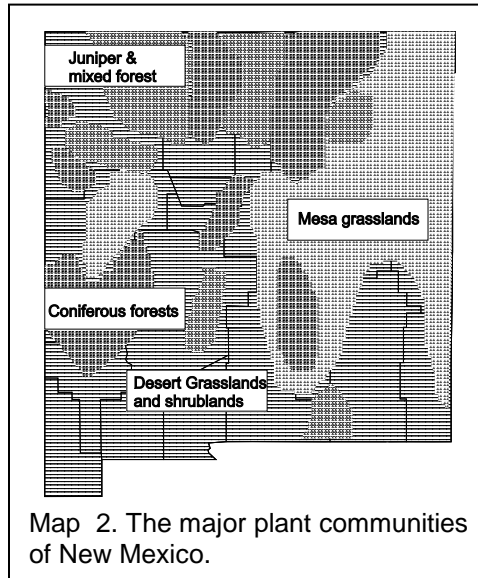
INTRODUCTION

New Mexico is one of the states in the southwestern part of the United States, bounded on the West by Arizona, on the north by Colorado, on the east and south by Texas, and on the south by the state of Chihuahua, Mexico. Physiographically, New Mexico is one of the most interesting of the states (Map 1). The Colorado plateau extends well into the western part of the state, the Rocky Mountains extend from the North as far south as the region around Santa Fe. The Piedmont of the Rocky Mountains covers about one-third of the eastern part of the state. Several areas of the state contain



isolated mountains, which are often located in arid regions, thus creating “sky islands”, or mesic peaks. Much of the central portion of the state includes regions of relatively lower elevation, covered primarily with grassland, or desert shrubs. Much of this area, as well as other areas of the state are geologically interesting, due to the activity of ancient volcanoes. The physiographic variation causes patterns in rainfall, and temperature. These patterns have resulted in a variety of plant communities located throughout the state (Map 2).

The vegetation of New Mexico has been well documented (Dick-Peddie, 1993). The northern part of the state is covered with forest, as well as several mountains located throughout the state (Map 2). More than half of the state is covered with grasslands or shrublands. Temperatures and precipitation closely match the types of vegetation found throughout the state, with the higher elevation forests being subject to cooler temperatures and more precipitation, the lower elevational areas subjected to



higher temperatures and less precipitation. This variety of climates and plant communities allows New Mexico to be one of the richest areas in America, in terms of numbers of species of ants. More than $\frac{1}{3}$ of the ant species found in the United States occurs in New Mexico.

The ants of New Mexico are poorly known. Cole published a series of papers on ants, which will be cited in the text. Whitford and his colleagues (See Kay and Whitford, 1978; Schaffer and Whitford, 1981; Schumacher and Whitford, 1976; Whitford, 1976, 1978a, 1978b; Whitford and Bryant, 1979; Whitford and Ettershank, 1975; Whitford et al., 1975, 1976, 1981; Wisdom and Whitford, 1981) have published extensively on the biology of the ants of New Mexico. Gregg's keys (1963) would be useful for identification of ants at least for the northern part of the state. Males can be identified to genus using Smith (1943). Smith (1979) and Bolton (1995) would be helpful in understanding nomenclatural changes made since the keys were written, as well as providing references to

articles on ants. Other recent works on ants would be indispensable for the serious myrmecologist, including Bolton (1994) and Hölldobler and Wilson (1990).

We have attempted to construct keys using current names, and which will be relatively easy to use by a non-specialist, but it must be kept in mind that ants are difficult to identify to species. We have also cited the most recent keys so identifications may be checked in more complete keys. Certainly we have not collected all of the species present in New Mexico. Therefore we also include additional genera and species collected in nearby states (especially Arizona, Colorado, Texas, and Chihuahua) and mark them with an asterisk to indicate that we did not actually collect them in New Mexico. References to complete keys to most genera can be found in Mackay and Vinson (1989) and Hölldobler and Wilson (1990, Table 2-2). Many works on ants of other states can be found in Hölldobler and Wilson (1990, Table 2-3).

Ants can be found almost anywhere in New Mexico. To collect legally, you will need a permit. Check with the New Mexico Game and Fish Office, PO Box 25112, Santa Fe, NM 87504 or (505) 827-7911. If you collect on private property, be sure to ask for permission. The vast majority of landowners are very cooperative, encouraging you to “take all of them”. You may even be invited for a glass of lemonade, or even supper!

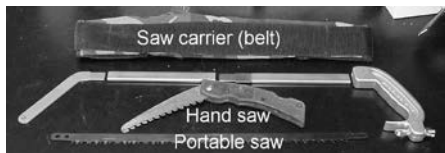


Fig. 1. A small hand saw and a collapsible saw for use in the field.

The general procedure is to locate an interesting area, and spend one or more hours turning over stones, searching logs and stumps or capturing ants foraging on the soil surface, and on vegetation. Tree limbs and logs can be opened using handsaws, axes or portable electric

saws. We have found the Wyoming© brand of collapsible handsaws to be very practical. The battery-operated DeWalt© reciprocating saw and circular saw, with the 12V charger are especially useful. It is important not to use standard inverters to convert 12 VDC to 120 VAC to charge the batteries using the standard rechargers. It is best to collect the ants using a pair of forceps, as several of our species can sting. Ants from a single colony should be placed in a single vial of 70 - 95 percent ethanol (isopropyl alcohol can be used, but tends to harden specimens). Each vial should be carefully labeled with either a field notebook number, or a

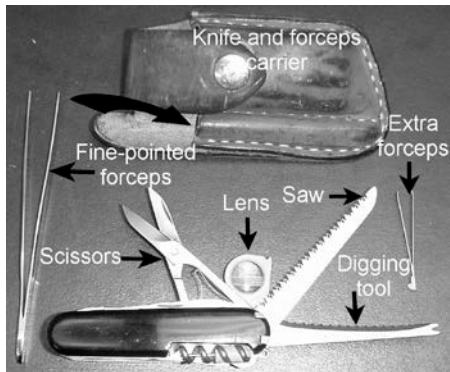


Fig. 2. Examples of forceps and knife used for field work. The forceps fit in the leather carrier, as indicated by the arrow.

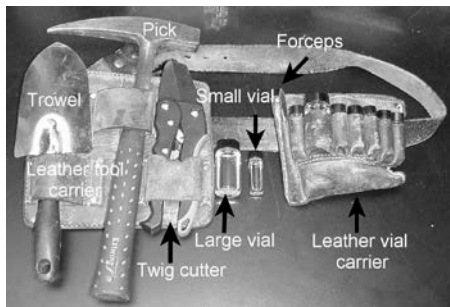


Fig. 4. Field tools for collecting ants.



Fig. 3. Two sizes of hand-made field bags.

find a rare species that is common in a certain area. We use trowels, picks and pruners, which we carry on a belt (Fig. 2). A leather pack with vials is carried on the same belt. All of our collecting equipment can be placed in a large, denim collecting bag (Fig. 4). An insect net can be useful for collecting flying sexuals during the day. A single swing of a net can result in abundant males and females from a single mating swarm. A pair that is mating should be preserved together in a single vial, and later pinned together on a single pin, with a biological note.

complete label that lists the location, date, name of collector, and brief field notes. We usually mix ants collected on the soil surface from a single locality in a single vial, and ants collected on vegetation in a second vial. Most ants can be identified to at least genus with a hand lens and practice. We use the Victorinox® Swiss Army knife, which contains the hand lens, the wood saw (capable of sawing large limbs) and the fishhook remover that is great for excavating nests with high precision and care. Additionally it has a variety of other tools that are very useful. Cheaper brands of the same knife work reasonably well.

Collecting ants in this way is a very pleasurable pastime, and can lead to many interesting discoveries. There are two methods that will maximize the numbers of species collected: collecting very intensely in a single location for several hours, or visiting several sites and collecting briefly at each site. Many ant species are localized in their distributions, and it is possible to

How many specimens should you collect? Generally 10 workers (various sizes if present) are sufficient for identification. You should always attempt to find winged females and males, although they are not always present in a nest. Avoid collecting the nest queen, as this will usually destroy the entire nest. Some species have several queens, and it will do little damage to collect a few. Collection of brood is not necessary, but you should note their presence in the nest. If you suspect you are collecting something unusual, collect as many specimens as you can find. Try to avoid killing an excessive number of animals, and repair the nest as well as possible after you have taken what you need.

Labels should be permanent, in the sense that they will not be affected by alcohol. Several pens are available with indelible ink, but it is important to test the pens, as some of the inks are not permanent. We use Ceramicron (Pentel©) pens. Several small labeling machines are available on the market, which make permanent labels. Again, check the label to be sure that it is permanent when placed in alcohol. Many computer printers will make decent, permanent labels, especially old dot matrix printers. Avoid LaserJet printers (the print tends to “flake off”) and most inkjet printers, as the ink slowly (or rapidly!) dissolves in alcohol. We have done a number of experiments with different printers, and have found the Lexmark© printers print permanent labels, when the Super Sharp Waterproof (#1361400) cartridge is used. In an emergency, a pencil will produce a decent, temporary label. The labels should be printed on high-quality heavy stock card, as regular paper may disintegrate in the alcohol.

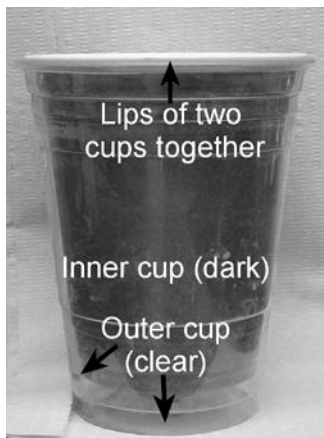


Fig. 5. Pitfall trap made of two plastic cups.

There are several, specialized techniques which can be used to collect ants, and often result in species of ants that are not collected using other techniques. For example, pitfall traps are very effective in collecting the rarer, soil inhabiting species. We use 2 sizes of plastic cups (Solo®), a 16-ounce and a 12-ounce. The 12-ounce cup is placed inside the 16-ounce cup, so that the lips of the cups match. The pair of cups is carefully buried in the ground up to the level of the cup. The inner cup

is then removed and the soil is dumped, this cup is then replaced in the larger cup and a small amount of alcohol, containing about 10% ethylene glycol (or regular anti-freeze) is placed in the cup. Often the alcohol will completely evaporate, but the ethylene glycol will keep the specimens in good shape. The amount of liquid to be used depends on the weather conditions: normally the cup is filled to about 1/8 of its capacity, in hot



Fig. 6. Examples of plastic bottles which can be reused for field work. The bottles used for refilling printer cartridges are excellent for injecting alcohol into twigs containing ants.

climates it may be necessary to fill the cup half full. The cups are then left in-place for a certain period of time, at least 24 hours. At the end of the time, the inner cup is carefully removed, and rinsed into a vial with the contents. Again the vial must be labeled as to the location and the placement of the cup on a transect. We have found that a transect of 10 cups, spaced 10 meters apart, is very effective. We usually place three transects in any one area.

There are a number of problems involved with pitfall traps. Some of the traps are often removed by mammals and destroyed. It is possible that these animals consume the contents of the cup, especially the ethylene glycol, which has a sweet taste (it is also poisonous to the animals). This disturbance can be avoided by reducing the quantity of ethylene glycol used in the cup. Humans will also occasionally destroy pitfall traps. The second major problem is that the ants in the bottom of the cup are contaminated by soil. Soil clouds the contents of the cup, and makes it difficult to sort the ants later. This contamination is greatly reduced by using the second cup as described above. The third problem is that the cup may fill and overflow during a rainstorm. This can be reduced by placing small blocks of wood supported by nails above the trap. Even with this precaution, surface water will enter the cup, diluting the alcohol, and contaminating the contents with soil. It is important to rinse the specimens and place them in fresh alcohol as soon as possible to remove the ethylene glycol, as well as to reestablish the original concentration of alcohol, if the samples were diluted by rain.

We usually place baits at the same stations with the pitfall traps. Our baits are made using 2 ml cryogenic vials (Corning© #25702), with 10 holes drilled in them (three sets of three along the sides, and a single

hole at the bottom). The holes along the sides allow entrance of ants, the single hole in the bottom allows the attachment of a string, which aids and retrieval of the baits. The diameters of the holes can be varied to exclude

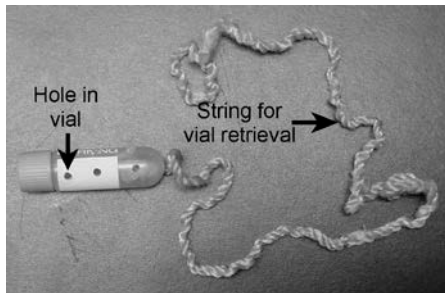


Fig. 7. Vial used for bait trap.

larger ants (for example, we use vials with holes > 1 mm for thief ants, most ants can enter a hole with a diameter of 2 mm). Almost anything can be used for bait, ranging from pieces of Vienna sausage, mealworms, or various mixtures of honey and oils. Normally we place one of these baits on the soil surface (at least one meter from the pitfall trap), the second bait is hung in the vegetation, using the string, and the third bait is buried in the soil at a depth of five to ten cm. These baits (at least the surface and vegetation baits) should be retrieved after about one-half hour, as the contents will be removed if they're left in the field for longer period of time. Normally we leave the subterranean bait in the soil for 24 hours. When the baits are retrieved, we simply carry a tray of scintillation vials (we use vials with the largest diameter openings, 2 cm, Wheaton© #986568), the bait tubes are picked up and if ants are present, they're rapidly placed in the vial containing alcohol and the lid is placed on the vial. The ants are able to enter and exit through the holes in the sides, and thus it is necessary to be nimble in

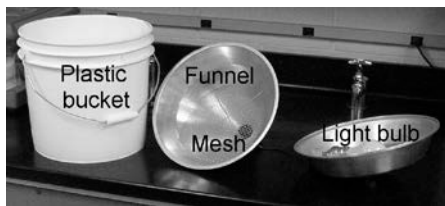


Fig. 8. Berlese funnel.

order not to loose valuable specimens. Later, we remove the ants in the traps, clean the traps, and use them again. It is important to check them very carefully before reusing them, as ants occasionally get stuck on the string, or in the side holes.

Other miscellaneous techniques are very effective in collecting ants. In mesic habitats, samples of litter can be collected in a cloth bag. The samples should be sieved (mesh of about 1 cm), to remove the larger pieces of organic matter. The samples are then placed in a Berlese funnel, of two general types. The first type consists of a bucket containing a fine mesh, under which is a funnel, and a vial. A vial of alcohol is placed in the bottom of the bucket, the funnel is located above the vial, and litter is

scattered on the mesh. The lid is then placed on the Berlese funnel, and the attached light is turned on for period of several hours to 3 days. The heat from the bulb causes the ants (and other creatures) to migrate downward, and fall in the vial. These traps are very bulky, and difficult to use due to the travel that is usually involved in collecting the samples. If the habitat to be sampled is not far from the home or the laboratory, the samples can be collected in cloth bags, returned to and extracted at the facility. If extensive travel is required, the second, portable type of trap may be used in the field. This type consists of a cloth bag, from which can be hung in a tree or motel room (available from BioQuip® Products, 17803 La Salle Avenue, Gardena, CA 90248-3602). A similar type of mesh is constructed inside the bag, again the sample is scattered on this mesh. If electricity is available, a light bulb may be used as in the previous type of trap. If electricity is not available, this trap can be hung in the sun, or small heat packs (available at sporting goods stores) may be placed on top of the litter.

Most reproductive ants, or sexuals, are active at night. This is especially true of the fascinating group of army ants. These reproductives can be collected in large numbers using a black light trap (available from BioQuip). This trap consists of a bucket, with a funnel, under which is

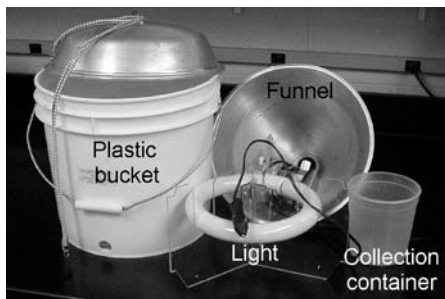


Fig. 9. black light trap.

located a jar of alcohol. An ultraviolet light is located above the funnel. These traps can be connected to a cigarette lighter of a vehicle. The sexuals are attracted to the ultraviolet light, fall onto the funnel, and tumbled into the jar under the funnel. It is best to place these traps on a white, portable table, located in the few meters from the vehicle.

You can then assemble the light just before dusk, plug it in, and relax in the vehicle while the trap does the work. It is always interesting to visit the trap at regular intervals, to see what sorts of creatures you're collecting, and to capture any of the ants that have not made into the jar. It is important to plug your ears with cotton, to avoid the unpleasant experience of having an insect exploring the inside of your ear! Different species of ants are active at different times of the night, but in general most of the interesting creatures will be collected by midnight. The trap can be placed in the vehicle, or in the trunk, and disassembled the next day. The contents

of the jar can be placed in a larger container, or simply dumped into a leak-proof plastic bag. Additional alcohol may need to be added. On humid, warm summer nights, is possible to collect a liter or more of insects, so it is often necessary to place a fairly large container under the funnel, or change the contents often. Later the material in the jar can be sorted at home or in the laboratory during the winter months, when ant activity is low. Be sure to share your samples, as well as litter samples, with other entomologists, that are interested in other groups of insects. You may develop a network of individuals that exchanges samples, and you may be able to obtain specimens from localities that would be impossible for you to visit.

Once you have collected specimens, what do you do next? You will need access to a dissection microscope to identify the ants to species. You may be able to use a microscope at a local school or university, or may purchase your own. Some myrmecologists simply leave the ants in alcohol. Specimens can be identified in alcohol, or you can remove them from the alcohol, allow the surface alcohol to evaporate, and identify them while holding them with forceps. This method involves 2 problems: you have to maintain the levels of the alcohol in the vials, and it is usually difficult or impossible to put the ant in the right position for identification. The first problem can be reduced by placing the individual vials in a larger jar, and maintaining the level of the alcohol in the jar. The second problem is difficult to avoid. Thus most myrmecologists use another method for preparing their specimens for identification: mounting them on an insect pin.

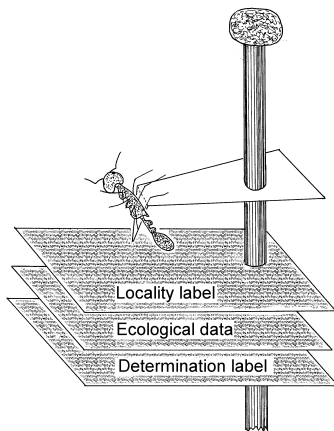


Fig. 10. Ant mounted on a card triangle and insect pin.

Most ants are too small to allow the insertion of an insect pin. Thus a number of techniques have been developed to mount an ant indirectly to the pin. Each researcher has her favorite technique, and considers anyone who uses a different technique to be unenlightened, to say the least! We will provide details on the technique we consider to be the best, and most commonly used by other entomologists. The specimen is actually glued to a small triangle,

which is mounted to the pin. These small triangles can be cut from stock card, or can be punched using a point punch, which rapidly punches perfect triangles from the card stock. The triangle is then mounted on an insect pin, the end of the triangle is bend downwards at a 90° angle. This bent portion is then glued to the right side of the ant, as is shown in Fig. 1. We use water soluble, white glue, thus allowing the specimen to be unmounted at a later time, by simply soaking the specimen and triangle in water or 70% ethanol. More than one specimen can be mounted on a single pin (each on a separate triangle), such as a major, minor, female and male, all from the same nest, all mounted on a single pin. Larger specimens should be mounted on two triangles, one supporting the mesosoma, the second supporting the gaster.

The locality label is mounted below the specimen, ecological data on another label, and finely the determination label (name of the species) on a third label. These labels can be easily prepared using a computer and a high quality printer that will accept heavy cardstock. Your labels can be

NEW MEXICO, Los
Alamos Co., Los Alamos
10-v-2000
W. & E. Mackay # 16345

Low mound of pebbles.
Foraging at 10AM
Reproductives and brood
in nest. # 16345

Pogonomyrmex
occidentalis (Cresson)
det. W. Mackay 2000

printed using a size 4 or 5 font,
and would look like these
(usually without the borders).

Note that the locality label lists the state (the country may be necessary), county, followed by the specific locality, then the date (note we use v instead of 5, as 10-5 could be May 10 or October 5), and finely the collectors name and field number. The field number corresponds to a number in the field notes or notebook, where more extensive data would be kept. You may want to add the latitude and longitude, if you have a GPS. This is especially useful if you are collecting in the middle of nowhere. The second label would have a summary of the ecological information, the third label would have the identification of the specimen. Each pin would have at least the locality label, and one of the pins in the series would have all 3 labels.

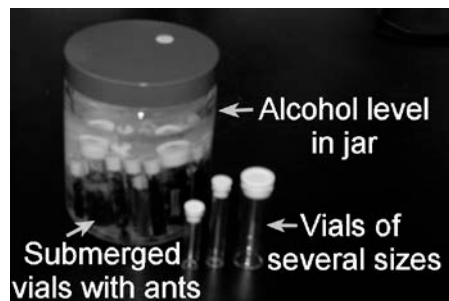


Fig. 11. Vials containing specimens, which are stored in a larger jar.

How should you store these dried specimens? They have to be well protected, as they can be destroyed by dermestid beetles, or other similar museum pests. They should be stored in an airtight box or drawer that contains mothballs. Be careful as a loose mothball can wipe out a lot of your collection! If you

are really serious about your ant collection, store it in a cabinet of glass topped drawers, with the specimens placed in pinning trays. These can be easily moved around each time that you need to reorganize your collection. You can pack the bottom with mothballs, and not have to worry about dermestids for several years. Each drawer should have a pinning tray full of mothballs. The excess specimens can be stored in alcohol in small vials, which are placed in jars filled with alcohol (Fig.).

Ants make wonderful pets! They are easy to find, easy to collect, and relatively easy to care for. Several products are available in toy stores, in which your ants may be kept and observed. Ants can also be kept in an aquarium. It is usually necessary to line the upper edge of the aquarium, in order to prevent the ants from escaping. Several products can be used, including baby powder, Vaseline, or a product called Fluon® AD-1 (which is available from Northern Products Inc., P. O. Box 1175, Woonsocket, RI 02895). Fluon is the most effective material; it can be painted on the sides of a container, and later dries to wax-like material that the ants cannot climb. Unfortunately it is expensive, but a small amount will protect several containers. You may want to construct an elaborate system of chambers and tubes for your ants. The actual nest may be made of Petri-plates (or similar containers), partially filled with Plaster of Paris, or dental stone, and kept moist with frequent applications of water. Just remember that the more elaborate your setup, the more likely an escape will occur.

Queens of some species can be collected with a little effort. It is common to turn over a stone, or peel a piece of bark from a log, and see the nest queen right on the surface. This is especially common in the morning when the stone or other material is just beginning to warm. Later in the day you may not even see workers under similar stones. You must have everything ready, or she will escape while you fumble for your equipment. Queens of many species of harvester ants (*Pogonomyrmex*) are near the surface in the spring when the soil temperatures first increase. Occasionally they are in the first shovelful sp.? of soil. Other genera as *Monomorium* and *Solenopsis* contain multiple queens, and it is easy to get several. In many cases it is simply a virgin female reproductive, which has dropped its wings during the excavation process. Place these individuals in a small container, together with workers from the same nest. After about an hour, workers will have gathered around the female, if she really is a queen. Otherwise they will treat this individual as if it were another worker. You may be tempted to trade queens with others, but please do

not move them far from the location where they were collected. It is illegal to ship queens without a permit, and you could be fined or arrested, or even worse, spread a pest species by accident.

Once you have started your ant colony, you must provide them with a constant source of water. The best technique involves using a test tube (or other small glass or plastic container) full of water, with a ball of cotton in the open end. This container can be left on its side, and will maintain moisture in the cotton, where the ants can come to drink. It is also necessary to dampen the nest or the soil that is in the aquarium. It may be difficult to determine the food source of your ants. We have tried to indicate the food sources of ants throughout this book, but many times the food source of individual species is unknown, or there may be geographical or seasonal variation in the preferred food. Thus it may be necessary to provide your ants with a small cafeteria, containing several different foods, until you discover what they like.

Pet ants will provide you with many rewards. They do not eat much, are quiet and are fascinating to watch. If you obtain a queen, your nest may be with you for several years. More than one species of ants are often found nesting together. Sometimes these involve enslavement, occasionally one of the species is a thief on the contents of the nest of a second species, and often they probably simply tolerate each other. It is interesting to study the interactions of such mixed species nests in home colonies, and you may be able to discover an interaction that is completely unknown!

The remainder of the book includes keys to the genera and species. You will find ant identification to be difficult at first, at least until you learn the vocabulary. Once you begin to learn the genera, you will consider them to be old friends when you see them again. It will be especially exciting when you see them alive in the field or in the nest in your home. As you gain experience with the genera, begin tackling the keys to species. Start out with genera that only have a few species in New Mexico, are common and are relatively easy to identify, such as *Liometopum*, *Solenopsis* (larger species) or *Pogonomyrmex*. Some of the genera, such as *Camponotus* and *Formica* are extremely difficult, wait until you have some experience before tackling them.

A large mass of important information on ants is available on the Internet, and is updated regularly. General information on ants can be found at <http://www.myrmecology.org>, <http://www.antcolony.org>, <http://www.angelfire.com/hi/redant/index.html>, <http://members.xoom>.

<http://members.aol.com/dinarda/ant/index.htm>. The major website for social insects is maintained by Dr. Donat Agosti and is available at http://research.amnh.org/entomology/social_insects/. Information on introduced ants could be found at <http://www.acusd.edu/~tmcglynn/exotic.htm>. Dr John Longino maintains a site for keys to the ants of Costa Rica at http://www.evergreen.edu/user/serv_res/research/arthropod/AntsofCostaR. Help with the identification of North American ants to species can be found at <http://www.utep.edu/leb/antgenera.htm>. The International Union for the Study of Social Insects can be accessed at <http://www.birkhauser.ch>. A website on army ants can be found at http://geocities.com/entomology_ants. Bibliographic references on ants can be obtained from <http://www.public.iastate.edu/~entomology/FORMIS>. [change this one]

Web pages on pest ants and ant control would include <http://www.ianr.ini.edu/ianr/lanco/enviro/pest/factsheet>. Fossil ants can be purchased from <http://www.americawest.com>, it is worth it to visit the site to look at the nice, colored pictures of fossil ants.

We have avoided most of the systematic details, mentioning only synonyms (species known by more than one name) that may be confusing. Check with Bolton (1995) for all of the details on the synonyms of ants.

Key to the Genera of Ants of New Mexico

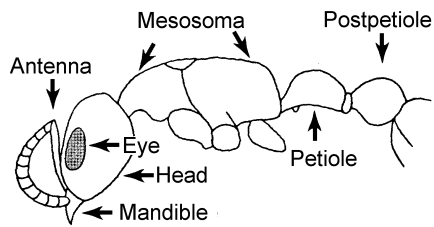


Fig. 12. Lateral view of a worker of *Pseudomyrmex apache*.

2(1). Frontal carinae (singular carina) positioned close to each other and do not cover insertions of antennae, which are located near base of mandibles (Fig. 14) **3**

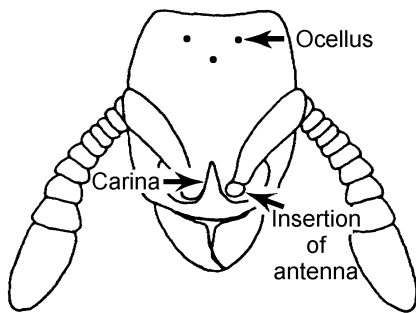


Fig. 14. Head of a *Cerapachys agustae* worker showing the exposed insertions of the antennae (where they connect to head).

3(2). Eyes very large, covering large portion of head (Fig. 16); 3 ocelli usually present; body long, slender (Fig. 12) (Subfamily Pseudomyrmecinae). *Pseudomyrmex* - Eyes absent or extremely small (Fig. 17) (Subfamily Ecitoninae) *Neivamyrmex*

1. Petiole and postpetiole present (Fig. 12) **2**
- Petiole present, but postpetiole not well separated from remainder of gaster (Fig. 13) **4**

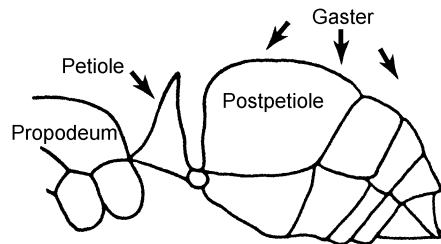


Fig. 13. Lateral view of the propodeum, petiole and gaster of a worker of *Odontomachus clarus*.

- Frontal carinae not positioned near each other and with lobes which partially or completely cover insertions of antennae (Fig. 15) (Subfamily Myrmicinae) . **11**

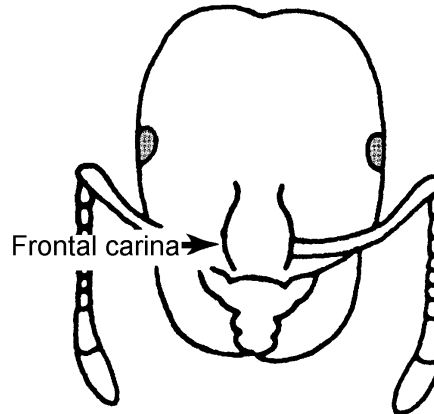


Fig. 15. Head of a *Solenopsis xyloni* worker, showing the insertions of the antennae covered by the frontal carina.

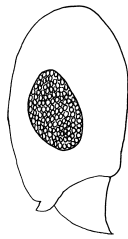


Fig. 17. Head of a worker *Pseudomyrmex apache*, showing the large eye.

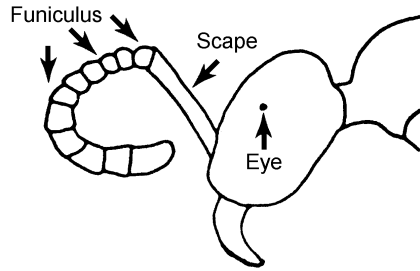


Fig. 16. Head of a worker of *Neivamyrmex harrisi*, showing the tiny eye.

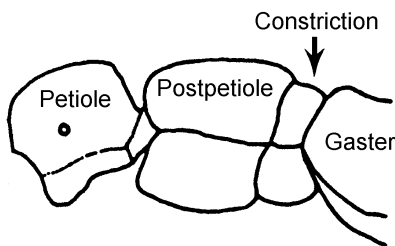


Fig. 18. Lateral view of *Cerapachys augustae* worker showing the petiole, postpetiole, and gaster, as well as the constriction between the postpetiole and gaster.

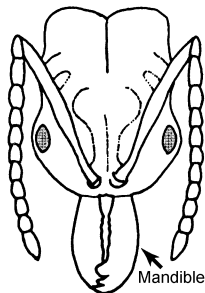


Fig. 19. Full face view of head of a worker of *Odontomachus clarus*.

(Fig. 14) gaster with well-developed constriction between first 2 terga (Fig. 18) 6

6(5). Antennae with 11 segments, last one forming club whose length is approximately as long as preceding 4 segments (Fig. 14); 3 ocelli present; rarely collected *Cerapachys*

4(1). Constriction present between postpetiole and remainder of gaster (Fig. 18); or mandibles very long with 3 teeth at apex (Fig. 19); integument hard; sting well developed; not commonly collected

..... 5

- No (or slight) constriction between postpetiole and remainder of gaster (Fig. 13); mandibles never elongate; integument soft; sting absent or rudimentary; very common ants 10

5(4). Mandibles elongate (Fig. 19) with 3 teeth at apex; antennae with 12 segments (Fig. 19); petiole sharply pointed above (Fig. 13); gaster with very weak constriction between first 2 terga (upper 1/2 of gastral segments - Fig. 13)

..... *Odontomachus*

- Mandibles not elongated

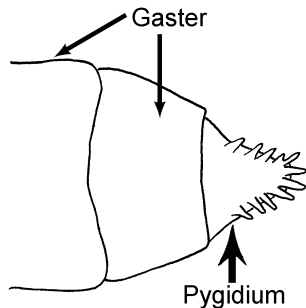


Fig. 20. Pygidium of a worker of *Acanthostichus punctiscapus*, as seen from above.

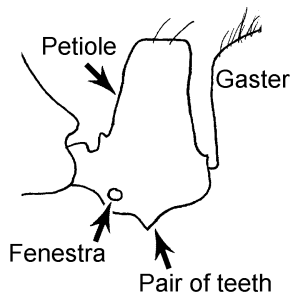


Fig. 21. Petiole of a worker of *Ponera pennsylvanica*, showing the fenestra and the paired teeth on the ventral surface of the petiole.

- Antennae with 12 segments (Fig. 19), the last one not forming a club; ocelli usually absent 7

7(6). Eyes absent or extremely small; pygidium (dorsum of last segment of gaster) bordered laterally by small spines (Fig. 20)

***Acanthostichus punctiscapus* Mackay**

- Eyes normally present and often large; pygidium not bordered laterally by small spines 8

8(7). Subpetiolar process with blunted, angled anteroventral corner and 2 distinctly angular posteroventral acute teeth, situated side by side (Fig. 21); anteriorly the subpetiolar process has circular or oval "thin spot" or fenestra, visible in transmitted light (Fig. 21)

***Ponera pennsylvanica* Buckley**

- Subpetiolar process simple lobe, never with fenestra or paired posterolateral teeth 9

9(8). Anterior border of clypeus with teeth; mandibles large with numerous irregular teeth (Fig. 12)

..... ***Amblyopone pallipes* (Haldeman)**

- Anterior border of clypeus without teeth; mandible small (Fig. 13) ***Hypoconera***

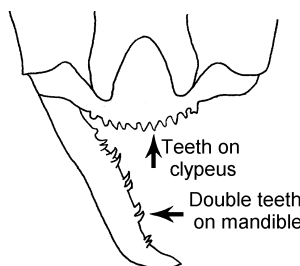


Fig. 22. Clypeus and mandible of a worker of *Amblyopone pallipes*.

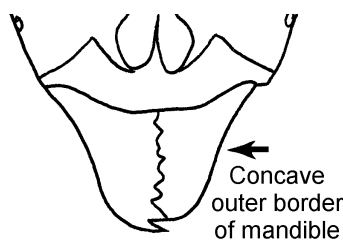


Fig. 23. Clypeus and mandibles of a worker of *Hypoconera inexorata*.

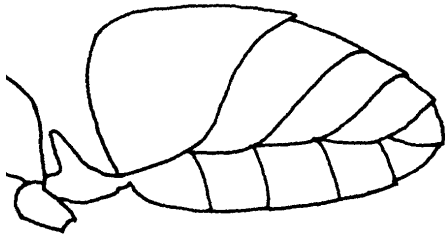


Fig. 27. Gaster of worker of *Liometopum apiculatum*, showing a lack of the acidopore.

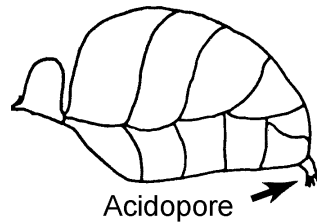


Fig. 26. Gaster of a worker of *Myrmecosyctus depilis*, showing the acidopore.

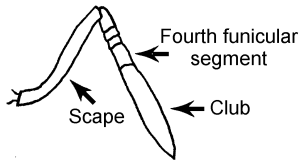


Fig. 26. Antenna of a worker of *Strumigenys*.

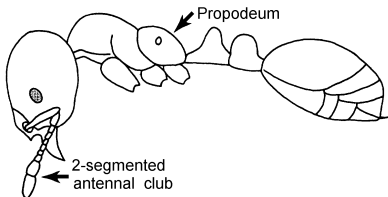


Fig. 27. Side view of a worker of *Solenopsis xyloni*, showing the 10 segmented antenna with 2 segmented club and the propodeum without spines.

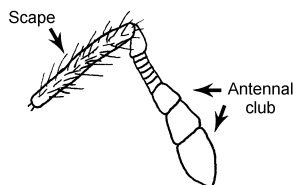


Fig. 28. Antenna of a worker of *Tranopelta* sp.

- 10(4).** Acidopore absent, no ring of hairs at apex of gaster (Fig. 24) (Subfamily Dolichoderinae) **33**
- Acidopore at apex of gaster round and usually surrounded by ring of hairs (Fig. 25) (Subfamily Formicinae) **37**
- 11(2).** Antennae with 6 segments (Fig. 26); unknown from New Mexico.....
- *Strumigenys louisianae* Roger
- Antennae with more than 6 segments **12**
- 12(11).**Antennae with 10 segments, last 2 forming club (Fig. 27); propodeum without spines (Fig. 27); either dimorphic species or very small monomorphic species *Solenopsis*
- Antennae with 11 or 12 segments, if only 10 segments present, antennal club formed from last 3 segments (Fig. 28) **12**
- 13(12).**Antenna consisting of 10 or 11 segments (Fig. 28) **14**
- Antenna consisting of 12 segments **21**
- 14(13).**Propodeum without spines (Fig. 27); antenna with 3 segmented club (Fig. 28); mesosoma mostly smooth and shining *Tranopelta*

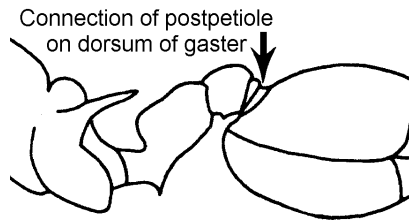


Fig. 29. Propodeum, petiole, postpetiole and gaster of a worker of *C. larreae*.

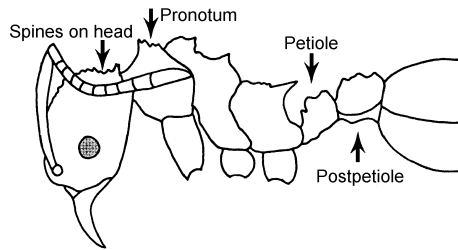


Fig. 31. Side of body of a worker of *Trachymyrmex smithi*.

- Pronotum without spines or bumps20
17(16).Frontal carina extends to posterior border of head (Figs. 32); dark red or grayish black ants; monomorphic **18**

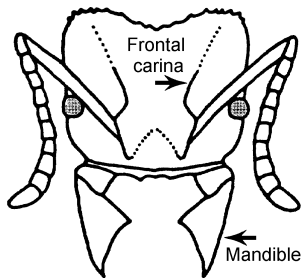


Fig. 32. Head of a worker of *Trachymyrmex smithi*, showing the frontal carina.

- Propodeum with spines or teeth (Fig. 29); antenna with or without 3 segmented club; mesosoma not smooth and shining **15**

15(14).Postpetiole connected to upper surface of gaster (Fig. 29); gaster, when seen from above, heart shaped with pointed apex; pronotum without spines or bumps
 **Crematogaster**

- Postpetiole not connected to upper surface of gaster (Fig. 30); gaster not heart shaped**16**

16(15).Pronotum with spines or bumps (Figs. 30 & 31).....**17**

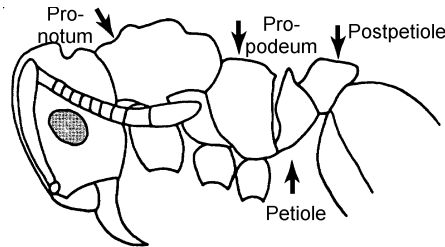


Fig. 30. Side of body of a worker of *Cyphomyrmex wheeleri*.

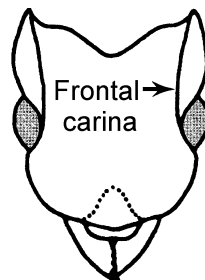


Fig. 33. Head of a worker of *Cyphomyrmex wheeleri*, showing frontal carina.

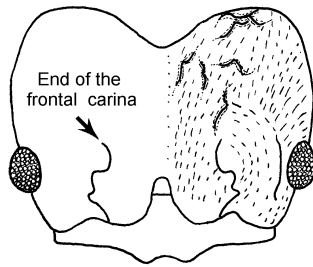


Fig. 34. Head of a worker of *Acromyrmex versicolor*, indicating the end of the frontal carina.

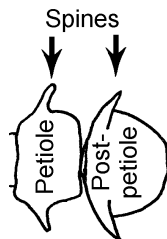


Fig. 35. Petiole and postpetiole of a minor worker of *Cephalotes rohweri*, as seen from above.

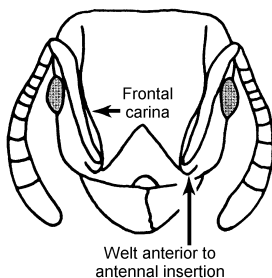


Fig. 36. Head of *Tetramorium spinosus* worker, showing the welt anterior to insertion of antenna and the frontal carina.

- Clypeus not forming welt; frontal carinae do not extend to posterior border of head *Leptothorax*

- Frontal carina does not extend more than $\frac{1}{2}$ distance from posterior border of clypeus to posterior border of head (Fig. 34); polymorphic red ants (2 - 6 mm) *Acromyrmex versicolor* Pergande) **18(17)**. Petiole and postpetiole with lateral spines (seen from above, Fig. 34) *Cephalotes rohweri* Wheeler
- Petiole and postpetiole without lateral spines **19 19(18)**. Dorsum of mesosoma with distinct pointed spines (Fig. 30); greater than 3 mm in total length *Trachymyrmex*
- Dorsum of mesosoma with bumps (Fig. 31); less than 3 mm in total length *Cyphomyrmex* **20(16)**. Clypeus elevated and forming welt (sharp-edged carina) in front of antennal insertions (Fig. 35); frontal carinae extend to posterior border of head and form scrobes to receive antennae (Fig. 23) *Tetramorium* (in part)

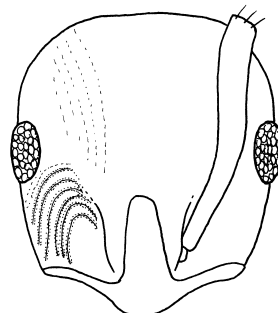


Fig. 37. Head of a worker of *Leptothorax cockendolphi* showing a lack of a welt anterior to the insertion of the antenna (from Mackay, 2000).

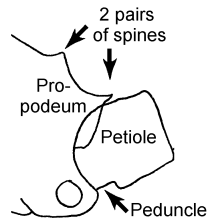


Fig. 38. Side view of the propodeum and petiole of a worker of *Myrmecina americana*.

forming welt in front of antennal insertions (Fig. 36)

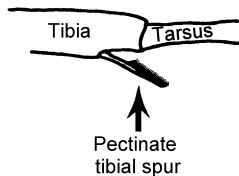


Fig. 39. Pectinate midial tibial spur of a worker of *Pogonomyrmex rugosus*.

24(23).Constriction between mesonotum and propodeum absent, propodeum often with spines, psammophore (long curved hairs on underside of head) usually present (Fig. 40); common in arid ecosystems ***Pogonomyrmex***

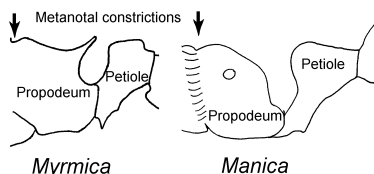


Fig. 41. Propodeal spines of a worker of *Myrmica lobifrons* and *Manica invidia*, showing the presence and absence of propodeal spines.

or teeth (Fig. 41, right), although blunt protuberances may be present ***Manica invidia* Bolton**

21(13).Propodeum with 2 pairs of spines (Fig. 38); petiole with short peduncle; legs short with thickened femora and tibiae; rarely collected

..... ***Myrmecina americana* Emery**
- Without all of these characteristics; commonly collected **22**

22(21).Clypeus elevated and forming welt in front of antennal insertions (Fig. 36) ***Tetramorium***

- Clypeus not elevated in form of welt **23**

23(22).Middle and hind tibial spurs pectinate (Fig. 39). **24**

- Middle and hind tibial spurs not pectinate **26**

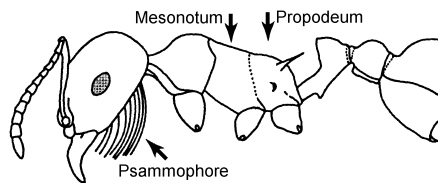


Fig. 40. Side view of a worker of *Pogonomyrmex rugosus* showing the mesonotum, propodeum and psammophore.

- Constriction present and distinct between mesonotum and propodeum (Fig. 41), which usually has spines (absent in *Manica*); psammophore absent; most common in pine forests and mountainous areas **25**

25(24). Propodeum with spines or teeth (Fig 41, left) ***Myrmica***

- Propodeum without spines ***Manica invidia* Bolton**

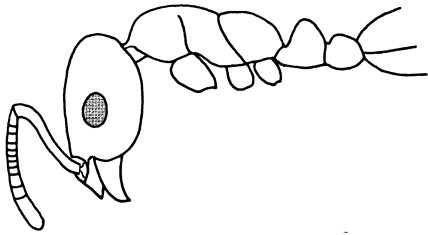


Fig. 43. Mesosoma of a worker of *Monomorium cyaneum*.

26(23). Propodeum without spines (Fig. 42); antennal club composed of 3 segments (Fig. 43); usually small, shiny, black ants ***Monomorium***

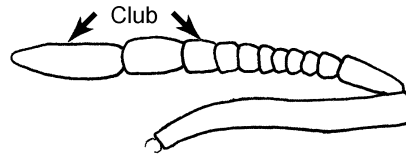


Fig. 42. Antenna of a worker of *Monomorium cyaneum*

- Propodeum with spines, or if not, ants not small, shiny and black; antennal club configuration varies **27**

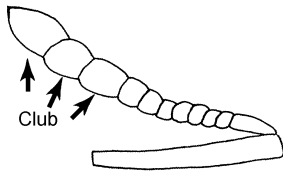


Fig. 44. Antenna of a worker of *Leptothorax* sp., showing a 3-segmented antennal club (from Mackay, 2000).

27(26). Antennal club composed of 3 segments (Figs. 44, 1 rare species with 4-segmented club) **28**

- Antenna without club or with club containing more than 3 segments **32**

28(27). Workers dimorphic or polymorphic; major with head larger than gaster (Fig. 46); petiole with long peduncle; scape of antenna of minor often extends past occipital border of head (Fig. 46); mandible with 2 well defined teeth at apex (Fig. 46); very common ants ***Pheidole***

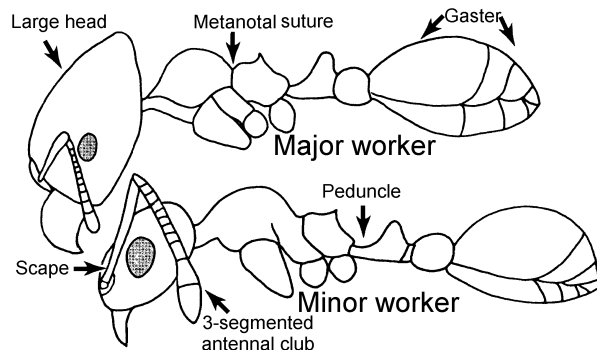


Fig. 45. Major and minor workers of *Pheidole tucsonica*.

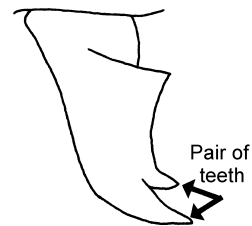


Fig. 46. Right mandible of a intermediate major worker of *Ph. obtusospinosa*.

- Monomorphic species; scape does not extend past occipital border of head (Fig. 48) 29

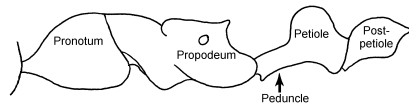


Fig. 47. Mesosoma, petiole and postpetiole of a worker of *Cardiocondyla ectopia*.

- 29(28). Peduncle of petiole about as long as height of petiolar node (Fig. 47); mesosoma moderately to strongly arched; promesonotal and metanotal suture often faintly indicated or absent; extremely rare, in arid and semiarid regions 30

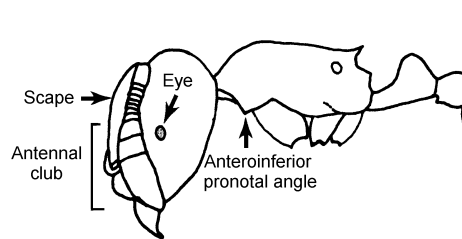


Fig. 48. Side view of worker of *Rogeria foreli*.

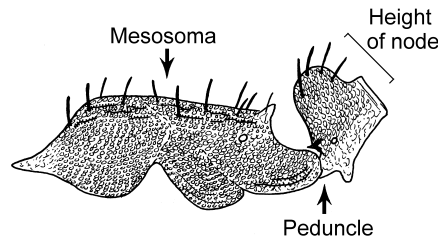


Fig. 49. Mesosoma and petiole of a worker of *Leptothorax emmae*

- Peduncle generally much shorter than height of node of petiole (Fig. 49); mesosoma usually with flat dorsum (Fig. 49); common, especially in pine forests, but occurring in all habitats *Leptothorax* 30(29). Eyes with fewer than 50 ommatidia (Fig. 48); antennal club longer than remainder of funiculus; anteroinferior pronotal angle present (Fig. 48) *Rogeria*
- Eyes with more than 50 ommatidia (Fig. 50); antennal club shorter than remainder of funiculus 31
- 31(30). Clypeus strongly projecting (Fig. 50) above mandibles (with head seen from side, Fig. 50) *Cardiocondyla ectopia*

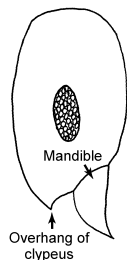


Fig. 51. Clypeus of a worker of *Cardiocondyla ectopia*, as seen from the side.

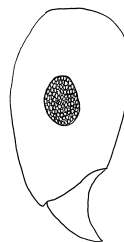


Fig. 50. Clypeus of a worker of *Leptothorax pergandei* as seen from the side.

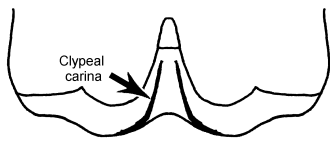


Fig. 52. Pair of carinae of the clypeus of a worker of *Stenamma occidentale*.

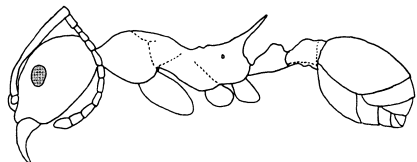


Fig. 54. Mesosoma of a worker of *Aphaenogaster cockerelli*.

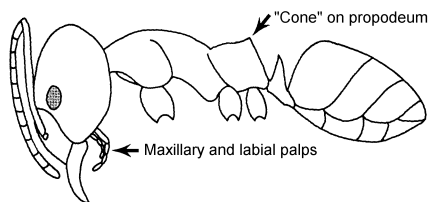


Fig. 53. Side view of a worker of *Dorymyrmex insanus*, showing the cone-like structure on the propodeum and the palps.

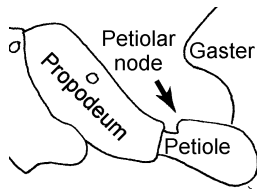


Fig. 55. Petiole of a worker of *Tapinoma sessile*.

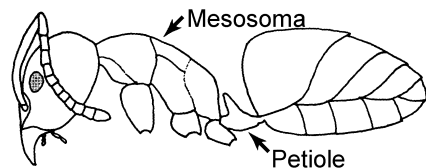


Fig. 56. Side view of a worker of *Liometopum apiculatum*.

Snelling

- Clypeus not strongly projecting above mandibles (Fig. 51)

..... *Leptothorax pergandei* Emery 32(27). Clypeus usually with pair of longitudinal carinae (Fig. 52); mesosoma thickened with little constriction between mesonotum and propodeum; rarely collected ants

..... *Stenamma*

- Clypeus without carinae or with more than 1 pair; mesosoma very slender (Fig. 53); common ants in numerous habitats

..... *Aphaenogaster*

33(10). Propodeum in form of cone (54); maxillary palps very long (Fig. 54) *Dorymyrmex*

- Propodeum never in form of cone 34

34(33). Node of petiole poorly developed (Fig. 55); monomorphic black ants, widely distributed in mesic areas of state

..... *Tapinoma sessile* (Say)

- Node of petiole obvious, although it may be small (Fig. 56); common ants 35

35(34). Workers polymorphic; mesosoma in profile without impression before posterior edge of propodeum (Fig. 56); ocelli present at least in larger workers; gaster with gray pubescence; nests usually in oak trees or under stones in mountainous areas *Liometopum*

- Workers monomorphic; ocelli absent; nesting in soil 36

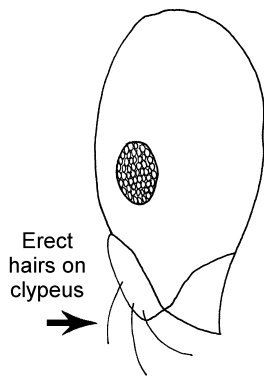


Fig. 58. Side view of the head of a worker of *Forelius pruinosus*, showing the long, erect hairs on the clypeus.

- Erect hairs on clypeus short, not extending to near tips of mandibles (Fig. 57); pronotum without long, erect hairs; occurring mostly in mesic and urban areas *Linepithema humile* (Mayr)

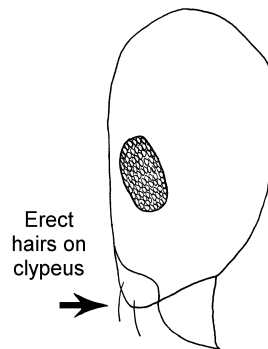


Fig. 57. Side view of the head of a worker of *Linepithema humile*, showing the short, erect hairs on the clypeus.

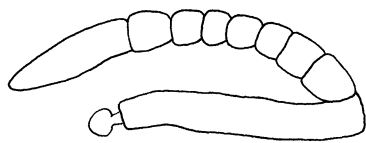


Fig. 60. Antenna of a worker of *Brachymyrmex depilis*.

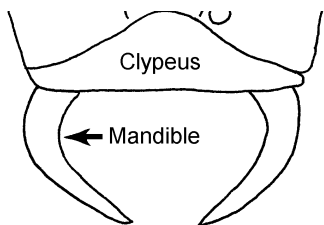


Fig. 59. Mandibles of a worker of *Polyergus breviceps*.

36(35). Erect hairs on clypeus long, extending to near tips of mandibles, when mandibles are shut (Fig. 57); pronotum with at least 1 pair of long, erect hairs (may be missing in some specimens in nest series); most common in desert regions (also common in urban areas) ... *Forelius*

37(10). Antenna with 9 segments (Fig. 59); small, light colored, inconspicuous ants, not commonly collected

..... *Brachymyrmex depilis* Emery

- Antenna with more than 9 segments; common ants

38(37). Mandibles long, sickle shaped (Fig. 60); red ants, not commonly collected

Polyergus
- Mandibles not long and sickle shaped, common ants

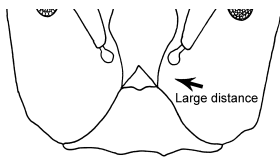


Fig. 62. Anterior portion of the head of a major of *Camponotus herculeanus*, showing the large distance between the insertions of the antennae and the posterior edge of the clypeus.

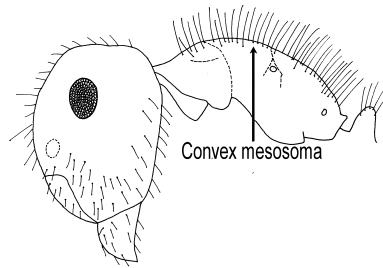


Fig. 61. Mesosoma of a major of *Camponotus mina*, showing the convex outline.

39(38). Insertions of antennae located far from posterior border of clypeus (Fig. 61); mesosoma convex (except for *C. hyatti*) in profile (Fig. 62)

..... **Camponotus**

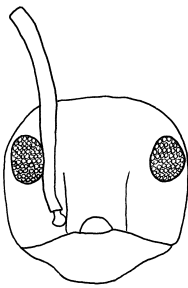


Fig. 63. Head of a worker of *Prenolepis imparis*.

- Insertions of antennae located near posterior border of clypeus (Fig. 63); mesosoma not convex in profile (Fig. 56) **40**

40(39). Maxillary palps very long, segment 4 as long as segments 5 and 6 combined (Fig. 64); psammophore present **Myrmecocystus**

- Maxillary palps shorter, segment 4 not unusually long; psammophore absent **41**

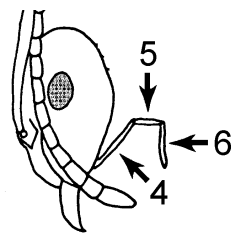


Fig. 64. Head of a worker of *Myrmecocystus depilis*, showing the last 3 segments of the maxillary palp.

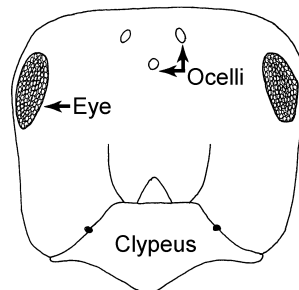


Fig. 65. Head of a worker of *Formica obscuripes*.

41(40). Frontal carinae prominent, lateral margins slightly reflected upward; ocelli often very distinct (Fig. 65); mostly large, polymorphic ants

..... ***Formica***

- Frontal carinae poorly marked, lateral margins flat; ocelli indistinct or absent; smaller monomorphic ants

..... **42**

42(41). Antennal scapes surpassing occipital margin by at least $\frac{1}{3}$ their length (Fig. 66), often much longer; erect hairs coarse, long and usually black in color and are especially noticeable on dorsum of pronotum (Fig. 66) **43**

- Antennal scapes not surpassing occipital margin, or at least not by amount greater than length of first funicular joint; erect hairs not coarse, are short and golden **44**

43(42). Mesosoma (seen from above) with mesonotum strongly compressed or narrowed (Fig. 67), swollen in front and behind constriction; scapes and tibiae without erect hairs; most or all of eye posterior to middle of head (Fig. 63) ***Prenolepis imparis* (Say)**

- Mesosoma (from above) only slightly constricted at mesothorax; scapes and tibiae usually with erect hairs; most or all of eyes at or anterior to middle of head ***Paratrechina***

44(42). Maxillary palps short and composed of 3 segments (Fig. 68), difficult to see ***Acanthomyops***

- Maxillary palps longer and composed of 6 segments, very obvious (Fig. 69) ***Lasius***

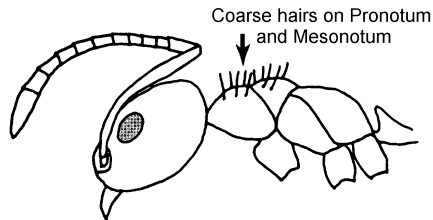


Fig. 67. Side view of a worker of *Paratrechina terricola*.

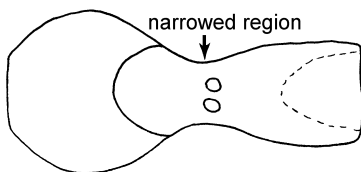


Fig. 66. Top of the mesosoma of a worker of *Prenolepis imparis* showing the strong constriction.



Fig. 68. Maxillary palp of a worker of *Acanthomyops* sp.

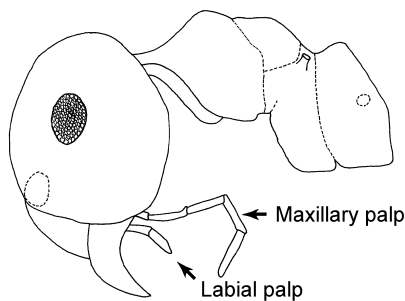


Fig. 69. Head and mesosoma of a worker of *Lasius pallitarsis*, showing the maxillary and labial palps.

SUBFAMILY PONERINAE

Ants of this subfamily are rarely collected in New Mexico (Cole, 1953a). Most species nest under stones or in the soil. All of the workers have well-developed stings and some can deliver a painful sting. Most are thought to be predators, but relatively little is known of their natural history. These ants can be distinguished from those of other subfamilies using the following characteristics: petiole developed, postpetiole fused with gaster and usually not very differentiated from it; sting well developed; pygidium never surrounded by teeth; integument hard and sclerotized. Workers of this subfamily can be separated from those of Cerapachyinae by the lack of teeth on the pygidium, and from Ecitoninae by the large, well-developed eyes, and from Formicinae and Dolichoderinae by the hard integument and the sting. It is easily separated from the Myrmicinae and Pseudomyrmecinae as both of these have a well-developed postpetiole. These characteristics would usually separate the females from those of the other subfamilies. Males are difficult to separate from those of many of the above mentioned subfamilies. Refer to Smith (1943) if identification of males is necessary.

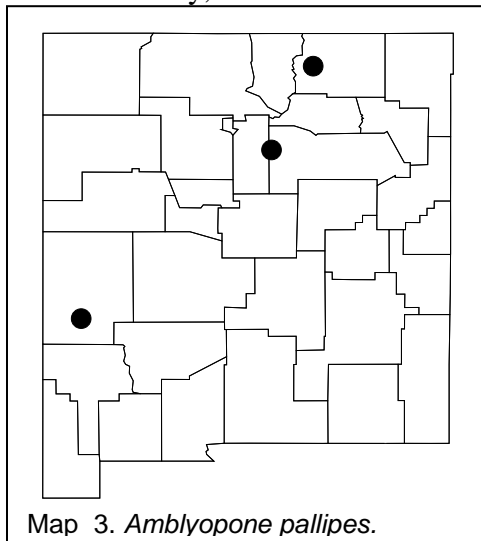
Genus *Amblyopone*

(Key: Lattke, 1991)

Only one species of this genus occurs in New Mexico. The genus can be recognized in having numerous teeth on the anterior border of the clypeus and the mandibles are covered with individual pairs of well-developed teeth (Fig.). The antenna has 12 segments and the scape reaches about half way to the posterior edge of the head. The eyes are very small. They are large ants (4 - 7 mm total length). The form of the mandibles and the large size separate them from all others in the subfamily.

Amblyopone pallipes (Haldeman)

Discussion. This is a very easily recognizable species as it is the only one in New Mexico that has denticles on the anterior border of the clypeus and the pairs of teeth on the mandible.

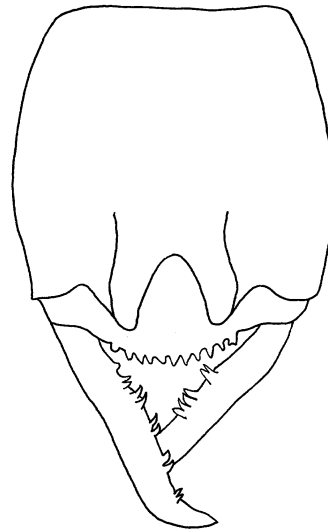

Map 3. *Amblyopone pallipes*.

Distribution. USA: eastern North America (Ontario south to Florida) west to OK, CO, TX, AZ; NM: **Catron Co.**, Snow Lake, **Colfax Co.**, Cimarron (Cole, 1953), **San Miguel Co.**, Beulah.

Habitat. Pine forests or deciduous canyon forests.

Biology. This species nests under stones in moist areas. Colonies apparently consist of only a few workers. They prey primarily on Chilopods. These secretive ants are rarely collected, but well worth the search. Their behavior is very non ant-like, and will give any myrmecologist a thrill.

Wheeler 1900, Haskins 1928, Gregg 1963


Fig. 70. Head of a worker of *A. pallipes*.

Genus *Hypoponera* (Key: Creighton, 1950)

These ants are not common in New Mexico. They are usually found in woodlands or riparian habitats nesting under stones, although they also occur in desert habitats. They are apparently predaceous, although we know little about them. They are small ants (2 - 4 mm total length). The mandibles are small and not remarkable. This separates them from the other two genera on the subfamily Ponerinae that occur in New Mexico: *Amblyopone* and *Odontomachus*. In addition, the eyes are small, consisting of only a few ommatidia; the antenna has 12 segments. The

females are similar to the workers, but have larger eyes. The males may be normal, but in some species the males are worker-like, almost indistinguishable from the workers. They can usually be distinguished from the workers by their 13 segmented antennae. This genus could be confused with the genus *Ponera*, but can be separated as these ants lack a round, nearly transparent region ventral to the petiole (compare Figs.). We may have only four species of this genus in New Mexico, although there are apparently undescribed species in Chihuahua and Texas, which may range into New Mexico. This is a difficult genus that is in need of revision.

Key to the workers of the genus *Hypoponera*

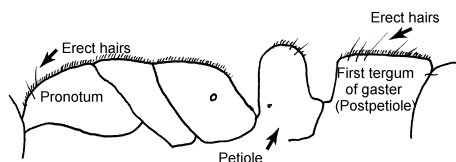


Fig. 71. Mesosoma, petiole and first gastral tergum of a worker of *H. punctatissima*.

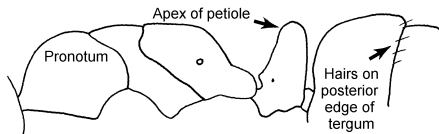


Fig. 72. Mesosoma, petiole and first gastral tergum of a worker of *H. opacior*.



Fig. 73. Side view of a worker of *H. opaciceps*.

1. Dorsum of first tergum of gaster with more than 5 erect hairs (Fig.); dorsum of pronotum with at least 1 erect hair (Fig.); petiole with apex about same width as base near peduncle (Fig.) **2**
- Dorsum of first tergum without erect hairs (or with fewer than 5), obvious hairs restricted to posterior edge; dorsum of pronotum without erect hairs; apex of petiole somewhat narrower than width near dorsum of peduncle (Fig.) ***opacior* (Forel)**
- 2(1).** Erect hairs on pronotum mostly relatively long (0.05 mm), smaller hairs decumbent or appressed (Fig.) **3**
- Erect hairs on pronotum of 2 distinct lengths, densely covered with short (less than 0.01 mm), bristly hairs with scattered longer (0.03 - 0.05 mm) hairs (Fig.) ***punctatissima* Roger**

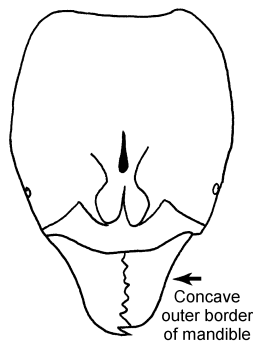


Fig. 75. Head of a worker of *H. inexorata*.

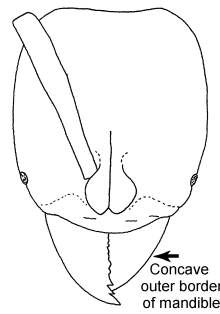


Fig. 74. Head of a worker of *H. opaciceps*.

- 3(2). Outer border of mandible distinctly concave (Fig.) *inexorata* Wheeler
 - Outer border of mandible nearly straight (Fig.) *opaciceps* (Mayr)

***Hypoponera inexorata* (Wheeler)**

Discussion. This species is easily recognized by the outline of the outer margin of the mandible, which is strongly concave (Fig.). The dorsum of the gaster has abundant, erect hairs (Fig.).

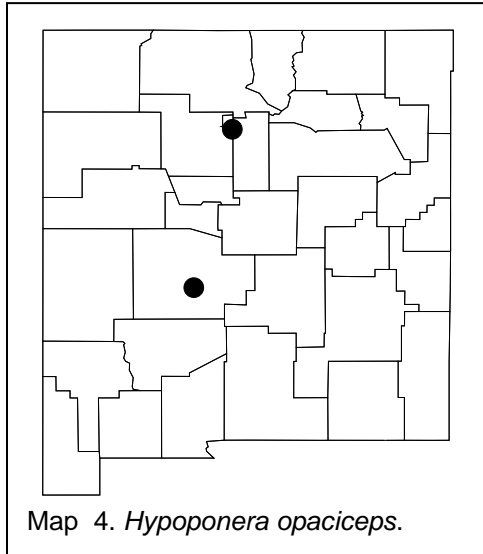
Distribution. Eastern USA west to TX and AZ, south to Central America. We have no records of this species from New Mexico, but expect it to occur there.

Habitat. Dry to moist forests.

Biology. This species nests under stones in dry, rocky forests. Wheeler 1908

***Hypoponera opaciceps* (Mayr)**

Discussion. The workers of this species are difficult to separate from those of *H. opacior*. In the majority of cases, the 2 can be separated as *H. opaciceps* has several hairs on the dorsum of the pronotum, and on the dorsum of the first tergum of the gaster, whereas *H. opacior* nearly always has no erect or suberect hairs on either of these surfaces (posteriorly directed hairs present on posterior edge of tergum). The shape of the petiole is a less reliable character, but the petiole of *H. opaciceps* is



nearly always approximately rectangular in shape, whereas that of *H. opacior* is usually narrowed towards the apex (compare Figs.). Females have abundant, erect hairs on the dorsum of the pronotum and dorsum of the gaster, which are much more numerous than they are in females of *H. opacior*.

Distribution. USA: eastern United States west to CO, TX, AZ south to Argentina. This species may not be native to New World; NM: **Los Alamos Co.**, at edge of Rio Grande River, **Socorro Co.**, Bosque del Apache.

Habitat. Cottonwood-willow forests, riparian habitats and sagebrush, urban areas.

Biology. This ant nests under stones.

Wheeler 1908, Smith 1927, Kempf 1960, Gregg 1963

Hypoponera opacior (Forel)

Discussion. The workers of this species are nearly identical to those of *H. opaciceps*, but usually have no erect hairs on the pronotum or dorsum of the first tergum of the gaster. The petiole is nearly always narrowed towards the apex (see discussion of *H. opaciceps* for details on how to separate them). Occasionally specimens are encountered which are relatively more hairy, and impossible to identify with any certainty. Females usually have a few erect hairs on the pronotum and dorsum of the gaster.

Distribution. CANADA: Quebec; USA: Most of the country including TX, CO, AZ; NM: **Catron Co.**, 2 mi N Frisco Hot Springs, **Colfax Co.**, Cimarron, **Doña Ana Co.**, 45 K. NE Las Cruces (Jornada Long Term Ecological Research Site), **Mora Co.**, 2 k E Wagon Mound, **Rio Arriba Co.**, **Sandoval Co.**, Bandelier National Monument, **San Miguel Co.**, Las Vegas; south to Chile and Argentina (Map 5).

Habitat. Ranges from Chihuahuan Desert mixed basin bajada to short grass prairie, sagebrush into areas of pinyon-juniper, alligator bark juniper, Chihuahuan pines, ponderosa pine and emery oak.

Biology. These ants nest under stones, primarily in shady areas with abundant stones.

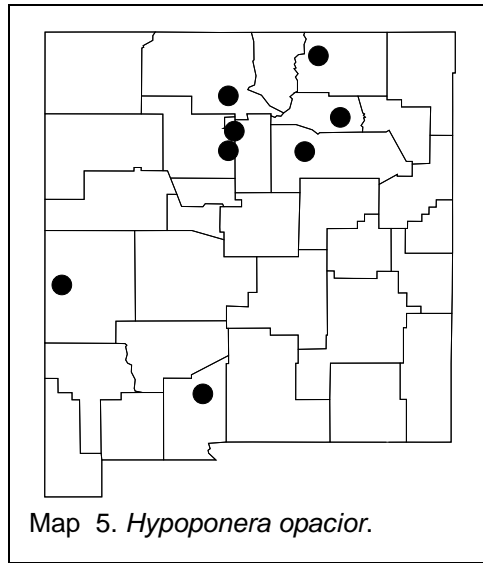
Dennis, 1938, Cole, 1940, Mallis, 1941, Potts, 1948, Gregg, 1963

Hypoponera punctatissima (Roger)

Discussion. This is a small (less than 2.5 mm total length), pale brown species, which is easily recognized by the plush, fine vestiture on the dorsum of the pronotum (Fig.), which also has scattered, erect hairs. The petiole is especially thickened (Fig.), somewhat globose in shape.

Distribution. USA: CA east to FL, Smith lists NM, south to Central America, possibly introduced into New World.

Habitat. Riparian zones in



arid habitats.

Biology. This species nests under stones or in the soil.

Genus *Odontomachus* **(Key: Brown, 1976, 1977)**

This genus is very rarely collected in New Mexico, although it is more common in Arizona, Texas and Chihuahua. These ants nest under logs or stones or simply in the ground. Colonies are usually small, although some of the Neotropical species have large nest populations. This genus is predaceous, and the elongate mandibles are held open (perpendicular to long axis of head) when the forager is approaching a prey. When the prey is in the proper position, or touch hairs at the base of the mandibles, they snap shut, trapping the prey.

This genus is easily recognized by the elongate mandibles. In addition the eyes are large and only the petiole is well developed; the postpetiole is fused to the gaster with little or no noticeable constriction between the two. The only other ant with similar mandibles in New Mexico belongs to the genus *Strumigenys* which is a member of the Myrmicinae and has the postpetiole well developed. The females are similar to the workers and are thus easily recognized. The males have a long, curved process that extends from the dorsum of the gaster and are also easily recognized. The mandibles of males are not elongate as in the workers and females.

There is only one species that occurs in the southwest (Brown, 1976).

***Odontomachus clarus* Roger**

Discussion. This is a rare, easily recognized species, which is the only ponerine that occurs in New Mexico with elongate, linear mandibles (Fig.). It superficially resembles the genus *Strumigenys*, but can be easily separated as the postpetiole is not well separated from the gaster.

Distribution. USA: AZ, TX; NM: Smith (1982) mentions that *O. desertorum* occurs in NM, but we have no specific records; MEXICO: Chihuahua, Nuevo León south to Guerrero, Clarion Island (Pacific, off coast of México).

Habitat. Semidesert areas, especially in riparian areas.

Biology. This ant nests under stones, and may be locally common, although they are rarely collected. These ants are fascinating predators which snap the elongated mandibles shut on prey. When placed in a vial, they can snap the mandibles together with such force they can flip completely out of the vial.

Wheeler, 1900, 1908, Haskins and Enzmann, 1938

Genus *Ponera*

This is a predominantly Old World and tropical genus, with two species found in North America. It can be easily recognized by the fenestra or thin oval-shaped impression (Fig. 66) on the ventral part of the petiole. It resembles the genus *Hypoponera*, but can be separated by this character. The mesosoma is little impressed along the dorsal margin.

It is usually found in moist, mesic forests, nesting under stones. Little is known of the biology of this genus.

***Ponera pennsylvanica* Buckley**

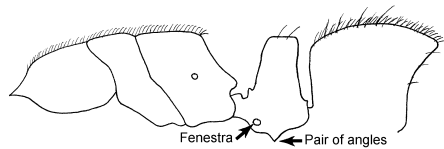


Fig. 76. Side view of the mesosoma, petiole and first gastral tergum of a worker of *P. pennsylvanica*.

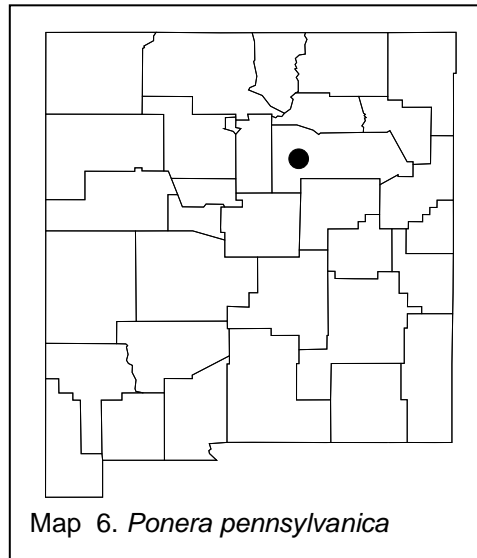
Discussion. The worker of this species is a small, black ant and is the only species in which there is a round, thin, nearly transparent region or fenestra located below the petiole (Fig.). Posterior to this region there is a pair of angles or posteriorly directed teeth. It could be confused with species of the genus *Hypoponera*, but these ants do not have such a region (Fig.). *Ponera exotica* occurs as far east as western Texas (Big Bend National Park, Jeff Davis Co., see Mackay and Anderson, 1991). It is smaller (less than 2.5 mm total length, vs. over 3 mm in *P. pennsylvanica* and pale brown or yellow in color, vs. dark brown in *P. pennsylvanica*).

Distribution. USA: Eastern North America west to the Four Corners, SW CO; NM: **San Miguel Co.**, Las Vegas Hot Springs (Taylor, 1967). See Mackay and Anderson (1991) for the distribution of this species.

Habitat. Mesic habitats including deciduous forest, pinyon-cedar woodland, cottonwood-willow forest, urban habitats.

Biology. This species nests under stones or logs; usually only a few workers are found.

Gregg 1963



Map 6. *Ponera pennsylvanica*

SUBFAMILY CERAPACHYINAE

Ants of this subfamily nest in the soil and are primarily subterranean in habit, thus rarely collected. They are predaceous,

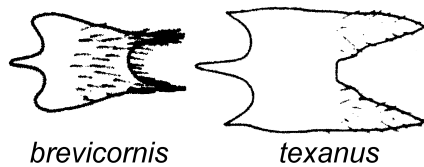


Fig. 77. Subgenital plates of a males of *A. brevicornis* and *A. texanus* (from Mackay, 1996).

especially on other ant species and termites. Workers can be distinguished from all other genera in the state as the pygidium is surrounded on both lateral sides by a row of teeth or denticles (Fig.); the petiole is well developed, the postpetiole is fused with the gaster, but is somewhat differentiated

from the gaster and the eyes are tiny, consisting of only a few facets, or completely absent. Additional characteristics would include: clypeus short, antennae situated very close to mandibles; insertions of antennae exposed, antenna with 11 or 12 segments. Males can be distinguished from those of all other genera as they are small (4 - 5 mm total length) and the subgenital plate is well developed, but delicate with two long teeth (Fig.). Males could only be confused with those of *Neivamyrmex*, which are larger (8 mm total length or larger) and have more robust subgenital plates with either two or three teeth .

Females are for the most part unknown or very rarely collected as they only occur with the colony. They may be either subdichthadiiform (large wingless form) or the normal winged form.

Genus *Acanthostichus*

(Key: Mackay, 1995)

Collections of this genus are extremely rare, due to the subterranean habits of colonies. Males of this genus are commonly collected at lights in the tropics; males of North American species are either very rare or are not attracted to lights. The males and females are known for only one of the species that occurs in the United States: *A. texanus*. The workers of this genus are easily separated from most other genera in the United States as they have a number of denticles or teeth on the dorso-lateral edges of the pygidium of the worker (Fig.). This genus can be separated from the closely related *Cerapachys* (which also has denticles on the pygidium of the worker) as it has a 12 segmented antenna (11 segmented in *Cerapachys*). There are three species of this genus found in the United States, which are easily separated with the following key:

Key to the workers of the Genus *Acanthostichus* in the United States

1. Eyes relatively large (Fig.); southeastern Texas and northeastern Mexico *texanus* Forel

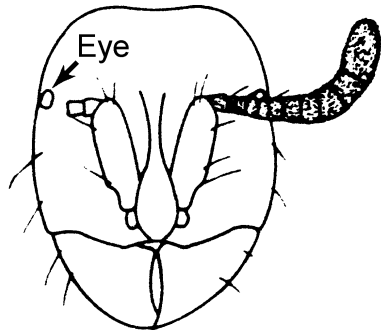


Fig. 78. Head of a worker of *A. texanus* (from Mackay, 1996).

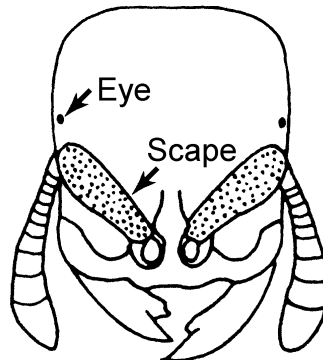


Fig. 79. Head of a worker of *A. punctiscapus* (from Mackay, 1996).

- Eyes tiny (Fig.); Arizona and New Mexico 2
- 2(1). Scares with numerous tiny punctures; New Mexico *punctiscapus* Mackay
- Scares smooth and shining; Arizona *arizonensis* Mackay

Acanthostichus arizonensis Mackay

Discussion. This species is easily separated from other species of *Acanthostichus* found in the United States by the smooth surface of the scape and by the tiny eye.

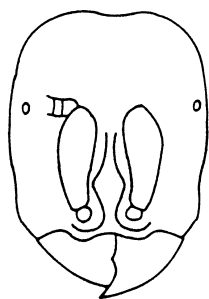


Fig. 80. Head of a worker of *A. arizonensis* (from Mackay, 1996).

Distribution. USA:

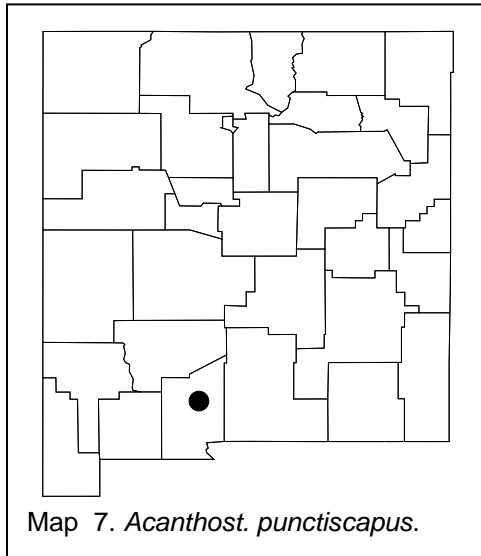
southeastern Arizona, may be found in southwestern New Mexico and northern Sonora and Chihuahua in the future.

Habitat. Grasslands at the Santa Rita Experimental Range.

Biology. Workers of this species are often found associated with termites, which may be their principal

or exclusive prey.

***Acanthostichus punctiscapus* Mackay**



Discussion. This small yellow ant is easily separated from all other species in the genus by the roughened surface of the scape.

Distribution. USA: NM: **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site) (Map 6).

Habitat. Weedy bajada surrounded by creosotebush scrub.

Biology. This species is known only from a type series, which was collected in the nest of *Pogonomyrmex desertorum* at a depth of 70 cm. Only part of the nest was collected, as the queen

was not found.

Genus *Cerapachys*

(Key: Brown, 1975; males in Smith, 1942).

Ants of this genus are rarely collected, due to their cryptic, subterranean habitats. Nests are found under stones, in the soil or under and in logs and branches. Males are commonly attracted to lights and can be relatively easily collected in the desert in the summer. Workers have the pygidium surrounded by teeth as in *Acanthostichus*. They can be easily separated from *Acanthostichus* as they have 11 segmented antennae with the ultimate segment enlarged into a club (Fig. 4). Males are very similar to those of *Acanthostichus*, but have 13 segmented antennae. *Acanthostichus texanus* has an 11-segmented antenna, the others in the genus have 12 segmented antennae. *Acanthostichus texanus* can be separated from *Cerapachys* as the teeth on the subgenital plate are thickened (Fig.). The female of *C. augustae* is the only one known of species that occur in the southwest.

This group is badly in need of a revision.

The workers of *C. davis* are unknown and thus a key is not provided. Males are occasionally collected at lights and in some areas are very abundant. The following key will separate these males:

Key to the males of *Cerapachys* in the United States

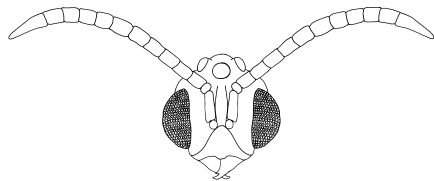


Fig. 81. Head of a male of *C. davis*.

1. Larger (total length at least 4 mm); all funicular segments except first longer than wide (Fig.); distance between lateral ocellus and medial ocellus less than diameter of medial ocellus (Fig.); collected at black lights in southern New Mexico

..... *davis* Smith
 - Small (total length less than 4 mm); funicular segments wider than long (Fig.); distance between lateral ocellus and medial ocellus about equal to diameter of medial ocellus (Fig.); not recorded from New Mexico (AZ, TX)
 *augustae* Wheeler

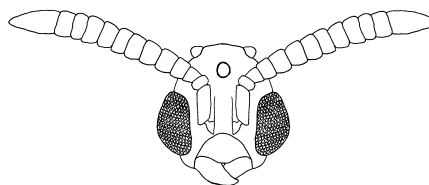


Fig. 82. Head of a male of *C. augustae*.

Cerapachys augustae Wheeler

Discussion. As this is the only species in the United States in which the workers are known, the characteristics given above will distinguish the genus from all others in New Mexico. The workers of *C. davis* would be expected to be similar and thus identifications should be made with caution. All records of *C. davis* have come from arid desert habitats, collections of *C. augustae* that we are aware of come from mesic woodlands, thus the species may be separated on the basis of habitat.

Distribution. USA: AZ, TX; NM: we have no records, but it may occur in the state. MEXICO: Nuevo León.

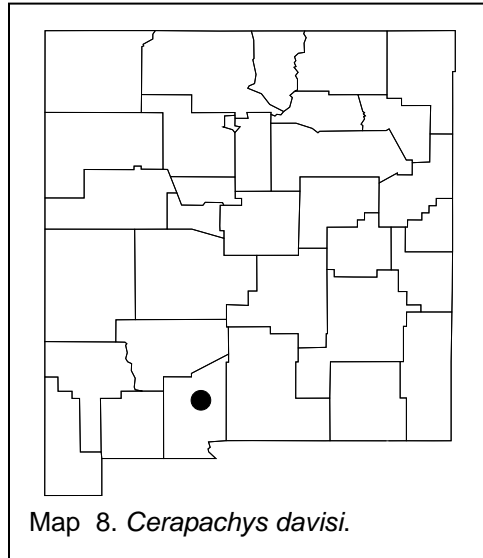
Habitat. This species is most commonly found in forests, usually in mesic areas.

Biology. Nests are unorganized and individuals are found in the litter and under stones, or in branches imbedded in soil in moist habitats.

These ants are rarely collected and are usually accidentally found when one is excavating the nest of another species.

Wheeler, 1903

***Cerapachys davis* M. Smith**



Discussion. This species is known only from males, which can be distinguished from those of *C. augustae* with characteristics in the key. Workers are unknown, but would be expected to occur only in arid habitats, and thus should not be confused with those of *C. augustae*.

Distribution. USA: west TX; NM: **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site). MEXICO: Chihuahua (Map 7).

Habitat. Creosote bush scrub and other desert vegetation.

Biology. Males can be occasionally collected in the southwest at blacklights. They are very abundant at some localities.

SUBFAMILY PSEUDOMYRMECINAE

Pseudomyrmex in North America nest only in plant cavities, which range from hollow stems, twigs and branches to tree trunks. Apparently the cavities already occur in the plants or are constructed by other insects. The species in the United States are moderately aggressive, unlike their extremely pugnacious tropical relatives. They are not commonly collected in the southwest and are apparently rare.

Ants of this genus are easily recognized. They are slim, elongate ants with very large eyes (Fig.). The pedicel consists of two segments, the petiole and postpetiole. The frontal carinae are closely placed and expose the insertions of the antennae. These characteristics separate this genus from all others. *Pseudomyrmex* is the only genus in this subfamily that occurs in New Mexico.

Genus *Pseudomyrmex*

(Key: Ward, 1985)

This is an easily recognized genus due to the presence of a petiole and postpetiole and the extremely large eyes (Fig.). The frontal carinae and bases of the scapes are located in close proximity (Fig.). This genus is rarely collected in New Mexico. Nests are found in hollow stems of various desert shrubs and in branches of relatively large trees in arid and semiarid habitats, especially oak trees. Ten species of this genus are found in the United States, only 2 of these would be expected to be found in New Mexico.

Key to workers of the genus *Pseudomyrmex*

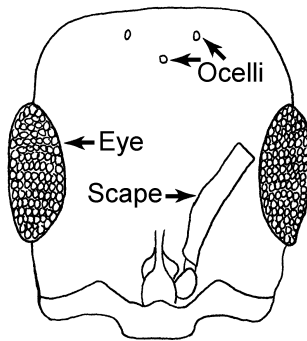


Fig. 83. Head of a worker of *P. apache*.

- Scares only about $\frac{3}{4}$ as long as maximum eye diameter (Fig.)
..... *pallidus* (Smith)

1. Scape relatively long, approximately equal to maximum eye diameter (Fig.)
..... *apache* Creighton

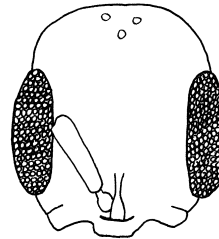
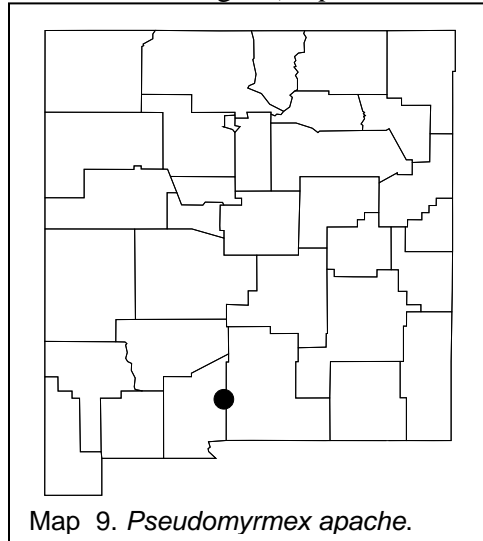


Fig. 84. Head of a worker of *P. pallidus*.

Pseudomyrmex apache Creighton

Discussion. The worker of this species is the larger of the two species found in southwestern United States, usually being greater than 5 mm in total length (*P. pallidus* is usually less than 4 mm in length). In



Map 9. *Pseudomyrmex apache*.

addition to the characters in the key, this species often has several erect hairs on the pronotum, and dorsum of the petiole and postpetiole, whereas *P. pallidus* usually has a single pair of hairs on the pronotum and postpetiole, and lacks hairs on the petiole.

Distribution. USA: southern CA, AZ, TX; NM: **Doña Ana Co.**, 40 k E Las Cruces; MEXICO.

Habitat. Desert habitats, especially the oak and mesquite areas.

Biology. This ant nests in oak trees and large mesquites, usually in the largest and most inaccessible dead branches that have living tissue at the base. Most of the galleries are constructed by wood boring beetles. These ants are unusual for the genus as they are not very aggressive and the sting is not painful.

Creighton, 1952, 1954, 1963, Wheeler and Wheeler, 1973

***Pseudomyrmex pallidus* (F. Smith)**

Discussion. The worker of this species is the smaller of the 2 species found in the southwestern United States, usually being less than 4 mm in total length (*P. apache* workers are greater than 5 mm total length). In addition to the characters in the key, this species usually has a single pair of hairs on the pronotum and on the postpetiole, and no erect hairs on the petiole (*P. apache* usually has several erect hairs on the pronotum, petiole and postpetiole).

Distribution. USA: CA east to NC, south to Central America; NM: We have no records, but it could occur in the arid part of the state.

Habitat. Desert habitats.

Biology. These ants nest in hollow stems, twigs and branches of a variety of plants. It apparently does not nest in the large trunks and

branches of living trees, as does *P. apache*. This species is more aggressive than *P. apache* and the sting is more painful, even though it is the smaller species.

Mitchell and Pierce, 1912, Wheeler, 1932, Wheeler and Wheeler, 1973

SUBFAMILY ECITONINAE

This is the subfamily of army ants, which forage in columns and prey on a number of arthropods and other animals. Our species belong to the genus *Neivamyrmex* and prey primarily on other species of ants, and termites.

Important morphological characteristics of the workers of this subfamily include: eyes tiny, consisting of only a few facets; frontal carinae closely placed, insertions of antennae exposed; clypeus short, antennae inserted close to mandibles; antenna with 12 segments; promesonotal suture poorly marked; propodeum without spines or angles (for USA species); both petiole and postpetiole well formed (USA only); sting well developed; pygidium without tubercles.

The males can be recognized as they are typically large and wasp like, winged individuals. The subgenital plate is well developed and has two or three teeth. They are commonly attracted to lights.

The workers of this subfamily could only be confused with those of the subfamily Cerapachyinae, based on the tiny eyes. They do not have the toothed or tuberculate pygidium of the subfamily Cerapachyinae. Workers of the subfamily Cerapachyinae have only the petiole well developed, the postpetiole is fused with the gaster (Fig.). The males could only be confused with those of the subfamily Cerapachyinae, due to the well-developed and toothed subgenital plate. They differ in that the subgenital plate is robust with large teeth (2 or 3), whereas the subgenital plate of males of the subfamily Cerapachyinae are delicate and the teeth are long and slender.

A number of species of the genus *Neivamyrmex* occur in New Mexico. Keys are presented for the workers and also the males as they are commonly collected at lights, and are the most common caste collected in New Mexico. Cole (1953a) includes this subfamily in his paper.

Genus *Neivamyrmex*

(Key: Watkins, 1985, Ward, 1999)

This is a genus of native army ants, which raid the nests of other ant species. These ants have diffuse nests, usually in arid ecosystems in the United States. They are usually encountered under stones or other similar materials. Foragers can be found on the surface during cool evenings and at night. Males are commonly attracted to lights and can be captured in blacklight traps.

Members of this genus can be easily separated from all other genera, based on the characteristics mentioned above in the description of the subfamily Ecitoninae, and is the only genus of the subfamily found in New Mexico. In addition, the following characteristics may be helpful in distinguishing workers of this genus: polymorphic; scape usually not extending past the posterior edge of head; mesonotum generally lower than pronotum; petiole usually longer than postpetiole. Males can be easily distinguished using the characteristics listed in the discussion of the subfamily. The eyes of the males are covered with bristly, erect hairs (Fig.). *Neivamyrmex californicus* (Mayr) is specifically excluded from New Mexico (Ward, 1999).

Key to the workers of the genus *Neivamyrmex* (modified from Watkins, 1985)

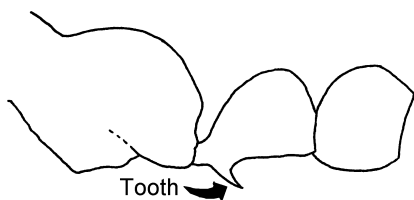


Fig. 85. Propodeum, petiole and postpetiole of a worker of *N. pilosus mexicanus*.

Note the following species, known only from the males, are not included in the worker key: *N. andrei*, *N. minor*, *N. macropterus*, *N. pilosus mandibularis*, and *N. swainsonii*.

1. Anteroventral tooth of petiole with prominent, acute spine directed downward and posteriorly

(Fig.); usually entire ant black or dark brown ***pilosus***

F. Smith

- Petiole without well developed spine; color never completely black **2**

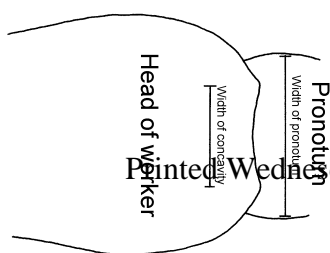


Fig. 87. Head and pronotum of a worker of *N. melanocephalus*.

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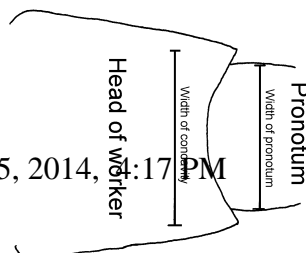


Fig. 86. Posterior margin of head and pronotum of a worker of *N. rugulosus*.

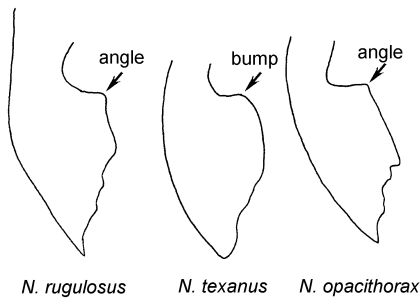


Fig. 88. Right mandibles of workers of *N. rugulosus*, *N. texanus*, and *N. opacithorax*. The arrows indicate the angles or bumps on the basal margin.

sandpaper) 4

- Head not densely granulated (often nearly smooth and glossy), but may have numerous punctures 6

4(3). Basal margin of mandible with a straight edge, which forms angular corner at junction with masticatory surface (Fig.); petiolar node only slightly longer than wide, as seen from above (Fig.) **3**

***rugulosus* Borgmeier**

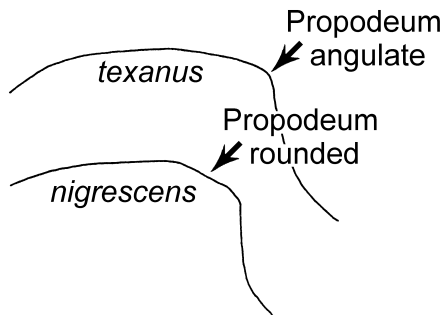


Fig. 89. Propodia of workers of *N. texanus* and *N. nigrescens*.

forming somewhat angular corner with dorsal surface (Fig.)

..... ***texanus* Watkins**

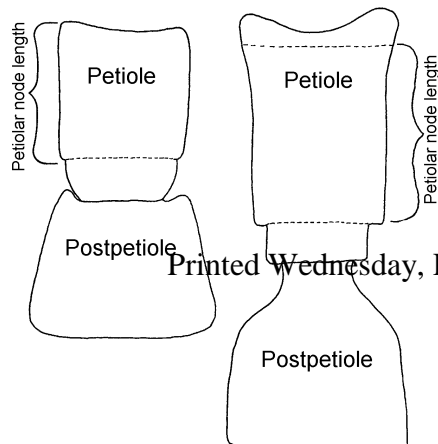


Fig. 90. Petiole and postpetiole of workers of *N. rugulosus* and *N. texanus*, showing the relative lengths of the petiolar nodes.

pronotum (as seen obliquely from the anterior part of ant, see Fig.)

..... ***melanocephalus* (Emery)**

- Mesosoma about same color as head and gaster; concave portion of posterior head margin as wide or wider than greatest width of pronotum (Fig.)

..... **3**

3(2). Head densely granulated (i.e., texture similar to

..... **4**

- Head not densely granulated (often nearly smooth and glossy), but may have numerous punctures **6**

4(3). Basal margin of mandible with a straight edge, which forms angular corner at junction with masticatory surface (Fig.); petiolar node only slightly longer than wide, as seen from above (Fig.) **3**

***rugulosus* Borgmeier**

- Basal margin of mandible with convex edge, which curves into masticatory border without forming angular corner (Fig.); length of node about 1.5 times width

..... **5**

5(4). Posterior face of propodeum

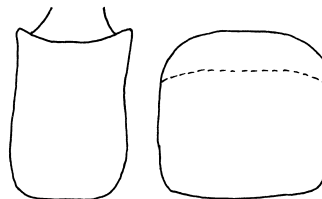


Fig. 91. Petioles of workers of *N. opacithorax* and *N. harrisii* as seen from above.

- Posterior face of propodeum forms rounded corner with dorsal

surface (Fig.) *nigrescens* (Cresson)

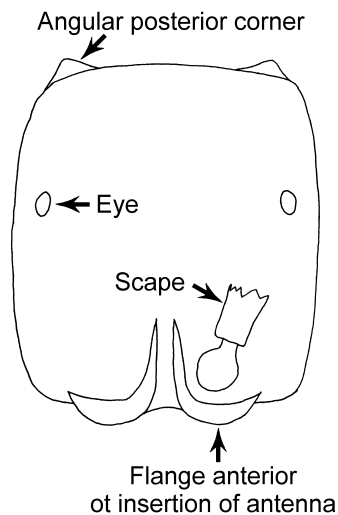


Fig. 92. Head of a worker of *N. harrisii*.

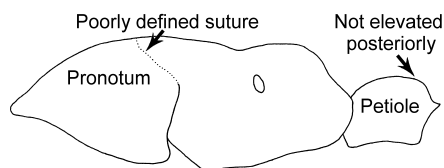


Fig. 93. Mesosoma and the petiole of a worker of *N. opacithorax*.

without distinct cornea, or absent 10

9(8). Total length of largest workers greater than 4 mm; head with angular posterior corners (Fig.); frontal carina curves in front of antennal fossa to form broad lamella, which gradually narrows laterally (Fig.) *harrisii* (Haldeman)

- Total length of largest workers less than 4 mm; head with rounded posterior corners; frontal carina abruptly narrows in front of antennal fossa to form narrow lamella, which

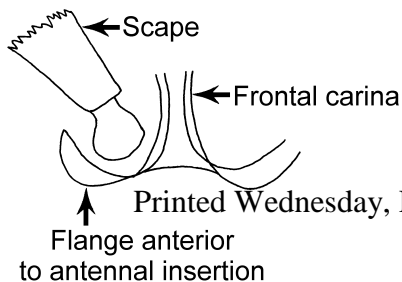


Fig. 95. Frontal carina and flanges anterior to the insertions of the antennae of a worker of *N. leonardi*.

6(3). Node of petiole (as seen from above) elongate, at least 1.3 X as long as wide 7

- Node of petiole nearly square (Fig.) 8

7(6). Suture between promesonotum and mesopleuron of larger workers complete and distinct; dorsum of petiole more elevated posteriorly than anteriorly *agilis*

Borgmeier

- Suture between promesonotum and mesopleuron of larger workers incomplete (Fig.); dorsum of petiole not more elevated posteriorly than anteriorly (Fig.) *opacithorax* (Emery)

8(6). Eye ocellus-like, with distinct, convex cornea (Fig.) 9

- Eye poorly formed and

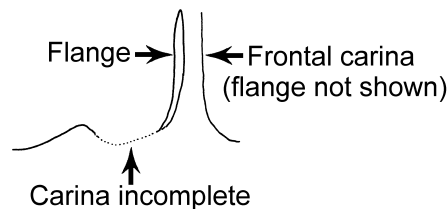


Fig. 94. Frontal carinae (including flange on left side of figure) of a worker of *N. carolinensis*.

may be incomplete (Fig.) *carolinensis* (Emery)

10(8). Frontal carina continues completely around front of antennal fossa as broad, upturned lamella, causing rim of fossa to be almost as high in front as along sides (Fig.); dorsal face of propodeum longer than posterior face (Fig.) *leonardi* (Wheeler)

- Frontal carina abruptly narrowed and does not form upturned lamella around front of antennal fossa (Fig.); posterior face of propodeum longer than dorsal face (Fig.) *fallax* Borgmeier

Key to the males of the genus *Neivamyrmex* (modified from Watkins, 1985)

Note that the following species, known only from the workers, are not included in the key: *N. agilis*, *N. fallax*, *N. melanocephalus*, and *N. rugulosus*.

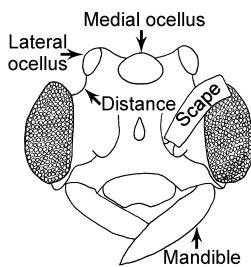


Fig. 96. Head of a male of *N. harrisii*, with spatulate mandibles.

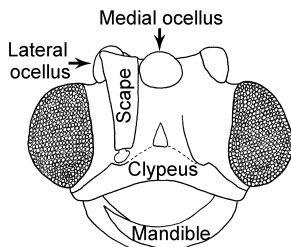


Fig. 97. Head of a male of *N. swainsoni*, with sickle-shaped mandibles.

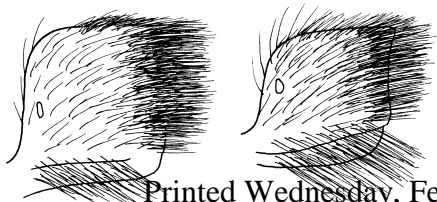


Fig. 98. Petioles of males of *N. nigrescens* and *N. texanus*.

1. Mandible spatulate, with distal half as broad or broader than basal portion (Fig.) **2**

- Mandible usually sickle-shaped (Fig.), at least slender and gradually tapered distally (Note: *N. pilosus mexicanus* has convex area along inner median portion of mandible, see Fig.) **5**

2(1). Distance from lateral ocellus to margin of compound eye about equal to or less than diameter of median ocellus (Fig.) *harrisii* (Haldeman)

- Distance from lateral ocellus to margin of compound eye at least 2 times diameter of median ocellus (Fig.) **3**

3(2). Gaster black to blackish-brown; white hairs on ventral surface of petiole shorter than greatest width of posterior femur, slanted posteroventrally (Fig.);

prominent transverse swelling present posterior to antennal fossa (Fig.)

..... ***nigrescens* (Cresson)**

- Gaster reddish-brown; golden hairs on ventral surface of petiole longer than greatest width of posterior femur, erect (Fig.); transverse swelling above antennal fossa weak or absent (Fig.)

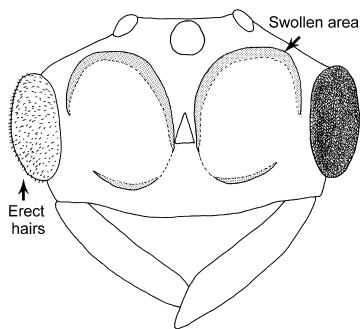


Fig. 99. Head of a male of *N. nigrescens*. The stippled region indicates a swollen area.

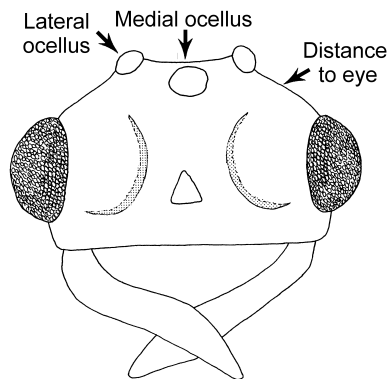


Fig. 100. Head of a male of *N. texanus*. The stippled region indicates a swollen area.

to margin of compound eye less

than diameter of median ocellus (Fig.)

- Distance from lateral ocellus to margin of compound eye about 1.5 to 3 times diameter of median ocellus

4

4(3). Mandible usually about equally wide along its entire length to a tapered apex (Fig.); dorsum of head mostly finely punctate and dull; total length 11 - 15 mm

..... ***texanus* Watkins**

- Distal $\frac{2}{3}$ of mandible usually slightly convex along inner margin (Fig.); much of dorsum of head smooth and glossy; total length 10 - 13 mm

***opacithorax* (Emery)**

5(1). Distance from lateral ocellus

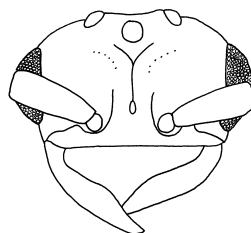


Fig. 101. Head of a male of *N. opacithorax* (modified from Borgmeier, 1955).

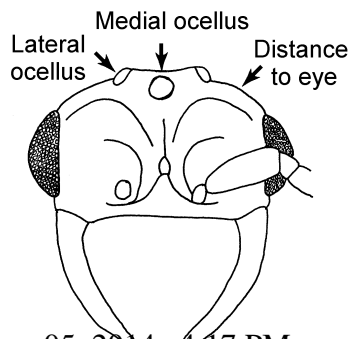


Fig. 102. Head of a male of *N. carolinensis* (from Borgmeier, 1955).

(Fig.) *carolinensis* (Emery)

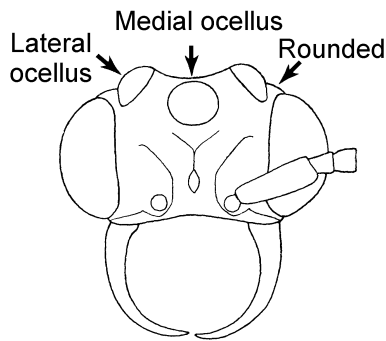


Fig. 105. Head of a male of *N. macropterus*, showing the rounded corner (arrow) (from Borgmeier, 1955)

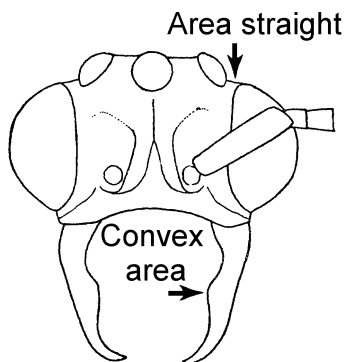


Fig. 104. Head of a male of *N. pilosus mexicanus* (from Borgmeier, 1955). and compound eye not forming rounded corner (Fig.); commonly collected in New Mexico 7

7(6). Mandible with a slightly (*N. pilosus mandibularis*) to moderately (*N. pilosus mexicanus*) convex area along inner medial surface (Fig.); occipital margin of head distinctly upturned into a sharp flange (Fig.)

6(5). Part of head between lateral ocellus and compound eye (as seen from front) forming rounded corner (Fig.); rarely collected in New Mexico

macropterus Borgmeier

- Area between lateral ocellus

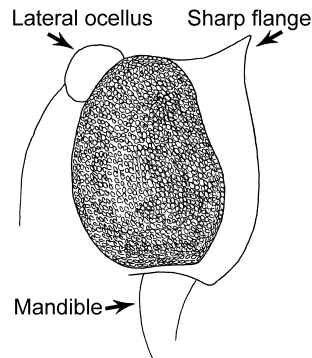


Fig. 106. Side of the head of a male of *N. pilosus mexicanus*, showing the upturned flange on the occipital margin of the head.

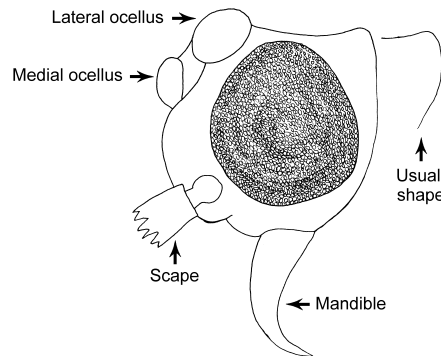
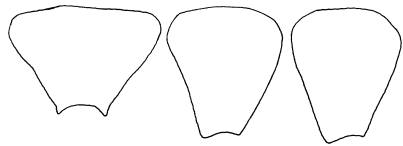


Fig. 103. Side of the head of a male of *N. minor*. The inset shows the normal shape of the posterior part of the head.

***pilosus* (F. Smith)**

- Mandible distinctly sickle-shaped, distally curved upward and gradually tapered to sharp apex (Fig.); occipital margin of head not upturned, or if upturned, formed into dull swelling (Fig.)
..... 8



andrei *swainsoni* *macropterus*
Fig. 107. Front coxae of males of *N. andrei* (left), *N. swainsoni* (middle), and *N. macropterus* (right).

- 9(8). Total length 7 - 9 mm; length of mandible about equal to height of compound eye (Fig.)
.....

***minor* (Cresson)**

- Total length 7 - 16 mm; length of mandible distinctly longer than height of compound eye (Fig.)
..... 10

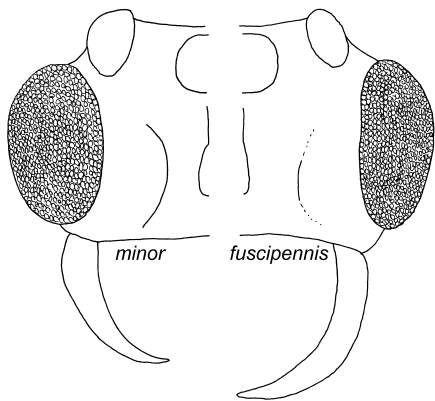


Fig. 109. The heads of males of *N. minor* and *N. fuscipennis* showing the relative lengths of the mandibles.

- 8(7). Front coxa about as wide as long (Fig.)
.....

***andrei* (Emery)**

- Front coxa longer than wide (Fig.); very common in New Mexico
..... 9

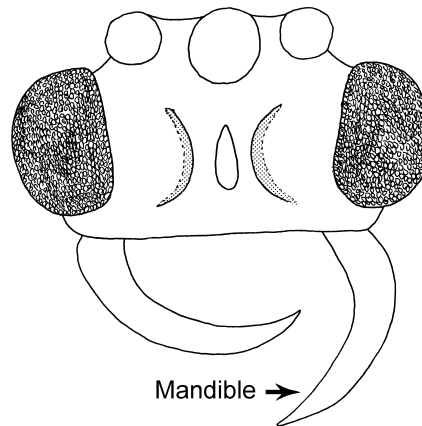


Fig. 108. Head of a male of *N. swainsonii*. The stippled region indicates a swollen area.

- 10(9). Total length 11 - 16 mm; most of dorsum of gaster dull and punctate;
..... common

***swainsonii* (Shuckard)**

- Total length 7 - 11 mm; entire dorsum of gaster smooth and glossy;
..... rarely collected
..... *fuscipennis*

(Smith)

Neivamyrmex agilis

Borgmeier

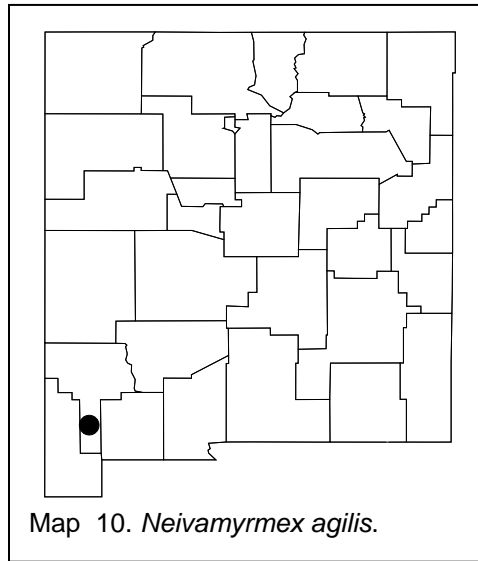
Discussion. Only the worker is known. The worker may be recognized by the elongate petiole (as seen from above, see Fig.), the complete suture between the promesonotum and the mesopleuron (Fig.), and the dorsum of the node of the petiole is more elevated posteriorly (Fig.).

Distribution. USA: AZ (southern); NM: **Grant Co.**, 3.8 mi E Separ (1/4 mi S I-10); MEXICO: Chihuahua, Jalisco (Map 9).

Habitat. Chihuahuan Desert, often in riparian areas.

Biology. Workers forage in columns, several meters long, searching in the leaf litter and holes in the habitat.

Borgmeier 1953

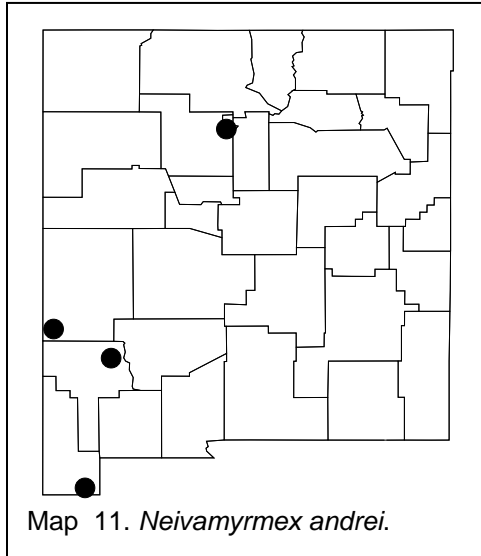


Map 10. *Neivamyrmex agilis*.

Neivamyrmex andrei (Emery)

Discussion. Only the male is known, which can be easily recognized as the front coxa is about as wide as long (Fig.), whereas the coxae of the other species are longer than wide. This character will separate *N. andrei* from all of the other species.

Distribution. USA: AZ; NM: **Catron Co.**, 5 mi N Glenwood (San Francisco River), **Grant Co.**, 100 k NE Silver City, **Hidalgo Co.**, Alamo Hueco Mts. (Wood Canyon), **Sandoval Co.**, Bandelier National Monument; MEXICO: Chihuahua.



Map 11. *Neivamyrmex andrei*.

Habitat. These ants are usually collected in forests, often in mesic sites.

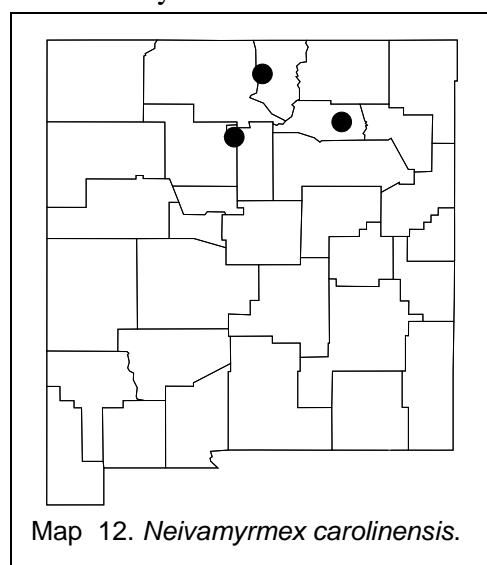
Biology. Males were collected from late June to August.
Baldrige et al., 1980

***Neivamyrmex carolinensis* (Emery)**

Discussion. All castes are known. The dorsum of the head is smooth and glossy, with scattered piligerous punctures. The mesosoma, petiole, and postpetiole are mostly smooth, and some areas are distinctly glossy. The node of the petiole is nearly square in shape, as seen from above (Fig.). The eye is ocellus-like, with a definite cornea. This species could be confused with *N. carolinensis*, but differs in that the posterior corners of the head are rounded (Fig.), and the frontal carinae diverge posteriorly, but do not curve in front of the antennal fossa (Fig.). Additionally much of mesosoma is smooth, whereas it is mostly

sculptured in *N. Harrisii*. This last character would also separate it from *N. opacithorax* (at least the top of the pronotum is sculptured in the latter species).

The male can be easily recognized by the presence of the sickle-shaped mandibles and the long distance between the lateral ocellus and the compound eye (at least 1.5 times the diameter of the median ocellus). It can be separated from all other New Mexico species on the basis of these 2 characters.



Distribution. USA: southeastern United States west to AZ, KS, NM: **Mora Co.**, 12 k N Wagon Mound, **Sandoval Co.**, Bandelier National Monument (Pippin and Pippin, 1984), **Taos Co.**, 14 k S Tres Piedras; MEXICO: Chihuahua.

Habitat. Pine forests,

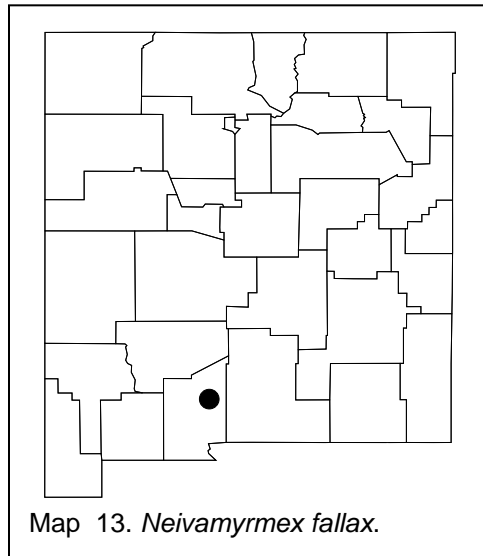
Biology. This species nests in the soil or under stones on stony hillsides. Nests are large, up to 50,000 workers. Foragers are rarely seen above the ground, as they are active nocturnally. Flights occur in May and

June. Trail pheromones are used in foraging. This is the only species known to be polygynous. Workers in laboratory nests with gynes present live longer than workers without the gyne.

Dennis, 1938, Watkins, 1964, Watkins and Rettenmeyer, 1967, Baldrige et al., 1980, Rettenmeyer and Watkins, 1978.

***Neivamyrmex fallax* Borgmeier**

Discussion. Only the worker has been described, which can be recognized as the head and dorsum of the mesosoma are predominantly smooth and glossy, the sides are coriaceous, but moderately shining. The tooth on the basal border of the mandible is well developed (Fig.). The node of the petiole is square-shaped as seen from above. The eyes nearly absent, and difficult to find. The posterior face of the propodeum is about as long as the dorsal face (Fig.). This species could be confused with *N. leonardi*, but can be separated by the shape of the propodeum. This species may be the worker of *N. swainsonii*.



Distribution. USA: AZ, TX, KS, LA; NM: workers assignable to this taxon were collected at **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site). MEXICO: Jalisco, Veracruz, Michoacán, Tabasco; GUATEMALA.

Habitat. Various habitats.

Biology. This species nests in the soil.

***Neivamyrmex fuscipennis* (Smith)**

Discussion. The males of this species are small, pale brown specimens with long, sickle-shaped mandibles. They would most likely be confused with *N. minor* due to their small size. The elongate mandibles

would easily separate them. The pale colored mesosoma would separate them from other species, which have small males, such as *N. carolinensis* and *N. opacithorax* (which have the mesosoma dark brown or black).

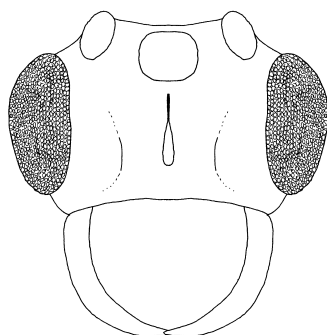
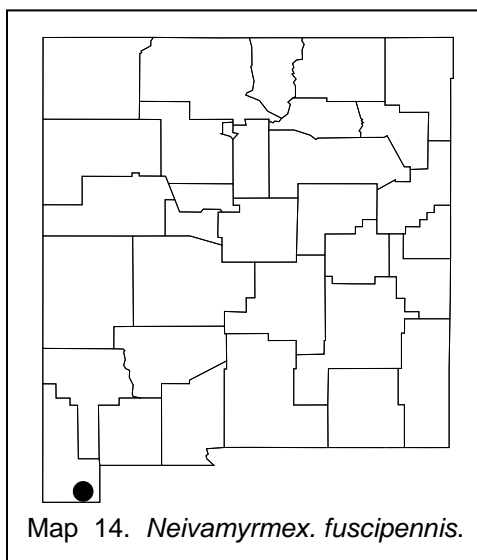


Fig. 110. Head of a male of *N. fuscipennis*.

Distribution. USA: KS, TX (eastern), AZ (Chiricahua Mts.); NM: **Hidalgo Co.**, ATM Alamo Hueco Mts. (Wood Canyon, data from R and G. Snelling). This is the first record from New Mexico.

Habitat. Desert riparian canyons with oaks, pines and junipers.

Biology. The habits of this ant are unknown, except that males are attracted to lights. Flights occur from June to August.



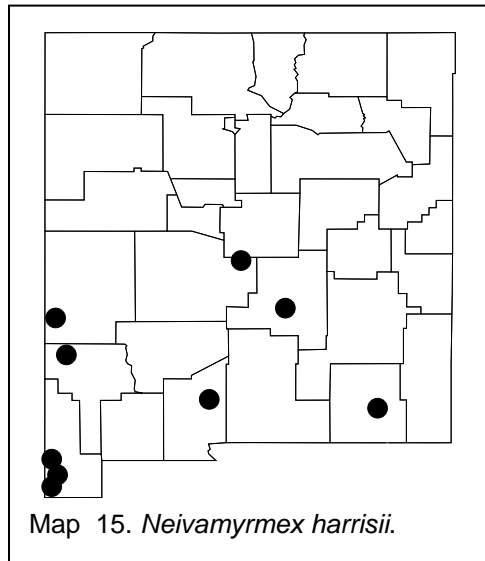
Map 14. *Neivamyrmex fuscipennis*.

***Neivamyrmex harrisii* (Haldeman)**

Discussion. All castes are known. The basal border of the mandible of the worker is nearly straight, with a poorly developed bump. The dorsum of the head is smooth and glossy, with scattered piligerous punctures. The mesosoma, petiole, and postpetiole are granulate. The node of the petiole is nearly square in shape, as seen from above (Fig.). The eye is ocellus-like, with a definite cornea. This species could be confused with *N. carolinensis*, but differs in that the posterior corners of the head are angulate (Fig.), and the frontal carinae curve in front of the antennal fossa (Fig.).

The males are easily recognized by the spatulate mandibles and the short distance between the lateral ocellus and the compound eye, which is less than the diameter of the median ocellus (Fig.). Other New Mexican

species that have spatulate mandibles (*N. nigrescens*, *N. texanus*, and *N. opacithorax*) have a wider distance between the lateral ocellus and the compound eye, at least twice the diameter of the median ocellus.



Map 15. *Neivamyrmex harrisii*.

Distribution. USA: AZ, TX, OK; NM: **Catron Co.**, 5 mi NE Glenwood (Whitewater Creek), **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site), **Eddy Co.**, Waste Isolation Pilot Plant, Site 14 (32°23'N 103°51.4'), **Grant Co.**, 100 k NW Silver City, **Hidalgo Co.**, Gray Ranch (Up Shaw Camp), Peloncillo Mts., San Simon Marsh (Ciénaga, 12 mi N,

1.6 mi W Portal Rd. and Highway 80), **Lincoln Co.**, 5 mi W Capitan, **Socorro Co.**, Gran Quivira; MEXICO: northern part of country.

Habitat. Creosotebush scrub up to foothills thorn scrub.

Biology. This species raids nests of *Pheidole xerophila*. Males were collected at lights from June to the first part of October. They were especially abundant in late July. Flights begin about 19:00 and extend to after 05:00 the next morning, and peaks between 23:00 and 04:00 (Baldrige et al., 1980).

Watkins and Cole, 1966, Watkins, Cole and Baldrige, 1967, Plsek, ??? Kroll and Watkins 1969, Baldrige et al., 1980

***Neivamyrmex leonardi* (Wheeler)**

Discussion. Only the worker is known, which can be recognized as shiny, polymorphic ants yellow in color with brown mandibles. The head and most of the mesosoma are smooth and glossy. The tooth on the basal margin of the mandibles is well developed. The node of the petiole is square, as seen from above. The eyes are insignificant spots. The dorsal face of the propodeum is longer than the posterior face (Fig.). This species could be confused with *N. fallax*, but can be separated by the shape of the propodeum.

Distribution. USA: OK, TX, CA; this species may occur in New Mexico; MEXICO: Baja California (Norte and Sur), Durango, Tamaulipas.

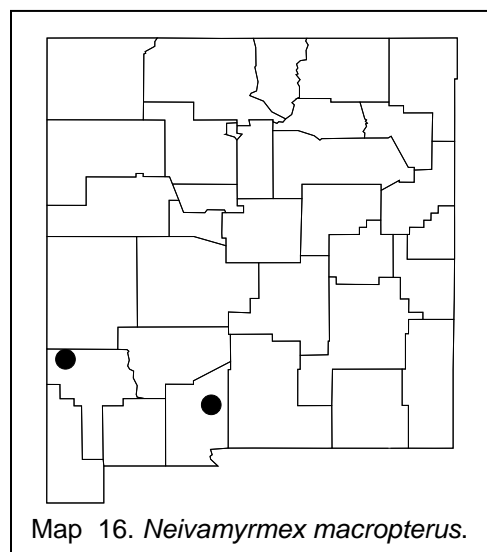
Habitat. Creosotebush scrub, *Sporobolus* grassland.

Biology. This species is primarily subterranean, and raids nests of *Pheidole obtusospinosa* (= *subdentata*).

Watkins and Cole 1966, Watkins, Cole and Baldrige, 1967, Rojas-Fernández and Fragoso 1994, 2000

***Neivamyrmex macropterus* Borgmeier**

Discussion. Only the male is known. It can be easily recognized by



Map 16. *Neivamyrmex macropterus*.

the sickle-shaped mandibles and the short distance between the lateral ocellus and the compound eye. This region is often somewhat angulate, although this is a poor characteristic. Unfortunately it is usually necessary to remove the genitalia to separate this species from several others, including *N. pilosus*, *N. andrei*, *N. minor*, and *N. swainsonii*. It is usually larger than the small *N. minor*, without the dense pubescence of *N. swainsonii* and *N. pilosus*. The front coxa is small (Fig.), but it does not have the peculiar shape

found in males of *N. andrei* (see Fig.).

Distribution. USA: AZ, TX; NM: **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site), **Grant Co.**, 100 k NW Silver City; MEXICO: Chihuahua, Durango, Oaxaca, Puebla.

Habitat. Creosotebush scrub.

Biology. Flights occur from May to the first part of August.

Baldrige et al., 1980

***Neivamyrmex melanocephalus* (Emery)**

Discussion. Only the worker is known. This is an easily recognized species as the head and gaster are dark brown or black and the

remainder of the ant is light or reddish brown. The concave portion of the posterior head margin is slightly narrower than the greatest width of the mesosoma, as obliquely backward as seen from above (Fig.). The scape usually extends to the posterior margin of the head. The dorsum of the head is smooth and glossy, the mesosoma is coarsely sculptured and granulate. The tooth on the anterior ventral surface of the petiole is small and directed downwards (Fig.).

Distribution. USA: southern AZ, may occur in western New Mexico; MEXICO: Hidalgo, Jalisco, Durango, Michoacán, Nayarit south to COSTA RICA.

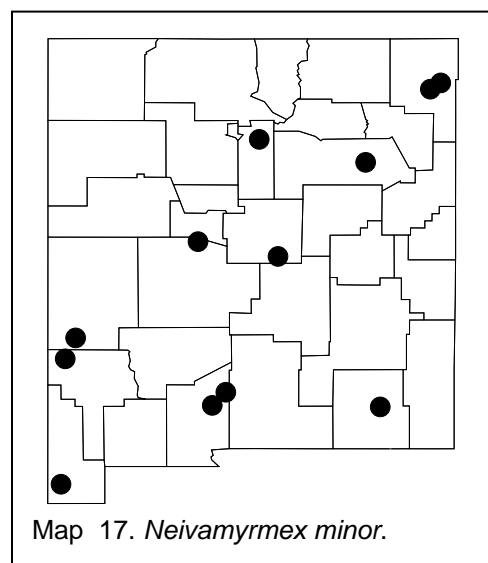
Habitat. Grasslands, and rarely in desert scrub.

Biology. This species nests in the soil, and raids nests of *Pheidole hyatti*. It is the host of the staphylinid beetle *Crematoxenus aenigma*.

Borgmeier, 1955, Rojas-Fernández and Fragoso 1994, 2000

***Neivamyrmex minor* (Cresson)**

Discussion. Only the male is known, which is one of the smallest species (7 - 9 mm total length, most of the males of the other species are larger than 9 mm total length). The mandible is about as long as the maximum diameter of the eye (Fig.). These characters will separate this species from all of the others. compare with *fuscipennis*???



Distribution. USA: CA, NV, KS, OK, AZ, TX; NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, Aguirre Springs, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site), **Eddy Co.**, Waste Isolation Pilot Plant (32°23'N 103°51.4'), **Grant Co.**, 100 k NW Silver City, **Hidalgo Co.**, Gray Ranch (Upshaw Camp), **San Miguel Co.**, Mosquero, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Sevilleta National Wildlife Refuge ATM, **Torrance Co.**, 5 mi NE Corona, **Union Co.**, Clayton, Clayton (15 mi W & 15 mi S Dellinger Ranch); MEXICO:

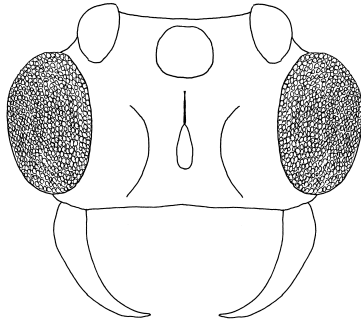


Fig. 111. Head of a male of *N. minor*.

Baldrige et al., 1980

Baja Calif. Sur, Isla del Carmen,
Coahuila. ATM all on map

Habitat. Creosotebush scrub.

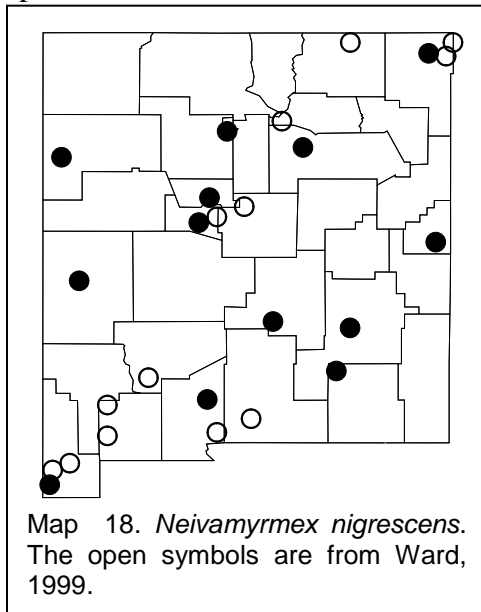
Biology. Males are commonly collected in blacklight traps, from late May to early September.

***Neivamyrmex nigrescens* (Cresson)**

Discussion. All castes are known. The worker can be recognized as the dorsum of the head, the mesosoma, petiole and postpetiole are punctate, with shiny bottoms. There is no angle along the basal margin of the mandible (see Fig.), which would separate it from *N. rugulosus*. It can be separated from the similar *N. texanus* as the posterior face of the propodeum is only weakly concave or straight and the two faces of the propodeum form a rounded face (Fig.). The males have a dark brown or black gaster (whole ant usually dark) with unusual, prominent lobes present posterior to the antennal fossa (Fig.). Additionally the mandible is spatulate and the distance between the lateral ocellus and the compound

eyes greater than the diameter of the median ocellus. These characters easily separate this species from all others.

Distribution. USA: TX, AZ, CO, TX, most of southern part of country; NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, Pueblo Park (33°59'N 108°96[?]', **Chaves Co.**, 20 mi W Hope (on Route 83), Roswell, **Curry Co.**, Clovis, **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site); **Eddy Co.**, Los Medanos, **Hidalgo Co.**, Gray Ranch (Upshaw Camp), **Lincoln Co.**, Alto, **Los Alamos**



Co., Los Alamos near Rio Grande, **McKinley Co.** 8 mi S Gallup, **San Miguel Co.**, Kearny's Gap, **Union Co.**, R 30 E T 24N, **Valencia Co.**, Belen; MEXICO: Sonora, Nayarit, Oaxaca..

Habitat. Pinyon-juniper woodlands, sagebrush, creosotebush scrub, grasslands.

Biology. Workers were found under stones or dung, males were attracted to light. Flights occur from August to November. This is a very common species that feeds primarily on the brood of other ant species. This species has a nomadic-statory life cycle like most other species in the subfamily. Most of the nomadic phase activity occurs at night, but activity may begin in the afternoon, especially on cloudy days. After about three weeks of nomadic activity, the larvae pupate and activity changes to the statory phase, which lasts about 18 days until the eclosion of the callows from the pupal stage. During this time the bivouac is subterranean, especially in the nest of a raided ant species. Collectors usually find such bivouacs under stones. Small raids may still occur during this stage. Workers follow trail pheromones in the laboratory, and will follow trails of other army ant species.

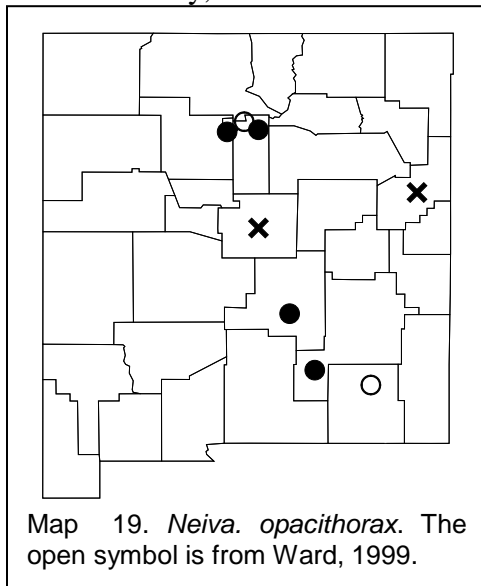
Wheeler, 1900, Smith 1927, Schneirla 1958, Gregg 1963, Watkins, 1964, Watkins et al., 1967, Baldrige et al., 1980

***Neivamyrmex opacithorax* (Emery)**

this part was deleted, check original.

Discussion. All castes are known. The worker can be recognized by the angular corner or small tooth found along the basal border of the mandible (Fig.), and by the shiny dorsum of the head. The side of the pronotum is often smooth and glossy. The node of the petiole is elongate, as in Fig. . It is pale to medium brown in color. It can be separated from *N. rugulosus* by the relatively smooth dorsum of the head (granulate in *N. rugulosus*) and the lighter brown color (*N. rugulosus* is darker brown).

The male is recognized on the basis of the spatulate mandible and the distance between the lateral ocellus and the compound eyes greater than the diameter of the median ocellus. Additionally, the gaster is brown, and the golden hairs on the ventral surface of the petiole are longer than the width of the posterior femur. It could be confused with *N. texanus*, but can be separated as ~~the stipes lacks a dorsal projection (Fig.). need other characters???~~



Distribution. USA: Most of United States, including AZ, TX; NM: **Chaves Co.**, 12 mi W Hope (on Route 83), **Lincoln Co.**, 5 mi W Capitan, **Los Alamos Co.**, Los Alamos, **Quay Co.** without locality, **Santa Fe Co.**, Santa Fe, **Torrance Co.**, without locality

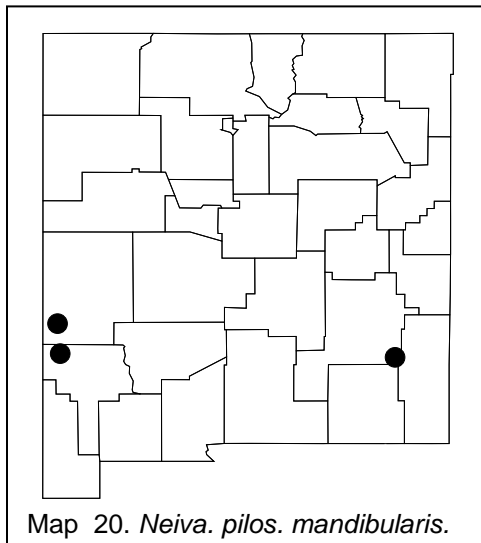
Habitat. Pine forests.

Biology. This is a relatively common species in which workers can be found under stones and logs, or nesting in wood, males are attracted to lights from September to December. Brood was found in a

nest in August. Workers follow trail pheromones in the laboratory, and will follow trails of other species, with no significant preference for their own trails.

Smith, 1924, Watkins, 1964, Watkins et al., 1967

***Neivamyrmex pilosus mandibularis* (M. Smith)**



Discussion. Only the male is known. It can be recognized by the sickle-shaped mandibles, the short distance between the lateral ocellus and the compound eye. It can be separated from *N. pilosus mexicanus* (which also occurs in New Mexico) as the area along the inner medial surface of the mandible is only slightly convex.

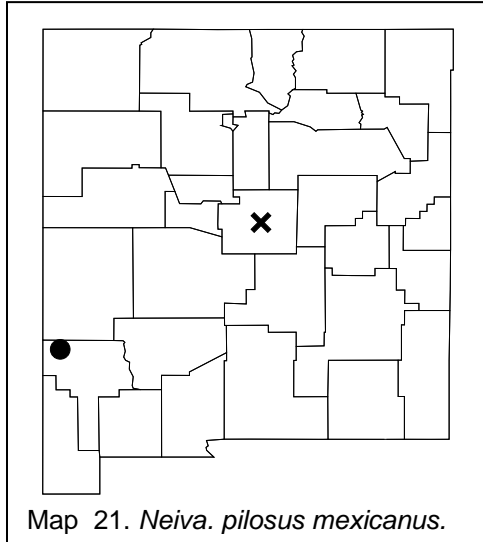
Distribution. USA: AZ; NM: **Catron Co.**, 5 mi NE Glenwood (Whitewater Creek), **Chavez Co.**, 9.5 mi W Caprock, **Grant Co.**, 100 k NW Silver City,

Habitat. Oak forests,

alligator juniper, pines.

Biology. The flights occur in July and August.
Baldrige et al., 1980

***Neivamyrmex pilosus mexicanus* (F. Smith)**



Discussion. All castes are known. The worker can be recognized as being a concolorous dark brownish-black specimen with a prominent, acute spine on the ventral surface of the petiole, which is directed posteroventrad. No other species in New Mexico has these 2 characters. The male is nearly identical to that of *N. pilosus mandibularis*, except that the area along the inner medial surface of the mandible is moderately convex, instead of only slightly convex, as is found in *N. pilosus mandibularis*.

Distribution. USA: CA east to MS, south to COLOMBIA (South America); NM: **Grant Co.**, 100 k NW Silver City, **Torrance Co.**, without locality.

Habitat. Oak forests.

Biology. Flights occur from May to late August, with the peak occurring from June to July. Nests were found to not be common in Mississippi, but the columns were large (about 1 - 1.2 cm wide, about 50 meters long). They prey on *Crematogaster ashmeadi*. Workers do not follow trails of other species of army ants.

Smith, 1924, Watkins et al., 1967, Baldrige et al., 1980

***Neivamyrmex rugulosus* Borgmeier**

Discussion. Only the worker is known, which can be recognized, by the presence of an angle along the basal margin of the mandible (Fig.). In addition, the dorsum of the head, mesosoma, petiole and postpetiole are completely granulate and dull. The node of the petiole is only slightly longer than wide (dorsal view, see Fig.).

This species would be easily separated from similar species, including *N. nigrescens*, and *N. texanus* by the angle on the basal border of the mandible. If the mandibles are closed, the head may be removed and the mandibles opened by holding the head with one insect pin, and prying the mandibles open with a second pin. Otherwise, this species can be separated from the common *N. nigrescens* as the posterior face of the propodeum is concave (Fig.) (straight or only weakly concave in *N. nigrescens*). The punctures on the dorsum of the head are poorly defined, whereas in both *N. nigrescens* and *N. texanus* they are well defined with shiny bottoms. It can be separated from *N. opacithorax*, which has a similar tooth on the mandible, by the darker color (*N. opacithorax* is pale to medium brown) and by the granulate surface of the head (shiny in *N. opacithorax*).

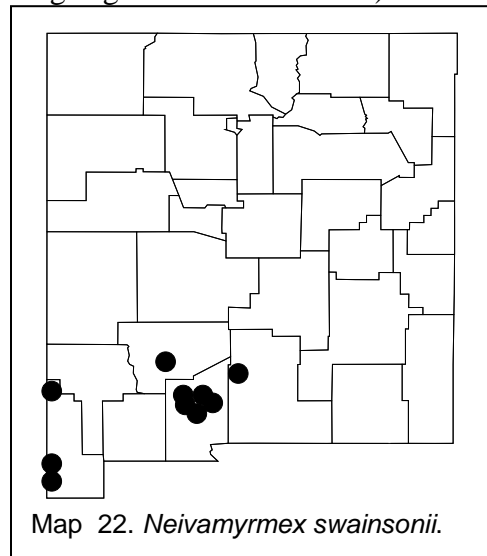
Distribution. USA: southern AZ (Chiricahua Mts.); NM: Not reported from New Mexico, but may occur there; MEXICO: Jalisco, Sonora, Nayarit.

Habitat. Pine-oak-juniper transition near 1600 meters.

Biology. Unknown.

***Neivamyrmex swainsonii* (Shuckard)**

Discussion. Only the male is known. It is a large species (total length greater than 1.1 cms) covered with decumbent, golden hairs. The sickle-shaped mandibles are longer than the greatest diameter of the eyes. The front coxa is longer than broad (Fig.).



Map 22. *Neivamyrmex swainsonii*.

Distribution. USA: CA east to LA, including AZ, TX; **NM: Doña Ana Co.**, Fort Selden State Park, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), Mesilla, Organ Mts., **Hidalgo Co.**, Gray Ranch, Rodeo, Virden, **Otero Co.**, White Sands National Monument, **Sierra Co.**, Caballo State Park (Map); MEXICO: much of country, south to ARGENTINA.

Habitat. Desert grasslands and creosotebush scrub.

Biology. Males are commonly collected in blacklight traps, from mid June until the first part of September. The number of males flying extends from 21:00 to 05:00 the next morning, peaking at 01:00 - 04:00.

Baldrige et al., 1980, Rojas and Fragoso, 2000

***Neivamyrmex texanus* Watkins**

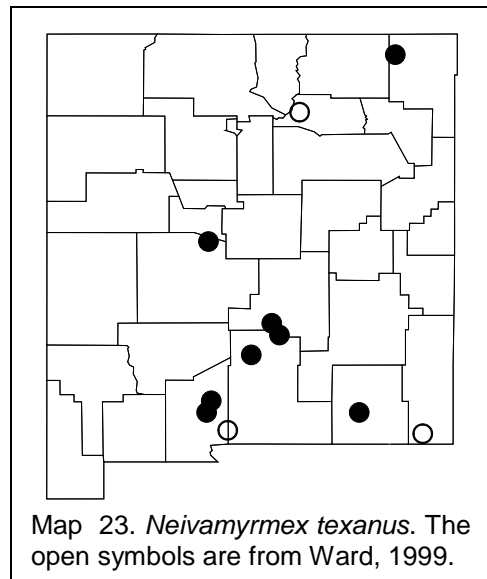
Discussion. All castes are known. The worker can be recognized by the punctate surfaces of the head, mesosoma, petiole and postpetiole. The posterior face of the propodeum forms a concave and slightly angular corner with the dorsal face (Fig.). This character would separate it from the common *N. nigrescens*. The lack of an angle along the basal border of the mandible, and a relatively long petiolar node (1.5 X width in dorsal view) would separate it from the similar *N. rugulosus*.

The males can be separated as the mandible is spatulate and the distance between the lateral ocellus and the compound eyes is greater than the diameter of the median ocellus. The gaster is reddish-brown, and the ventral surface of the petiole has long, white hairs (Fig.). It is similar to *N.*

opacithorax, but differs??? ~~but differs in being larger and the stipes (paramere???) has a tall, dorsal projection.~~

Distribution. USA: AZ east to FL, north to CO, VA; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), Isaac's Lake, **Eddy Co.**, Los Medanos, **Lincoln Co.**, Alto, 2 mi SE Alto, **Otero Co.**, 8 mi NE Tularosa, **Socorro Co.**, Sevilleta National Wildlife Refuge, **Union Co.**, Capulin National Monument; MEXICO: Chihuahua, Hidalgo, Jalisco, San Luis Potosí.

Habitat. Oak forests, urban



habitats.

Biology. Flights occur from September to November.

Baldrige et al., 1980

SUBFAMILY MYRMICINAE

The clypeus usually extends posteriorly between the frontal carinae, the frontal area or triangle is well defined. The frontal carinae are well developed, and have lobes that cover the insertions of the antennae. The eyes are usually well developed, containing numerous ommatidia, the ocelli are nearly always absent in the workers (well developed in the females and males). The antennae have 6 - 12 segments (usually 11 or 12) in the workers and females, 13 in the males. An antennal club is often present, with 1 - 5 segments. The metanotal suture is often depressed below the level of the remainder of the mesosoma. The propodeum usually has a pair of angles or spines. The pedicel of these ants consists of 2 segments: the petiole and the postpetiole. The sting is usually well developed, but has become secondarily modified in a few genera (i. e. *Crematogaster*) and no longer functions as a stinger, but usually continues to provide some defensive function. The cuticle of most species is hardened and sculptured.

This subfamily can be separated from most of the others by the presence of a well-defined postpetiole. It could be confused with Pseudomyrmecinae, but can be separated in having smaller eyes (compare figures ____ and ____). It could be separated from Ecitoninae by having much larger eyes (compare figures ____ and ____).

Genus *Acromyrmex*

(Key: Fowler, 1988)

This is a genus of fungus cultivation ants, which can be distinguished as the workers are polymorphic. The frontal carinae extend about ½ the length to the occiput, and the occipital lobes are covered with coarse rugae (Fig.). The mesosoma has numerous spines and the gaster is covered with tubercles. Ants of this genus have 11 segmented antennae in which the insertion is hidden by the lobes of the frontal carinae. Most tubercles and spines have a curved, coarse hair (Fig.). It could only be confused with *Trachymyrmex*, from which it differs in being polymorphic. *Atta* also occurs in the United States (southern AZ, southern TX), and is similar to *Acromyrmex*, but differs in that the dorsum of the gaster is smooth (no tubercles).

This genus is primarily Neotropical, only one species may occur in New Mexico.

***Acromyrmex versicolor* (Pergande)**

Discussion. As this is the only species that would be found in New Mexico, it can be recognized by the characters listed for the genus.

Distribution. USA: CA, AZ; NM: This species has not been reported from New Mexico, but would be expected to be found in the southern part of the state; MEXICO: Chihuahua, Durango check Weber 1972

Habitat. Creosotebush scrub.

Biology. This species nests in the soil, and forages in columns, collecting leaves and pieces of leaves ranging from mesquite (*Prosopis* spp.), *Jatropha dioica*, creosotebush (*Larrea tridentata*), buffalo gourd (*Curcubita foetidissima*) to composite seeds. Nests are large, with probably several thousand workers.

Wheeler, 1907, 1911, 1917, Weber, 1972, Rojas-Fernández and Fragoso, 1994, 2000

Genus *Aphaenogaster*

(Key: Creighton, 1950)

This is a genus of elongate, slender ants, which are very fast and agile in the field. Most species nest in the soil under stones or logs, some of the desert species nest in the soil with the nest entrance surrounded by pebbles. These ants are carnivorous, and collect dead insects, as well as

tend Homoptera or collect nectar. The colonies are moderately large to very large. This is a common genus in New Mexico and occurs in all habitats, but is especially common in desert regions.

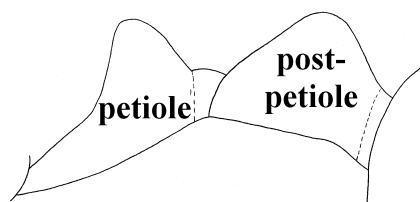


Fig. 112. Petiole and postpetiole of a worker of *A. punctaticeps*.

These ants can usually be easily distinguished by their elongate, slender habitus (general appearance). Their head is usually

longer than broad, eye large, convex and placed at the middle of the head. The mesonotum of the worker is elongate and depressed, the propodeum

usually has a pair of spines or small teeth. The workers could be confused with the minor workers of *Pheidole*, but differ in usually being much larger (over 3 mm total length, usually less than 3 mm in *Pheidole*), and that the antennal club is poorly defined and consists of four segments (well defined in *Pheidole* and usually consisting of three segments).

Key to the workers of the genus *Aphaenogaster*

1. Large ants (10 - 12 mm total length), if smaller, mesosomal dorsum with mesopropodeal suture faint or absent (Fig.); propodeal spines very long (Fig.); usually in arid or semiarid habitats **2**

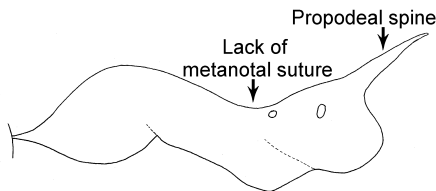


Fig. 113. Outline of the mesosoma of a worker of *A. albisetosa*, showing the lack of a metanotal suture and the long propodeal spines.

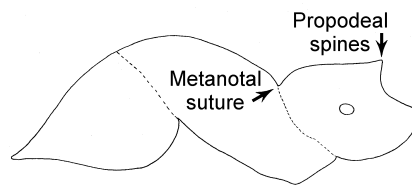


Fig. 114. Outline of the mesosomal outline of a worker of *A. uinta*, showing the metanotal suture and the short propodeal angle or spine.

- Smaller ants (less than 4 mm total length); thoracic dorsum with mesopropodeal suture well marked (Fig.); propodeal spines usually poorly or only moderately defined (Fig.); most common in mesic habitats **3**

2(1). Head (excluding mandibles) slightly longer than broad, with wavy, longitudinal rugae extending almost to occipital border, the occipital area granulose ***albisetosa* Mayr**

- Head (excluding mandibles) at least $1\frac{1}{3}$ times as long as broad with wavy longitudinal rugae well developed only in anterior half of head; posterior half with feeble rugae which are replaced towards the occiput with fine, coriaceous sculpture ***cockerelli* André**

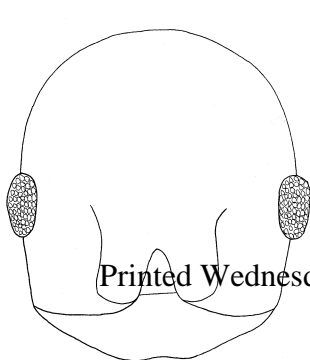


Fig. 116. Head of a worker of *A. albisetosa*.

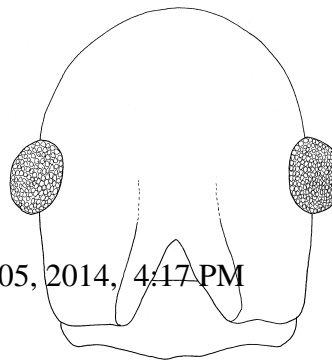


Fig. 115. Head of a worker of *A. cockerelli*.

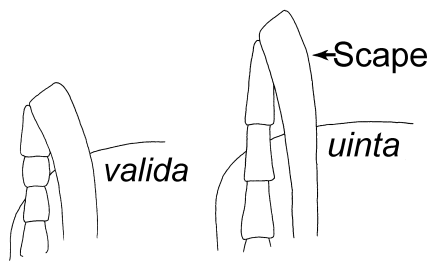


Fig. 117. Outline of the occipital corners of workers of *A. subterranea valida* (left), and *A. uinta* (right) showing the antennal scape extending less than two funicular segments past the occipital corner.



Fig. 118. Outline of the occipital corner of a worker of *A. texana*, showing the antennal scape extending 3 funicular segments past the occipital corner.

3(1). Antennal scape of largest worker (not always true of minim) surpassing occipital margin by less than length of first 2 funicular segments (or rarely equal to, Fig.); sculpture of head fine **4**

- Antennal scapes of all workers surpassing occipital margin by greater than length of first 2 funicular segments in workers of all sizes;

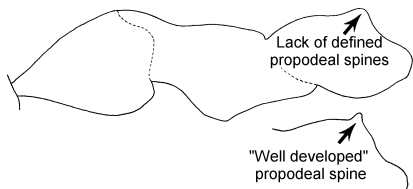


Fig. 119. Outline of the dorsum of the mesosoma of a worker of *A. boulderensis smithi*, showing the lack of propodeal spines on the propodeum. The inset shows an exceedingly well developed propodeal spine.

dorsum of head with coarse rugae, or completely punctate **5**

4(3). Bicolored, head and mesosoma orange yellow or red, gaster dusky red to deep brown; head with very feeble intrarugal sculpture **uinta**

Wheeler

- Concolorous castaneous brown; head with abundant, fine, punctatorugose sculpture between longitudinal rugae **subterranea valida**

Wheeler

5(3). Propodeum without spines, rounded or angular (Figs); bicolored, head and mesosoma red, gaster black **boulderensis smithi**

- Propodeum with distinct teeth or spines (Figs); color variable, sometimes bicolored **6**

6(5). Base of antennal scape with small, angular lobe which projects forward; propodeal armed with short, triangular teeth **7**

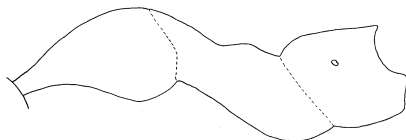


Fig. 120. Outline of the dorsum of the mesosoma of a worker of *A. punctaticeps*, showing the presence of propodeal spines on the propodeum.

- Base of antennal scape without such lobe (Fig.); propodeal armature variable **8**

7(6). Concolorous light reddish brown *huachucana huachucana* **Creighton**

- Darker, head mesosoma and legs reddish brown, gaster black *huachucana crinimera* **Cole**

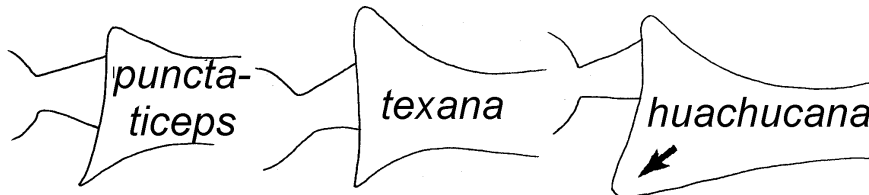


Fig. 121. The base of the scape of workers of *A. punctaticeps*, *A. texana*, and *A. huachucana* (the arrow indicates the lobe).

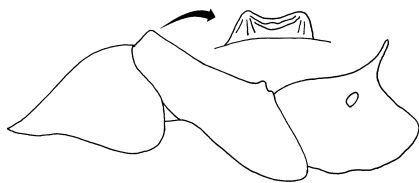


Fig. 124. Outline of the mesosoma of a worker of *A. fulva*, showing the metanotal welt from the side and from the front (inset).

8(6). Anterior edge of mesonotum rising abruptly above adjacent portion of pronotum, transverse welt thus formed distinctly concave in middle; propodeal spines at least as long as posterior face of propodeum and directed upwards *fulva* **Roger**

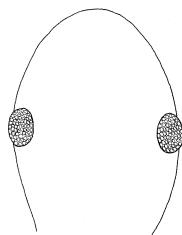


Fig. 122. Outline of the head of a worker of *A. punctaticeps*, showing part of the punctate sculpturing.

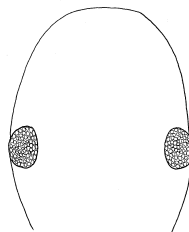


Fig. 123. Outline of the head of a worker of *A. texana*, showing part of the coarse sculpturing. puncture missing???

- Mesonotum not abruptly elevated above pronotum, or if higher, anterior edge not forming transverse welt (Fig. of *punctaticeps*) ; propodeal spines rarely as long as posterior face of propodeum, usually directed backward **9**

9(8). Head of largest workers not more than one sixth longer than broad (excluding mandibles); head of smaller workers approximately one-fifth longer than broad *picea rudis* **Enzmann**

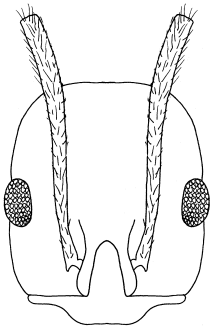


Fig. 125. Outline of the head of a worker of *A. picea rudis*.

- Head of worker, regardless of size, approximately one-third longer than broad **10**

10(9). Dorsum of head with prominent coarse rugae *texana* **Wheeler**

- Dorsum of head without prominent coarse rugae, a few poorly defined rugae present posterior to frontal area, remainder of head punctate *punctaticeps* **Mackay**

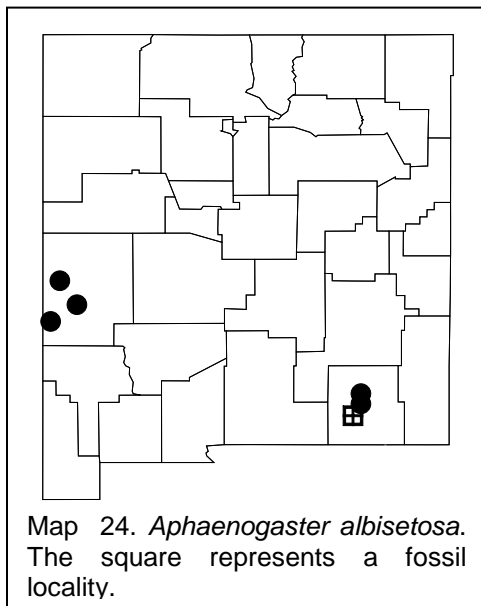
Aphaenogaster albisetosa Mayr

Discussion. This is the second most common species of the genus in New Mexico. It can be distinguished from all others except *A.*

cockerelli by the elongate body, long legs and well-developed spines on the propodeum. Most workers can be distinguished from the closely related *A. cockerelli* as it has a less elongate head. Specimens of these 2 species are often difficult to separate.

Distribution. USA: TX, AZ; NM: **Catron Co.**, Catwalk, Frisco Hot Springs, 20k N Glenwood, **Eddy Co.**, 12 mi N Carlsbad, 10 mi S Carlsbad, Last Chance Canyon (fossil); MEXICO: Chihuahua

Habitat. Areas ranging from Chihuahuan Desert to oak



forests. When it is found in arid ecosystems, it is usually found in the bottoms of arroyos or in areas near water. The soil is often rocky with boulders.

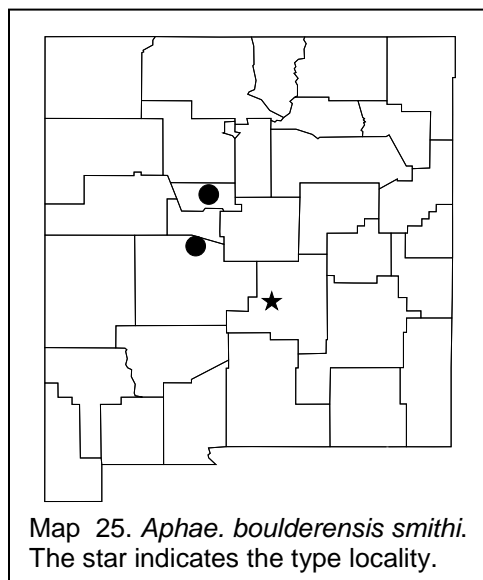
Biology. Nests are usually found under stones with the entrance surrounded by gravel.

Wheeler 1910, Cole 1934, Creighton 1955

***Aphaenogaster boulderensis smithi* Gregg**

Discussion. This is not a common subspecies in New Mexico. It can be separated from all other *Aphaenogaster* sp. in New Mexico by the lack of propodeal spines (Fig. bould. smithi.), although tiny bumps may be present. It is very similar to *A. boulderensis boulderensis* and could

perhaps be synonymized, but differs in that it is a red ant with a black gaster, which is a color pattern that we have never seen in *A. boulderensis boulderensis* (which occurs in AZ, NV and possibly TX, and could also be found in New Mexico).



ATM Distribution. USA: NM: Bernalillo Co., Petroglyph Park, Lincoln Co., near Carrizozo (Malpais Lava Beds of Tularosa Basin, type locality), Socorro Co., Sevilleta Wildlife Refuge (Map).

Habitat. Creosotebush scrub.

Biology. Unknown.

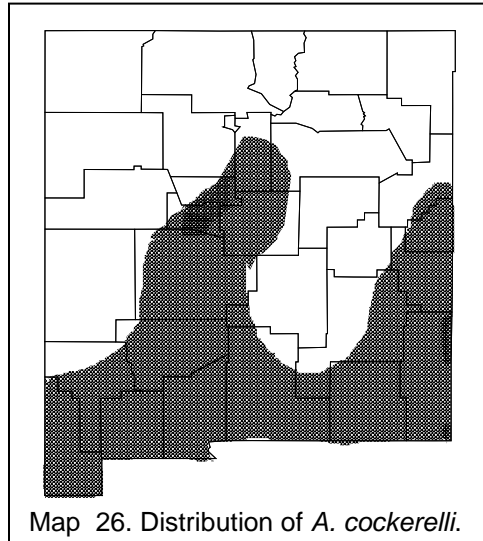
***Aphaenogaster cockerelli* André**

Synonyms. *Aphaenogaster sonora* Pergande.

Discussion. This ant is easily distinguished, as it is a large, elongate species with long legs and two well-developed spines on the propodeum. Its elongate head usually distinguishes it from the closely related *A. albisetosa*, although the two species can be difficult to separate.

Distribution. USA: southern CA, NV, AZ, TX, NM: Doña Ana Co., Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological

Research site), 18 k E Las Cruces, 1.5 m W Mesilla, **Eddy Co.**, Carlsbad, Carlsbad Caverns, Brantly Lake State Park, **Grant Co.** 100 k N Silver City, 60 k E Silver City, **Lea Co.** 20 mi WSW Hobbs, **Luna Co.** near Deming. 40 k W Deming, **Otero Co.** Lake Lucero, **Quay Co.**, Logan/Ute Lake, **Sierra Co.** 4 k W Hillsborough, Truth or Consequences, **Socorro Co.**, Sevilleta National Wildlife Refuge; MEXICO: Sonora, Chihuahua, Coahuila, Durango, Nuevo León.



Habitat. Creosotebush scrub, in the most arid of habitats, fluff grass, open areas with annuals, usually at elevations below 1500 m.

Biology. This is the most common member of this genus in New Mexico. Nests are usually found in the soil with the entrance surrounded by a circle of pebbles with a diameter of about 50 cms. Even nests under stones usually have the entrance surrounded by pebbles. Most nests are found in rocky soil, although they may nest in sandy soils, even dunes.

Individual foragers are usually found during early morning and evening, and occasionally during the night. Foraging occurs throughout the day during the cool part of the year or even on cloudy days during the summer. These ants are omnivorous. Prey usually consists of dead or dying insects, parts of plants and seeds. This species is very aggressive, but cannot sting; the bite is very fastidious when large numbers are attacking.

Wheeler, 1910, Wheeler and Creighton, 1934, Cole, 1934, Mallis, 1941, Cole 1953, Creighton, 1955, Whitford and Ettershank, 1975, Rodríguez, 1986, Rojas-Fernández and Fragoso, 1994, 2000

***Aphaenogaster fulva* Roger**

Discussion. This species is easily separated from all other species in the genus by the form of the mesonotum, which is abruptly elevated above the level of the pronotum (Fig.). This structure is actually a welt

which is concave in the middle (as seen from behind - Fig.), or may appear as two broad tubercles.

Distribution. USA: Eastern United States west to CO. Not reported from NM, but may occur in the northern part of the state.

Habitat. Mesic forests and meadows.

Biology. This species nests in logs and stumps or under stones. It is a temporary host of other members of the genus.

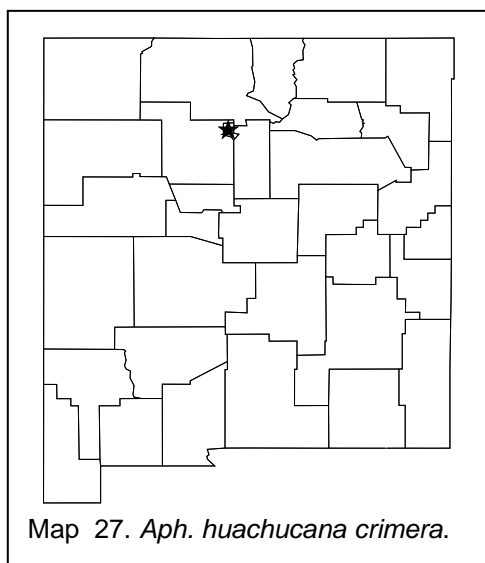
***Aphaenogaster huachucana huachucana* Creighton**

Discussion. This species is difficult to recognize. The antennal scapes are long, extending more than 2 funicular segments past the occipital corners. The head is elongate (head width / head length about 0.67). The propodeal spines are short and broad at the base. The key character, the small, angular lobe at the base of the antennal scape (Fig.), projects forward, but is difficult to see. Fortunately this species is not common anywhere and has not been reported from New Mexico.

Distribution. USA: SE AZ, central and extreme SW CO; west Texas, east of El Paso (fossils, see Mackay and Elias, 1992); **NM:** Not yet reported from New Mexico, but would be expected to occur in the state.

Habitat. Oak, alligator bark juniper, and pinyon-cedar woodlands.

Biology. This ant nests under stones, and is uncommon.



***Aphaenogaster huachucana crinimera* Cole**

Discussion. This species differs from the typical *A. huachucana huachucana*, in having a black gaster. It is similar to the situation with *A. boulderensis smithi*, which also has a black gaster, and will continue to be considered as a subspecies.

Distribution. USA: **NM:** Sandoval Co., Bandelier National Monument (Type locality).

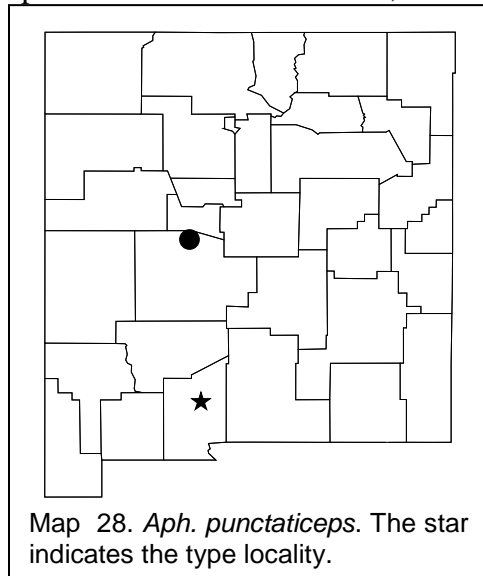
Habitat. Grassy areas with dense pines and scrub oak, south facing slope to a densely shaded stream in an area of large pines (Cole, 1953).

Biology. This species nests under stones. The workers are very active and agile. Sexuals were present in nests in late July.

Cole 1953

***Aphaenogaster punctaticeps* Mackay**

Discussion. The head of this species is elongate (head width / head length 0.71), and nearly completely covered with punctures. Most of the mesosoma has similar sculpture. The propodeal spines are small. This species is similar to *A. texana*, but differs in that the posterior border of the



head is moderately pointed (rounded in *A. texana*) and the dorsum of the head is primarily punctate (rugose with punctures in the intrarugal spaces in *A. texana*).

Distribution. USA: TX (Sabine Co., Smith Co.); NM: Doña Ana Co., 45 K NE Las Cruces (Jornada Long Term Ecological Research Site, type locality), Socorro Co., Sevilleta National Wildlife Refuge.

Habitat. Creosotebush scrub.

Biology. This ant nests in kangaroo rat mounds (Cover, pers. comm.) or in prairie dog towns (Fagerlund, pers. comm.).

***Aphaenogaster picea rudis* Enzmann**

Discussion. Workers of this species have shortened heads (head width / head length about 0.81), the scapes extend more than two funicular segments past the occipital corners, and have moderately sized propodeal spines. It can be separated from *A. fulva* by the lower level of the mesonotum, the top of which is at about the level of the pronotum. The propodeal spines are more developed than those in *A. huachucana*. *Aphaenogaster rudis rudis* Emery occurs in eastern United States.

Distribution. USA: Eastern United States west to CO, may occur in northern New Mexico.

Habitat. Mesic forest sites.

Biology. This species nests in a variety of sites, from soil, under stones. to hollow plant stems.

***Aphaenogaster subterranea valida* Wheeler**

Discussion. The workers of this species are small, medium brown ants in which the scape extends past the occipital border by about two funicular segments. The mesopropodeum is a single, convex unit, with the promesonotal suture is poorly marked. The dorsum of the propodeum is level and straight, the propodeal spines are poorly developed. The apices of the petiole and postpetiole are rounded and similar in shape. This species can be easily confused with members of the genus *Stenamma*. It differs in that the eyes are of a normal size (small to tiny in *Stenamma*) and the scapes extend past the occipital corners, although usually less than the first two funicular segments (barely reach occipital corners in *Stenamma*). It could be confused with minor workers of *Pheidole*, but can be separated by the similar shapes of the petiole and postpetiole. Also, the scape is shorter than that of the minors of most species of *Pheidole*. This subspecies intergrades with *A. subterranea occidentalis* and is undoubtedly a synonym. Creighton (1950) separates this subspecies from *A. subterranea occidentalis* on the basis of the larger workers (6 mm in length versus 4.5 mm in length in *A. subterranea occidentalis*), larger females (8 mm in length versus 6.5 mm in length) and darker color (castaneous brown versus piceous brown). None of these characters appear to be reliable. We have several series of *A. subterranea occidentalis* from northern California with workers ranging from 2.8 - 5 mm, and specimens of *A. subterranea valida* from Utah which are as small as 5 mm. The queens of two series of *A. subterranea occidentalis* are nearly 8 mm in length. Specimens of *A. subterranea valida* from Utah are often medium brown, much lighter than the darker *A. subterranea occidentalis*.

Aphaenogaster subterranea subterranea occurs in Europe. Emery separated *A. subterranea occidentalis* using minor differences including a longer head and thinner scapes (see Creighton, 1950:149). Comparison of workers from Czechoslovakia and Spain with specimens of *A. subterranea occidentalis* from California shows them to be essentially identical, and

both of the subspecies in the United States may be found to be synonyms of the typical *A. subterranea* from Europe.

Distribution. USA: Canada south to CO; NM: This species has not been collected in New Mexico, but occurs throughout the western half of Colorado as far south as La Plata Co. near the New Mexico border, and would be expected to occur in the northwestern part of the state.

Habitat. Moist, shady foothill canyons.

Biology. This ant nests under stones. Creighton (1950) suggests that the nesting habits are considerably more flexible than those of *A. subterranea occidentalis*, and that colonies are often in areas of moderately heavy cover, although it prefers open and rather dry nest sites.

***Aphaenogaster texana texana* Wheeler**

Discussion. Workers of this species have elongate heads (head width / head length about 0.77), the scapes of the largest workers extend about 4 funicular segments past the occipital border. The head has rugae mixed with punctures, and the occipital border is rounded. The propodeal spines are weakly or moderately developed. This species could be confused with *A. punctaticeps*, but can be separated on the basis of the sculpture of the head (punctate in *A. punctaticeps*) and the rounded occipital border (more pointed in *A. punctaticeps*). The head is much more elongate than that of *A. rudis* (compare figures ____ and ____).

Distribution. USA: eastern United States west to AZ. It has not been reported from New Mexico, but may occur there.

Habitat. Riparian deciduous forests, pine forests (Apache, ponderosa, and Chihuahua), oak forests (*Quercus emoryi*), grassy forest floors.

Biology. This species nests under stones, in moist, rocky soil. Brood was found in nests in April. All nests had only a single gyne.

***Aphaenogaster uinta* Wheeler**

Discussion. The scapes of the workers of this species extend past the occipital corner by about 2 funicular segments. The rugae on the dorsum of the head are weakly developed and the spaces between the rugae are weakly shining. The head is relatively short (head width / head length about 0.8). The propodeal spines are poorly developed and weak at the base.

Distribution. USA: ID, UT to SW CO; NM: We have no records from the state, but occurs in Montezuma Co., of the extreme SW corner of Colorado, and may occur in the NW corner of New Mexico.

Habitat. Arid regions, Creighton (1950) reports that it is one of the few ants that thrives in the vicinity of the Great Salt Lake.

Biology. Unknown.

Wheeler, 1917, Creighton, 1950, Gregg, 1963

Genus *Cardiocondyla*

(Key: Mackay, 1995)

This is a genus of small, inconspicuous ants, which have not been reported from New Mexico. Most or all of the New World species have been introduced. We have recently found one species (*C. ectopia* Snelling check id) in El Paso, and a desert habitat in west Texas near Van Horn. It is also reported from Arizona. Thus it is likely that this species will be found in New Mexico.

Genus *Cephalotes*

(Key: de Andrade and Baroni-Urbani, 1999)

Ants of this genus are among the most interesting that we have, due to their curious shape (Fig.), which also makes them easily distinguished from all other genera. The genus is primarily South American, and due to the large number of species, and confusion with the previously recognized genera *Cryptocerus*, *Zacryptocerus*, and *Paracryptocerus*, makes these ants difficult to identify. Only one species of this genus would be expected in New Mexico.

Cephalotes rohweri (Wheeler)

Discussion. This ant is easily distinguished from all others in the southwest by numerous spines on the frontal carinae extend to the posterior cavity into which the scape rests. The well-defined club. The mesosoma has tubercles, and the petiole and postpetiole confused with *Trachymyrmex*, but can be flattened, the pronotal spines are directed

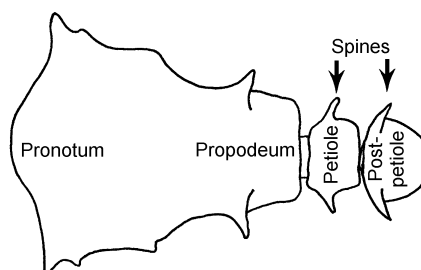


Fig. 126. Top view of the mesosoma, petiole and postpetiole of a minor worker of *C. rohweri*.

(*Trachymyrmex* is not flattened, the pronotal spines are directed vertically, and it lives in the soil).

Distribution. USA: Southern AZ, may occur in western NM; MEXICO (Smith, 1979).

Habitat. Oak forests.

Biology. These ants nest in branches and limbs of oaks (*Quercus* spp.). Large numbers of

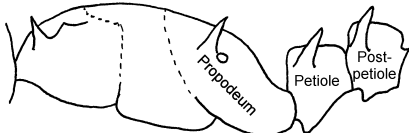


Fig. 128. Side view of the mesosoma, petiole and postpetiole of a minor worker of *C. rohweri*.

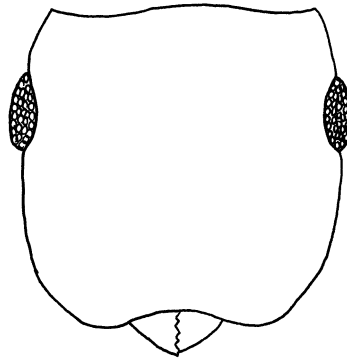


Fig. 127. Head of a minor worker of *C. rohweri*.

branches have to be searched to find this rare ant, but the chance to see this fascinating ant is well worth the search. Food consists of honeydew and small arthropods.

Smith, 1947, Creighton and Nutting, 1965, Creighton, 1967

Genus *Crematogaster*

(Key: Buren, 1968)

This genus is the most easily recognized among those found in New Mexico. The gaster is heart shaped (as seen from above) and the postpetiole attaches to the dorsum of the gaster. When a nest is disturbed, workers wave the gaster above the body, exuding a drop of liquid from the tip. Thus they are commonly referred to as acrobatic ants. In addition, the antenna is 11 segmented with a three segmented club (two segmented in two New Mexican species, *C. arizonensis* and *C. minutissima*). The propodeum has a pair of spines. The petiole is flattened and somewhat concave in all species except *C. arizonensis* and *C. minutissima* (best seen from above); the postpetiole has two lateral lobes separated by a longitudinal furrow (lacking in *C. arizonensis* and *C. minutissima*). No other genus in New Mexico has this combination of characters.

The genus is most common in arid areas, although species occur

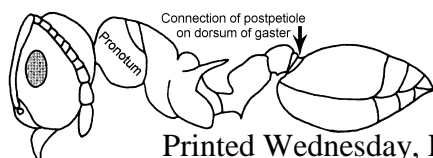


Fig. 129. Side view of a worker of *C. larreae*.

in essentially all habitats in New Mexico. Most species nest under stones or occasionally in logs. Some nest in trees (especially cottonwoods and oaks) and hollow stems or roots of desert plants. They tend Homoptera and feed on dead animals. These ants are docile and cannot sting, rarely individuals in a colony will attack an intruder, but such behavior is rarely threatening.

This is an extremely difficult group for identification to species, due to the similarity among species and variability within species. A series should consist of 10 or more workers. It is rarely possible to identify a single ant or even a series of two or three specimens. Much of the identification depends on the numbers of hairs on the mesosoma, or on subtle differences in sculpture of the mesosoma. These hairs are apparently broken during normal activities of the ant. Thus it is not unusual to find workers in a series with the numbers of hairs ranging from none to several. In this case, use the ant with the most hairs to key the series. Buren (1968) presented a key to the North American species, but due to the variability within species, use of the key does not always result in correct identifications. A number of "species", such as *C. cerasi*, are probably species complexes. Others appear to be synonyms. The following key will hopefully be adequate for identification of the New Mexican species.

Key to the workers of the genus *Crematogaster*

1. Postpetiole without trace of median, elongate depression, sub-oval and entire; pronotum predominantly smooth and shining 2

- Postpetiole divided by a median, longitudinal depression, forming 2 lateral lobes; pronotum usually with sculpture 3

2(1). Concolorous (one color) yellow *minutissima smithi* Creighton

- Concolorous dark brown *arizonensis* Wheeler

3.(1). Erect hairs numerous on the dorsum of mesosoma (Fig.), usually 10 or more on pronotum, 2 or more (usually 6 or more) on the mesonotum; one or more on the

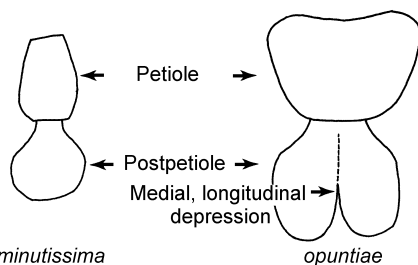


Fig. 130. Petiole and postpetiole of a worker of *C. minutissima*, as seen from the top, showing the postpetiole without a median depression, and of a worker of *C. opuntiae*, showing the postpetiole with a median depression.

propodeum or propodeal spines 4

- Erect hairs not numerous on dorsum of mesosoma (Fig.) and rarely present on mesothorax or propodeum, usually restricted to 1 - 4 on pronotum, often completely absent on pronotum 6

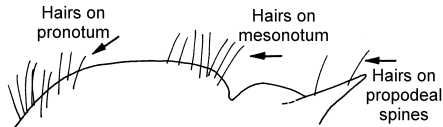


Fig. 132. Mesosoma of a worker of *C. punctulata*. The arrows indicates the numerous hairs on the pronotum, mesonotum, and propodeal spines.

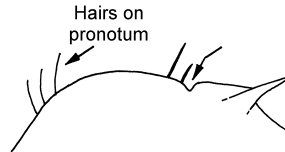


Fig. 131. Mesosoma of a worker of *C. hespera*, showing the sparse erect hairs.

4(3). Thoracic punctation fine (Fig.), surface shining to subopaque, especially obvious on sides of pronotum **navajoa Buren**

- Sides of mesosoma with coarse punctures (Fig.), surface subopaque 5

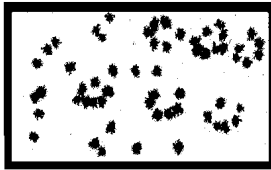


Fig. 134. Mesosomal punctation of a worker of *C. navajoa*.

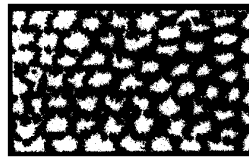


Fig. 133. Mesosomal punctation of a worker of *C. punctulata*.

5(4). Dorsal surface of mesosoma punctate; relatively common **punctulata Emery**

- Dorsal surface of mesosoma rugose or striate; unknown from New Mexico **lineolata (Say)**

6(3). Posterior face of propodeum and entire head strongly punctate; erect hairs numerous on gaster (normally more than 20)..... **dentinodis Forel**

- Posterior face of propodeum smooth and usually glossy; at least central portion of dorsum of head relatively smooth; erect hairs sparse on gaster (rarely more than 10 in total) ... 7

7(6). Propodeal spines not inserted at widest point of propodeum; nests in oak branches **isolata Buren**

- Mesopropodeal impression shallow; propodeal spines inserted at widest point of propodeum; rarely or never nesting in oaks 8

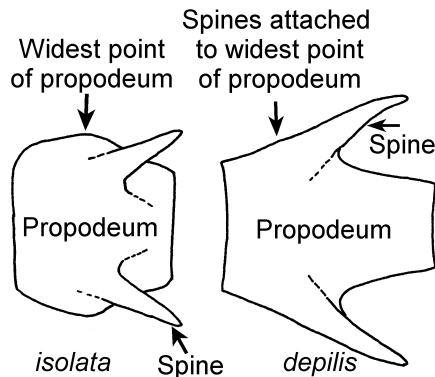


Fig. 135. Propodea and propodeal spines of workers of *C. isolata* and *C. depilis*. The arrow indicates that the spines of *C. isolata* do not originate at the widest point of the propodeum, but they do in *C. depilis*.

8(7). Mesosoma densely punctate; erect hairs of mesosoma restricted to a single hair on each pronotal shoulder (Fig.), or completely absent (pronotal hairs similar in all members of a nest series) 9

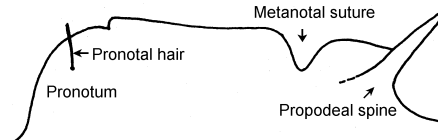


Fig. 136. Mesosoma of a worker of *C. dentinodis*.

members of a nest series) 14

9(8). Mesosoma without erect hairs 10

- Mesosoma with a single erect hair on each shoulder (caution: may be broken and missing on 1 or both of the shoulders, look at as many specimens as possible. Some specimens have 1 hair on 1 side, 2 on the other) 11

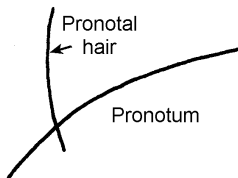


Fig. 137. Pronotal hair of a worker of *C. cerasi*.

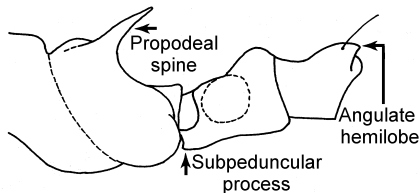


Fig. 139. Propodeum, petiole and postpetiole of a worker of *C. colei*, indicating the propodeal spines, which are not thickened at the base, the process on the ventral surface of the petiole, and the angulate hemilobes of the postpetiole.

10(9). Head and mesosoma red, gaster black; nests in and among roots of various plants **depilis** Wheeler

- Concolorous dark brown or black; nests in roots of creosotebush **larreae** Buren

11(10). Possessing most or all of following characteristics: hemilobes

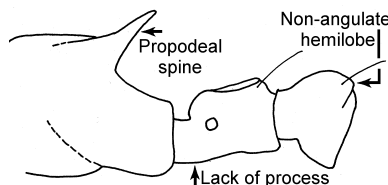


Fig. 138. Propodeum, petiole and postpetiole of a worker of *C. cerasi*, indicating the propodeal spines, the lack of a process on the peduncle, and the non-angulate (blunt) hemilobes of the postpetiole.

of postpetiole somewhat angulate to very angulate behind in profile (Fig.); process on ventral surface of peduncle well developed and lobe like (Fig.); propodeal spines not thickened at base, smoothly tapering (Fig.)

..... ***colei* Buren**

- Without all of these characteristics (Fig.); postpetiole not sharply angulate posteriorly, as seen in profile (Fig.) **12**

12(11). Pubescent hairs suberect on scapes and head, rather long on body

..... ***californica* Wheeler**

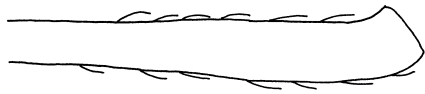


Fig. 140. Antennal scape of a worker of *C. opuntiae*.

13(12). Mesosoma opaque with strong puncturing on all surfaces except posterior face of propodeum; often associated with cholla ***opuntiae* Buren**

- Mesosoma sub-shining, punctures shallow, except on lower mesopleuron ***nocturna* Buren***

14(8). Lower half of mesopleuron with distinct striae (Fig.)

***mormonum* Emery**

Fig. 142. Mesopleuron of a worker of *C. mormonum*.

- Pubescent hairs appressed on scapes and head and shorter and less noticeable on all surfaces

..... **13**

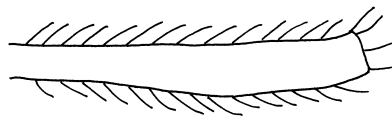


Fig. 141. Antennal scape of a worker of *C. californica*

- Lower half of mesopleuron without distinct striae (Fig.) **15**

15(14). Head and mesosoma red; mesosoma shining, but with fine, distinct longitudinal striae; without distinct declivity at rear of mesonotum, usually nest in cottonwoods

***hespera* Buren**

Fig. 143. Mesopleuron of a worker of *C. hespera*.

- Without this combination of characteristics **16**

16(15). Mesosomal hairs short and straight, with 4 - 6 in a clump on pronotal shoulder, plus 1 or 2 pairs

at rear of mesonotum (Fig.); often constructs carton structures under stones, especially in mountainous areas ***emeryana* Creighton**

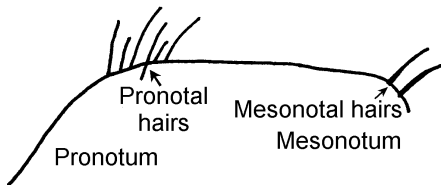


Fig. 144. Mesosoma of a worker of *C. emeryana*.

- Mesosomal hairs longer and flexuous, with clump of 1 - 3 hairs on each pronotal shoulder, remainder of mesosoma without erect hairs **17**

17(16). Propodeal spines very short, straight or slightly to moderately incurved; petiole barely

wider than postpetiole; rarely collected, usually in mountainous areas

***browni* Buren**

- Propodeal spines well developed, thickened at base; process on ventral surface of peduncle of petiole very poorly developed or absent; widely distributed, usually found in more arid areas **18**

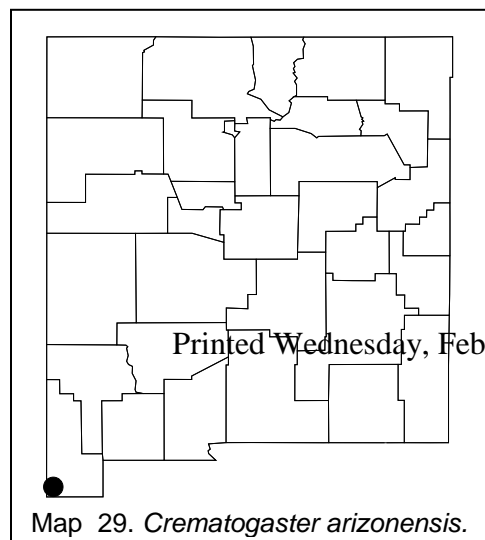
18(17). Sides of pronotum usually distinctly punctate and dorsum of mesosoma striate; propodeal spines often curved (Fig.); commonly collected ***cerasi* (Fitch)**

Fig. 145. Propodeal spines of *C. cerasi* and *C. laeviuscula*.

- Sides of pronotum and dorsum of pronotum and mesonotum smooth and shining; propodeal spines usually straight (Fig.); not known from New Mexico ***laeviuscula* Mayr**

***Crematogaster arizonensis* Wheeler**

Discussion. This species is easily recognized by the shape of the petiole (sides almost parallel, dorsum slightly convex) and the lack of distinct hemilobes in the postpetiole. The postpetiole is basically shaped like a laterally elongate sphere (Fig.). It is concolorous dark brown and has only a few erect hairs on the gaster, characters, which distinguish it from the closely related *C. minutissima*. This species is closely related to



Map 29. *Crematogaster arizonensis*.

the Neotropical species *C. ampla* (as well as *C. brevispinosa*), and may be a synonym of the former species.

Distribution. USA: southeastern Arizona, NM: **Hidalgo Co.**, Guadalupe Canyon.

Habitat. Oak forests, or areas with desert shrubs.

Biology. This species nests in the soil, in mistletoe and branches of oak trees, mesquite trees or palo verde trees, or under the roots of a cottonwood tree. Some of the workers are larger and specialized for producing unfertilized eggs, which are fed to the queen or brood, or develop into males. The specimens from New Mexico were collected under oaks along a trail.

Wheeler, 1908, 1912, Heinze et al., 1995

***Crematogaster browni* Buren**

Discussion. This is a rarely collected species that can be recognized by the tiny propodeal spines (Fig.) and the presence of a few erect hairs on the pronotum and none on the mesonotum. The petiole is only slightly wider (maximum width) than the postpetiole (Fig.).

Distribution. USA: southern AZ east to western TX; NM: We know of no records of this species from New Mexico.

Habitat. Mountainous areas.

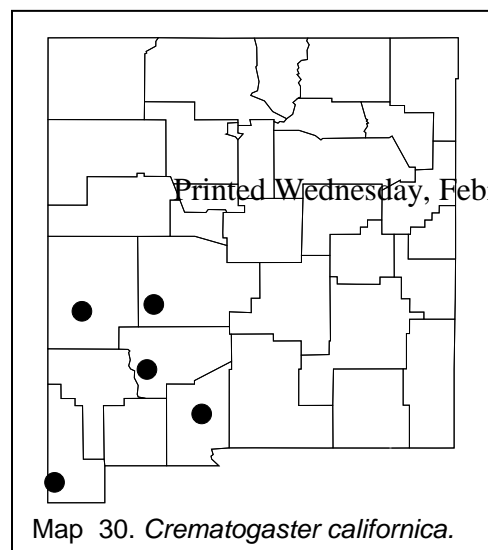
Biology. Nests are found under stones.

***Crematogaster californica* Wheeler**

Discussion. This species is closely related to *C. opuntiae*, which is probably a synonym. It is not unusual to find specimens with semierect hairs on 1 scape and decumbent hairs on the other. Sometimes a single scape has semierect hairs on 1 section, and decumbent hairs on the other. We will maintain them as separate species until they can be closely examined. Some specimens in New Mexico can be considered to be *C. californica* as recognized in Buren (1968). See the discussion of *C. opuntiae* for more details.

A small, pale, possibly undescribed species from **Catron Co.**, 20.6 k N Glenwood (33°30'23.2"N 108°54'6.4"W, nesting under stones) keys to *C. californica*, and may represent incipient nests.

Distribution. USA: Buren (1968) states it occurs in southern California and Baja California;



Printed Wednesday, February 05, 2014, 4:17 PM

NM: Catron Co., Catwalk, **Doña Ana Co.**, 45 k NE Las Cruces, (Long Term Ecological Research site), **Grant Co.**, Gila Mts (Wright's Cabin), **Hidalgo Co.**, Clanton Draw (Gray Ranch), **Socorro Co.**, 8 mi from H107 on H52.

Habitat. Arid areas, including grasslands (grama) and desert scrub (creosote) up to pinyon-juniper forests, Chihuahuah pine and oak forests up to 2350 meters elevation. One nest was in a ponderosa pine, Douglas fir forest, but this as in unusual habitat for this species.

Biology. Nests are found at the bases of plants and in chollas (although Buren [1968] stated that it did not nest in cactus), or under stones (one nest at high elevation was under a log). Brood was found in nests in March. This at tends coccids and aphids. One colony was nesting together with *Camponotus* #17959. ??? not in Camp revision or in this manuscript

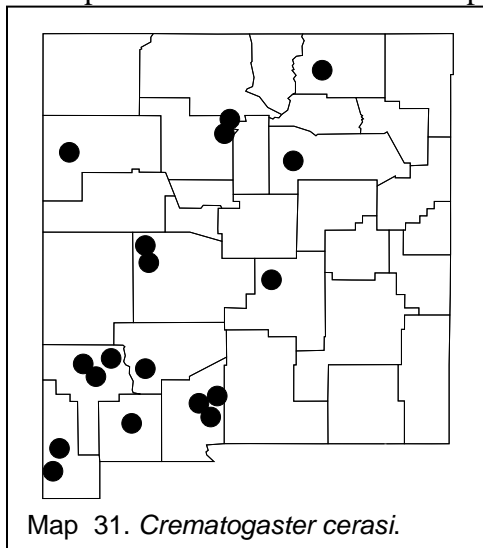
Mallis, 1941, Wheeler and Wheeler, 1973

***Crematogaster cerasi* (Fitch)**

Discussion. Specimens of this species may be keyed with difficulty to *C. colei* using Buren (1968). The pronotum often has a single erect hair, a pair of hairs or three or more pairs of erect hairs. The hemilobes of the postpetiole are never sharply angulate as in *C. colei*. This species is even more difficult to distinguish from *C. hespera*. Both are small, delicate species that are very similar. *Crematogaster cerasi* never has hairs at the rear of the mesonotum, *C. hespera* often has hairs in the same position. The dorsum of the promesonotum of *C. cerasi* is usually

granulated, that of *C. hespera* has longitudinal striations in the same position. The basal face of the propodeum also has longitudinal striation. The characteristics in our key should allow separation of the two species.

Distribution. USA: eastern United States west to AZ; **NM: Colfax Co.**, 41 k E Eagle Nest, **Doña Ana Co.**, Aguirre Springs, 45 K NE Las Cruces (Jornada Long Term Ecological Research



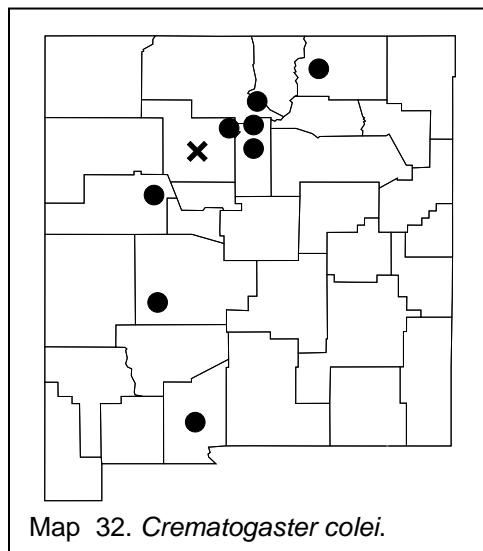
Site), Organ Mts., Soledad Canyon, **Grant Co.**, Gila Mts. (Wright's Cabin), Mimbres, 100k NW Silver City, **Hidalgo Co.**, SW Animas Mts., Coronado National Park (Clanton Draw), **Lincoln Co.**, Valley of Fire State Park, **Los Alamos Co.** Los Alamos, near Rio Grande, Camp May, **Luna Co.**, 14 mi S Deming, **McKinley Co.**, Zuni Mts (southeast of Gallup), **San Miguel Co.**, Villanueva State Park, **Socorro Co.**, Grassy Lookout, Magdalena Mts.

Habitat. Chihuahuan Desert along mountain slopes, grasslands, pinyon-juniper, oak, sagebrush, ponderosa pine, fir forests, and riparian habitats, up to 2350 meters elevation.

Biology. This species commonly nests under stones, or under a log (1 nest); brood and reproductives were found in nests from May to August. This is one of the most common *Crematogaster* spp. in mesic and xeric sites in New Mexico. Workers are sometimes aggressive when the nest is disturbed. Foragers are often found on vegetation, especially cholla (*Opuntia* spp). This species may be polygynous, as multiple, dealate females are often encountered in nests. Two colonies were nesting with *Camponotus festinatus*.

Gaige, 1914, Headley, 1943, Morris, 1943, Wheeler and Wheeler, 1944, Kanno, 1959, Kulman 1965, Smith 1965

***Crematogaster colei* Buren**



Discussion. Specimens of this species will often key to *C. depilis* using Buren (1968), as there are often no hairs present on the pronotum. It differs in that the hemilobes of postpetiole are always at least somewhat sharply angulate (rounded in *C. depilis*), the posterior part of the side of the pronotum is somewhat shiny and lightly punctated (heavily punctated in *C. depilis*), it is concolorous dark brown to yellowish brown (*C. depilis* is usually reddish brown with a black gaster) and the subpeduncular

process is well developed (poorly developed in *C. depilis*). It could also be confused with *C. larreae*, but as far as is known, *C. larreae* nests only in creosotebush shrubs (*Larrea tridentata*).

Distribution. USA: AZ to W TX; NM: **Cibola Co.**, Laguna, **Colfax Co.**, 41 k E Eagle Nest, **Doña Ana Co.**, 18 k E Las Cruces, **Los Alamos Co.**, Los Alamos, **Rio Arriba Co.**, 2 k N Dixon, **Sandoval Co.**, without locality, **Santa Fe Co.**, Santa Fe, 24 k NE Santa Fe, **Socorro Co.**, Intersection Rd. 330 & 107, 33°48'32.2"N 107°22'57.2".

Habitat. Sagebrush, disturbed areas, grasslands.

Biology. This species is not common in New Mexico, it usually nests under stones.

***Crematogaster dentinodis* Forel**

Discussion. This is one of the few species that is reasonably easy to recognize, as most of the surfaces of the head and mesosoma are densely punctate. It may be confused with *C. punctulata*, but can be distinguished, as the descending face of the propodeum is also punctate, the same surface of *C. punctulata* is smooth and shining. The punctuation of the head of *C. punctulata* is not as dense as it is in *C. dentinodis*, leaving parts of the middle of the head somewhat smooth and shining. Also the dorsum of the mesosoma of *C. dentinodis* has fewer hairs than occurs in *C. punctulata*.

Distribution. USA: AZ (including SE corner), may occur in New Mexico.

Habitat. Occurs in a number of different community types.

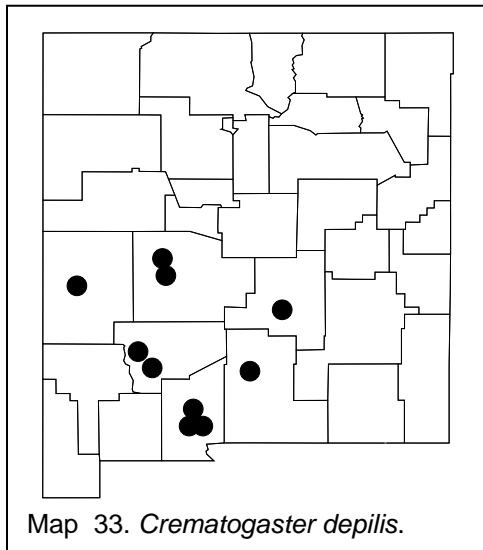
Biology. This species nests under stones.

***Crematogaster depilis* Wheeler**

Discussion. This species, together with the closely related *C. larreae*, can be distinguished from others in the genus by the lack of any erect hairs on the pronotal shoulder and in being robust ants with a heavily punctated mesosoma. Separating this species from *C. larreae* is difficult, and is based almost exclusively on color. *Crematogaster depilis* is usually red or reddish brown with a darker gaster, whereas *C. larreae* is usually concolorous dark brown. Some specimens of *Crematogaster* are brown with a slightly darker gaster. These specimens are usually impossible to separate into one of these species. If they were nesting in creosotebush, they are probably *C. larreae*, although *C. depilis* nests at the bases of

creosotebushes. Specimens of *C. isolata* may key to *C. depilis*, but they nest in the branches of oaks, thus allowing their recognition.

A small, dark species with the side of the pronotum mostly smooth and shining and with small propodeal spines keys to *C. depilis*, but may represent an undescribed species. Two specimens were collected from **Hidalgo Co.**, Clanton Draw (# 17937), nesting in beetle galleries in the oak *Quercus arizonica*.



Distribution. USA: S CA east to TX; NM: **Catron Co.**, 18.9 k NW Old Horse Springs; **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 9 k E Las Cruces, **Lincoln Co.**, 5 mi W Capitan; **Otero Co.**, Alamogordo, **Sierra Co.**, 20.7 k SW Hillsboro, 12.5 mi NW Winston, **Socorro Co.**, Bear Mt. (11 k NW Magdalena, 17.6 k NW Magdalena), 33°48'32.2"N 107°22'57.2"W. MEXICO: Baja California, Chihuahua, Durango, and Nuevo León.

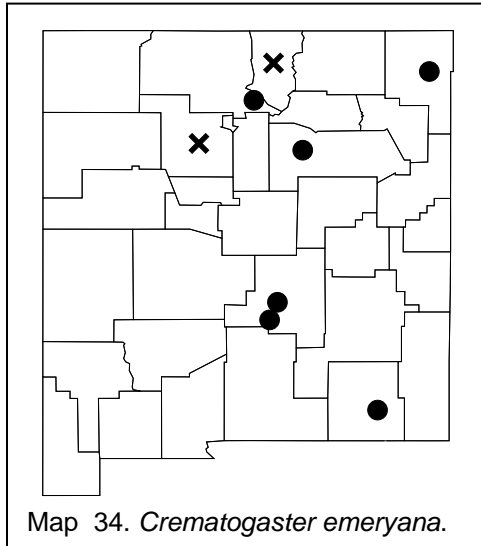
Habitat. Desert communities, except grasslands without shrubs, creosote bush scrub, mesquite forests, up into pinyon-juniper and oak woodlands (2100 meters elevation).

Biology. This species nests at base of desert shrubs (*Eriogonum*, *Larrea*, *Opuntia*, *Yucca*, *Dasyilirion*, *Hamatocactus*, *Franseria*, *Ephedra*) or in the branches of mesquite. Nests are occasionally found under stones or under cattle manure. Brood is present in nests in August and September. It is primarily an individual forager which collect nectar from flowers, or tends scale insects. They are often found foraging on cholla (*Opuntia* spp.), and occasionally on oaks.

Wheeler, 1908, Creighton, 1950, Wheeler and Wheeler, 1973, 1968, Rojas-Fernández and Fragoso, 1994, 2000

***Crematogaster emeryana* Creighton**

Discussion. This species can be recognized due to the presence of several erect hairs on the pronotal shoulder, in addition to at least one pair on the rear of the mesonotum. It may be confused with *C. hespera*, but the latter species has fewer erect hairs on the pronotum (1 - 3 versus 4 - 6 or more in *C. emeryana*). It can be separated from *C. browni* and *C. cerasi* as neither have any erect hairs on the rear of the mesonotum.



Distribution. USA: AZ, TX north to CO, UT; NM: **Eddy Co.**, Hidden Cave, **Lincoln Co.**, Nogal, Sacramento Mts. (2 mi W Alto), **Rio Arriba Co.**, Dixon, **Sandoval Co.**, without locality, **San Miguel Co.**, 20 k NW Las Vegas, **Taos Co.**, without locality, **Union Co.**, 15 mi SW Clayton.

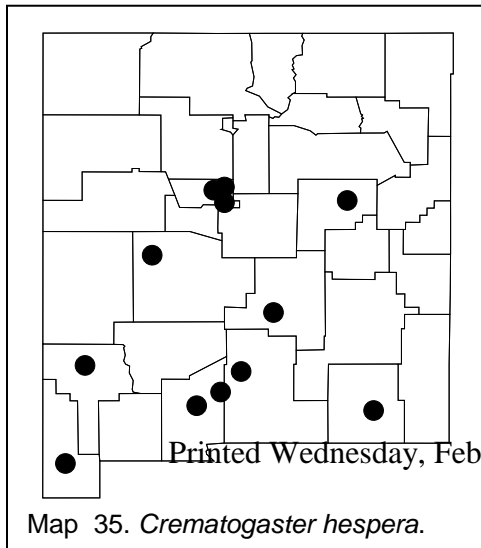
Habitat. Mountain forests, oak forests, riparian canyon forests, grasslands, urban habitats.

Biology. This ant nests under stones or logs (or in logs), with brood present in April and July, and sexuals present in nests in

July and August. This species appears to be polygynous, with up to 9 dealate females found in a single nest. One colony was nesting together with *Lasius* sp. and *Tapinoma sessile*.

Gregg, 1963

***Crematogaster hespera* Buren**



Discussion. This is a common species in New Mexico that can be recognized by having few (less than 4) long erect hairs on the pronotum, usually having at least one pair on the mesonotum and by the longitudinal striations on the dorsum of the mesosoma and basal face of the propodeum.

See discussion of *C. cerasi* and *C. emeryana* for more details.

Distribution. USA: CA east to W TX north to UT, **NM:** **Bernalillo Co.**, Embudo Canyon, Cibola National Forest (Pine Flat), Elena Gallego Mt., **Doña Ana Co.**, Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Site), **Eddy Co.**, Hidden Cave, **Grant Co.**, 14 m N Silver City, **Guadalupe Co.**, Santa Rosa, **Hidalgo Co.**, Animas Mts. (Black Bull Canyon), **Lincoln Co.**, Fort Stanton Cave Area, **Otero Co.**, White Sands National Monument, **Socorro Co.**, Magdalena Mts. (Water Canyon); MEXICO: Chihuahua.

Habitat. Chihuahuan Desert, creosotebush scrub up to pinyon-juniper forests (5600 ft.), occasionally in riparian areas.

Biology. This species nests in the soil, usually under stones. Brood was found in nests from May to August, sexuals in August. Foragers tend coccids on the roots of snakeweed (*Gutierrezia sarothrae*). They are attracted to baits, including rotten liver and tuna fish.

***Crematogaster isolata* Buren**

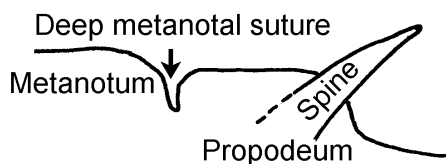
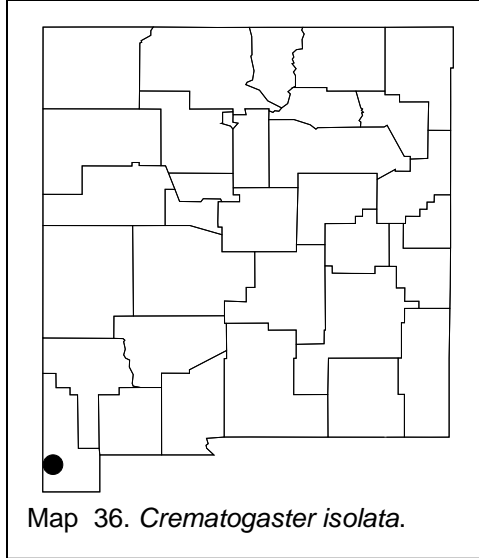


Fig. 146. The mesosoma and propodeum of a worker of *C. isolata*, showing the deep metanotal suture.

Discussion. It is difficult to characterize this species. The only reasonable character is that the propodeal spines are not attached at the widest point of the propodeum (Fig.). Buren (1968) states that the mesopropodeal suture is deep, but narrow on the dorsum of the mesosoma (Fig.),

but this is a subjective character, and other species are similar. The fact that it is rarely collected in New Mexico, and appears to nest only in oaks, makes misidentifications unlikely. If the couplet is missed, it will key to *C. depilis* (if there are no hairs on the pronotal shoulder, which is the most common situation), or to *C. opuntiae* (if there is a pair of hairs on the pronotal shoulder). Neither of these two latter species is known to nest in oaks.

Distribution. USA: S AZ west to W Texas; **NM:** **Hidalgo Co.**, Coronado National Forest (Cloverdale Creek).



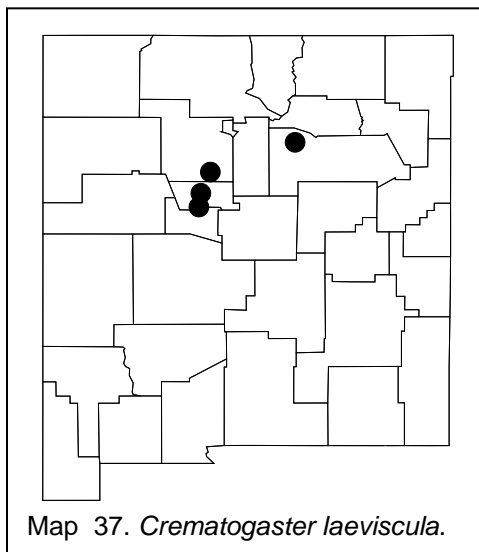
Habitat. Mountainous areas.

Biology. This is a very rare species, collected from only 1 site in New Mexico. It nests in dead branches of oaks (*Quercus arizonica*), at altitudes over 1500m.

***Crematogaster laeviuscula* Mayr**

Discussion. The workers of this species are predominantly shiny, specifically the head and side of the pronotum are shiny and glossy, the top of the pronotum is shiny, but finely sculptured. The side of the mesopleuron and propodeum are punctate or finely striate. The propodeal spines are well developed and long. It is generally light colored, with a pale reddish-yellow head and mesosoma and a darker gaster.

It is difficult to separate this species from *C. mormonum*, and it is possible that the latter species is a synonym. *Crematogaster laeviuscula* has the dorsum of the pronotum smooth or finely sculptured, whereas the top of the pronotum of *C. mormonum* is slightly more roughly sculptured. *Crematogaster laeviuscula* nests in oak galls or twigs, but also in logs and stumps, whereas nests of *C. mormonum* are usually found in the soil, often under stones. They were originally separated by the states of Arizona and New Mexico, but what appears to be both species occur in New Mexico.



Distribution. USA: Central part of country (Oklahoma, AR, MS, TX, Louisiana, extending south into México); NM: **Bernalillo Co.**, Albuquerque, RGNC, **Sandoval Co.**, Coronado State Park, **San Miguel Co.**, Gallinas Canyon; MEXICO: Chihuahua, Nuevo León.

Habitat. Riparian forests.

Biology. This species nests in wood, or under bark of dead logs (cottonwood), or in oak galls of the wasp *Holcaspis cinerosus*. Sexu-
als occurred in nests in August. These ants are more aggressive than is typical
for North American *Crematogaster*.

Wheeler, 1908

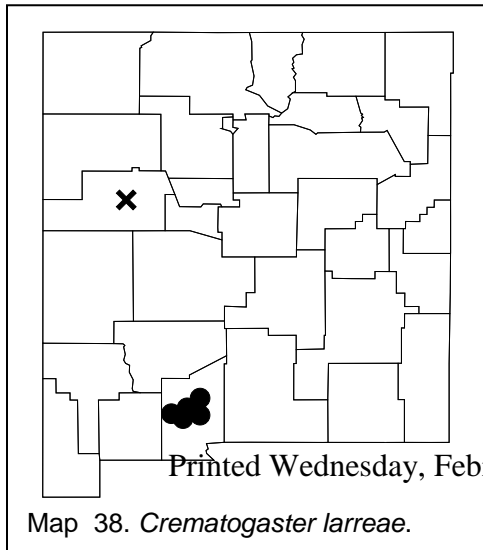
***Crematogaster larreae* Buren**

Discussion. This is a common species that nests in the roots of the
creosotebush, *Larrea tridentata*). It is concolorous dark brown or black,
and the mesosoma is densely and evenly punctate. The pronotal shoulders
are without erect hairs, in fact there are rarely any erect hairs on the
dorsum of the mesosoma. The head is finely sculptured with a mixture of
punctae and striae, some parts, especially the central region, are nearly
smooth and shining. This species is most likely to be confused with *C.*
depilis. The two species can be usually be separated as *C. larreae* is
concolorous, and *C. depilis* is bicolored. Also *C. depilis* apparently does
not nest in creosotebush. Occasionally specimens of *C. opuntiae*, which
have lost the pronotal hairs, can be confused with *C. larreae*. The nesting
sites of the two species are different, and thus ecological characteristics
will separate them. The head of *C. opuntiae* has extensive areas, which are
smooth, whereas these areas are limited in *C. larreae*. The hairs on the
scapes of *C. larreae* are usually slightly elevated from the surface,
whereas they are usually completely appressed in *C. opuntiae* (this is a
poor character with a lot of variation).

Distribution. USA: CA west to W Texas; NM: **Cibola Co.**,
without locality, **Doña Ana Co.**, Las Cruces, 0.4 mi N Las Cruces, 4 mi
W Las Cruces, 4 mi NW Las Cruces, 45 k NE Las Cruces (Jornada Long
Term Ecological Research Site); MEXICO: Chihuahua.

Habitat. Creosotebush
scrub.

Biology. This ant nests in
the roots of the creosotebush,
Larrea tridentata, in galleries of
wood boring beetles. A nest
occupies a single bush, but may be
in various roots of the same plant.
There is a single queen and a mean
of 789 adult ants in a nest. The



larval population peaks in the fall and winter, pupae are found in the spring. Males are most commonly found in the nest in June, with flights occurring during the last 2 weeks of June and during July. Foragers are active 24 hours per day, with activity peaking in summer. They feed on nectar, honeydew and dead insects. They apparently cause no damage to the creosote, and may even form a mutualistic relationship with the shrub.

Mackay et al., 1984

***Crematogaster lineolata* (Say)**

Discussion. The workers of this species have numerous hairs on the pronotum, at least two on the mesonotum and usually at least two on the propodeum or propodeal spines. The side of the mesosoma is roughly sculptured with striae and punctae, most surfaces are dull, although the central region of the side of the pronotum may be weakly shining (but still is sculptured). The top of the mesosoma is roughly sculptured with striae / rugae and scattered punctures. The sides or the head are roughly sculptured with striae and scattered punctae, the central region is partially smooth, although is only moderately shining.

The numerous hairs on the pronotum would separate this species from most of the others that may occur in New Mexico. It is more roughly sculptured than is *C. navajoa*, and the hairs on the pronotum are shorter (about 0.01 mm in length, compared to about 0.25 mm in length in *C. navajoa*). The rugae and/or striae on the dorsum of the mesosoma would separate this species from *C. punctulata*, which has dense punctae on the same surface.

Distribution. USA: eastern United States west to CO and TX; NM: Not yet collected in the state, but may occur in the northern or eastern parts of the state.

Habitat. Oak woodland, deciduous canyon forest, grasslands.

Biology. This species nests under logs and stumps or stones and is an occasional house pest. They feed on dead insects and tend Homoptera, especially on plant roots. This is an aggressive species with a annoying bite.

Gregg, 1963, Wheeler and Wheeler, 1963

***Crematogaster minutissima smithi* Creighton**

Discussion. This is a light colored species, which can be recognized by characters listed in the discussion of *C. arizonensis*. It

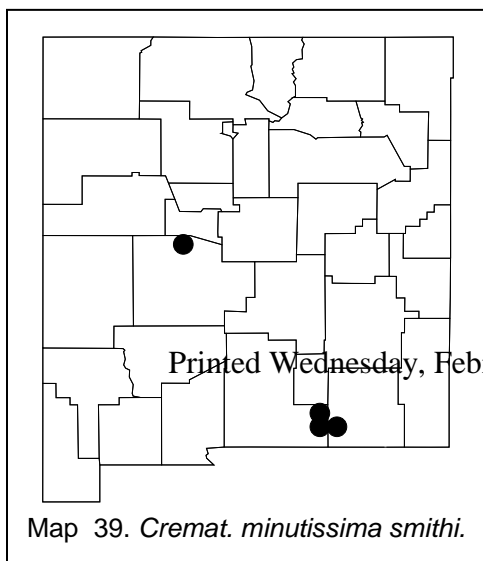
differs from *C. arizonensis* in color and in having more abundant hair on the gaster. *Crematogaster minutissima minutissima* Mayr occurs in eastern United States.

New stuff: ???

This group of subspecies belongs to the *brevispinosa* species complex, and is closely allied to *C. victima* (which perhaps should be considered as another separate species complex). This is a Neotropical species complex, with only a few forms which are found in the Nearctic Region. It is the most difficult species complex in the genus. Of the 3 subspecies of *C. minutissima*, only *C. minutissima missouriensis* is relatively easily separated. It is not as closely related to the others as the others are to each other, and is probably a valid species. It differs in that the propodeal spines are longer (about 1/2 the length of the distance between the bases of the spines) and are bend upwards. Thus it may be more closely related to *C. erecta*, which is structurally similar, but is dark brown and has shorter propodeal spines. The other 2 subspecies are nearly impossible to separate, and are possibly both the same thing. Both of the remaining subspecies have short propodeal spines (1/4 - 1/3 the length of the distance between the bases of the spines). The propodeal spines may be directed slightly upwards, but not to the degree of *C. minutissima missouriensis* (possibly an optical illusion due to the shorter length of the spines). Most specimens of *C. minutissima smithi* have the dorsum of the pronotum smooth and polished, without any striae (there are striae on the sides). The propodeal spines are short, similar to most other members of the *brevispinosus* complex (including the dark brown *C. arizonensis*, which is may be a synonym of *C. brevispinosa* var. *ampla*, although the pronotum of *C. arizonensis* is more smooth and polished). *Crematogaster minutissima smithi* is a western subspecies, ranging from Chihuahua north into southeastern Arizona, New Mexico and western Texas. *Crematogaster minutissima minutissima* is more eastern in distribution, ranging from the eastern seaboard west to central Texas. It usually has

striae (often 2) in the central region of the top of the pronotum. All 3 subspecies are yellow, often with the head and the tip of the gaster darker brown.

Distribution. USA: Middle of United States south to NM and TX; NM: **Eddy Co.**, Sitting Bull



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Falls, **Otero Co.** Guadalupe Mts (41.4 km straight line NW Sitting Bull Falls, Bates Park Turnoff, N side of road), **Socorro Co.**, Sevilleta.

Habitat. Grassland and pinyon-juniper forests.

Biology. This ant nests under stones. double check??? not in Smith.

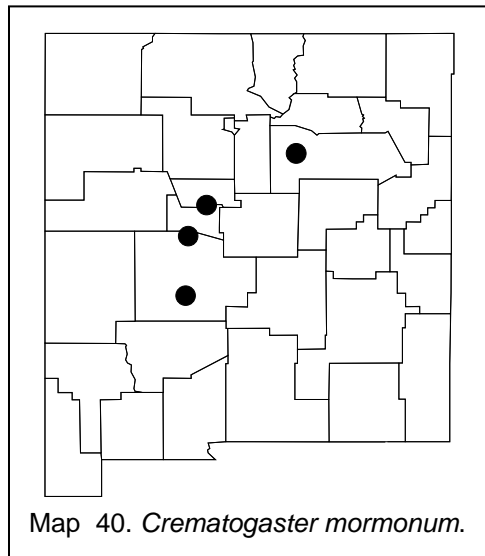
Gregg 1963

minutissima minutissima **Lincoln Co.**, 2.5 m NNE Ft, Stanton 6200 ft. attracted to oatmeal/grape bait

***Crematogaster mormonum* Emery**

Discussion. The workers of this species can be recognized as the pronotum is nearly smooth and shining, the dorsum of the mesopleural area has well defined rugae or striae, the lower surface is punctate with the punctures lining up into striae, the side of the propodeum has striae with the background shining. The dorsum of the mesosoma has poorly defined striae with the background smooth and shining. The head and the posterior face of the propodeum are predominantly smooth and shining. The pronotum has several erect hairs (approximately 3) on each pronotal shoulder.

The distinct striae on the lower half of the mesopleuron would



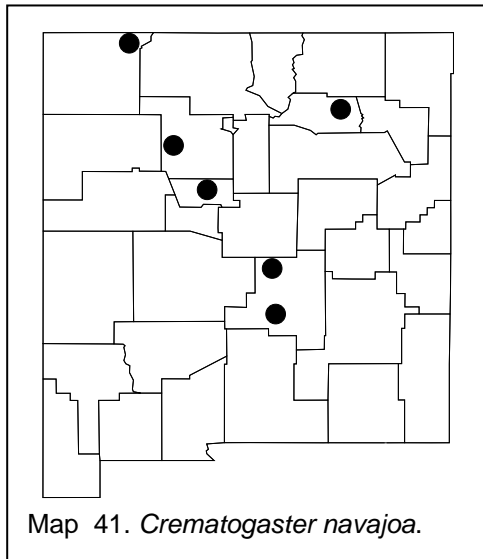
separate this species from similar species, such as *C. hespera*, *C. emeryana*, *C. browni* and *C. cerasi*. It could be separated from species with many hairs on the pronotal shoulder or those with 1 pair or none, by the few hairs on this surface.

Distribution. USA: southern CA, ID, UT, NV; NM: **Bernalillo Co.** Bosque Forest, Rio Grande, **San Miguel Co.**, Romeroville, **Socorro Co.**, Sevilleta National Wildlife Refuge, Bosque del Apache; MEXICO: Baja California.

Habitat. Arid ecosystems, creosotebush scrub, areas with woody shrubs.

Biology. These ants nest in rotten limbs in termite holes, as well as soil adjacent to the wood. Brood occurred in nests in April, sexuals in August.

***Crematogaster navajoa* Buren**



Discussion. The workers of this species have abundant, long (about 0.25mm) erect hairs on the pronotum and mesonotum, with somewhat fewer hairs on the dorsum of the propodeum and the propodeal spines. The side of the pronotum is finely sculptured with striae or poorly defined punctae, but mostly smooth and shiny. The side of the mesosoma and propodeum are covered with striae intermixed with punctae.

This species could be confused with *C. punctulata*. It differs in that the some of the

smaller hairs on the head are suberect and the erect hairs on the pronotum are longer (0.25mm) than they are in *C. punctulata*. The longer pronotal hairs would also separate this species from *C. lineolata*.

Distribution. USA: AZ; NM: **Bernalillo Co.**, Albuquerque, **Lincoln Co.**, Cibola National Forest, Fort Stanton, **Mora Co.**, 2 k E Wagon Mound, **Sandoval Co.**, Cabezón, **San Juan Co.**, 4 k E Aztec.

Habitat. Arid grasslands, up to 6200 feet.

Biology. This species nests at the base of desert plants or under logs.

***Crematogaster nocturna* XX???**

Discussion. ###

Distribution. USA:; NM: Not recorded from New Mexico, but

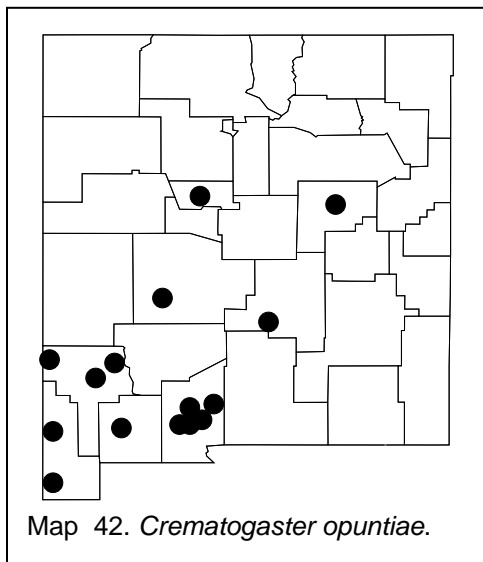
Habitat. ^^^ ????

Biology. add here???

***Crematogaster opuntiae* Buren**

Discussion. This species can be recognized, as there is only a single pair of hairs on the pronotal shoulder, and usually no other erect hairs on the dorsum of the mesosoma. The head is mostly shiny, the mesosoma coarsely punctate. The hemilobes of the postpetiole are blunt. The pubescence on the head and scapes is mostly appressed. Specimens of *C. isolata* may key to *C. opuntiae*, but can be readily separated as they nest in the branches of oaks. Specimens of *C. cerasi*, which are missing all but 1 hair on the pronotal shoulder, would key to this species. The only way to avoid this error is to collect several workers from a nest, so that several specimens can be examined. If the series was collected under a stone or in the soil, it may be *C. cerasi* (but could be *C. californica*).

Buren (1968) states that *C. opuntiae* differs from *C. californica* by its shorter pubescence, which is entirely appressed on the heads and scapes. The sculpturing, especially on the hind portions of the head, is weaker and the colors are nearly always dark in life. He also states that *C. californica* is never associated with cactus. These seem to be poor characters, and *C. californica* does nest in cholla in southern California. Specimens of *C. californica* in New Mexico were collected on *Opuntia imbricata* (# 16793). Thus this species will probably be found to be a synonym of *C. californica*.



Map 42. *Crematogaster opuntiae*.

Distribution. USA: Southern AZ; NM: **Bernalillo Co.**, NE Albuquerque, **Doña Ana Co.**, Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Research site), 18 k E Las Cruces, 10 mi W Las Cruces, 10 mi W Organ Mts., **Grant Co.**, 6 k E Mule Creek, Leopold Vista, 77 k E Silver City, 79 k E Silver City, **Guadalupe Co.**, Santa Rosa Park, **Hidalgo Co.**, Coronado National Park (Clanton Draw), **Lincoln Co.**, Sacramento Mts. (2 mi W Alto), **Luna Co.**, 18.5 k NW Deming,

Socorro Co., 33°48'2" 107°22'57.2"; Buren (1968) lists the area on route 89 near the Arizona border (Hidalgo Co.).

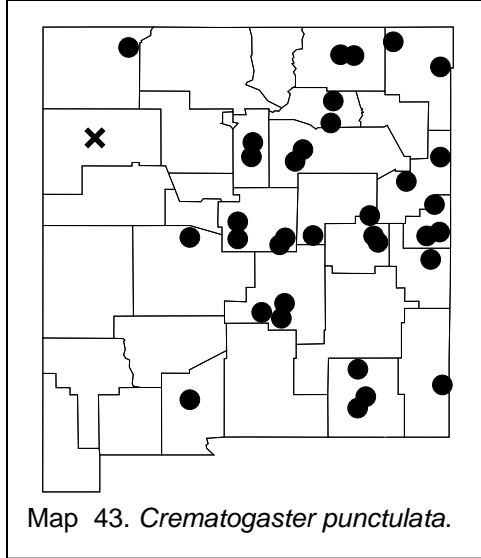
Habitat. Chihuahuan Desert scrub and grasslands (especially grama grass), as well as transitional areas with the Sonoran Desert, up into pinyon-juniper forests, oak forests and ponderosa pine forests (up to 1380 meters elevation).

Biology. These ants nest in cholla cactus, especially *Opuntia fulgida*. Nests are also found in the soil or under stones or in rotten wood, including under the bark of a standing, dead tree, and in limbs of oaks (*Quercus* sp.). Brood was found from March to October, sexuals in nests in July - September. The crickets *Myrmecophila* sp. occur in nests.

***Crematogaster punctulata* Emery**

Discussion. This species could be confused with *C. navajoa* and with *C. dentinodis*; see the discussions of these two species for distinguishing characteristics.

Distribution. USA: Eastern United States west to AZ; **NM:** **Colfax Co.**, Jefferson, Jeffers Ranch, **Curry Co.**, Clovis, near Clovis, Grady Roadside Park, **De Baca Co.**, 2.5 m N Fort Sumner, 4 mi N Taiban, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, 5 mi W Artesia, Carlsbad, Los Medanos, 32°20.3'N 103°50'W, **Guadalupe Co.**, 25 mi SE Vaughn, **Lea Co.**, 20 m WSW Hobbs, **Lincoln Co.**, 5 mi E Red Cloud Campground, Nogal, Road Runner Ranch, **McKinley Co.**, without locality, **Mora Co.**, 12 k N Wagon Mound, 3 k E Wagon Mound, **Quay Co.**, 6 mi SW Nara Visa, 7 mi S Quay, **San Juan Co.**, 4 k E Aztec, **San Miguel Co.**, Bernal, Las Vegas, **Santa Fe Co.**, 34 mi S Santa Fe, Galisteo, **Socorro Co.**, Sevilleta, **Torrance Co.**, Corona, 5 mi NE Corona, 13 k NW Mountainair, 24 k S Mountainair, **Union Co.**, Capulin National Monument, 6 mi E Clayton; MEXICO: Chihuahua.



May - The ants of New Mexico 101

Habitat. Mesquite forests (including dunes), pinyon pine, juniper forests, shinnery oaks forests, cottonwood forests, grasslands.

Biology. These ants nest in the soil or under stones and logs. Brood was found in nests in August, sexuals are found from August to September. Flights were

reported in May (Wheeler, 1908) at 11:00 MST. Foragers tend membracids on sunflowers, as well as coccids and aphids. They commonly forage on cholla (*Opuntia* sp.). One nest was together with *Lasius sitiens*, another with *L. sitiens*.

Gregg, 1963

Genus *Cyphomyrmex*

(Key: Snelling and Longino, 1992)

This is a large genus with most species found in Latin America. Only two species make it into the United States and New Mexico. These ants cultivate fungi in nests in the soil, using insect dung for fungal substrate. These ants are not commonly collected; they are probably rare or are rarely seen due to their secretive habits or dark color. Many of the species are difficult to identify, fortunately the two species that occur in the United States are easily separated.

Workers can be distinguished from other ants by the scrobes for the antennal scapes, and which extend to the posterior borders of the head (Fig.), the numerous tubercles or bumps on the mesosoma (Fig.), and the numerous bumps on the gaster. This genus has an 11-segmented antenna, of which the insertion is completely hidden by the lateral lobes of the frontal carinae. The propodeum has a pair of bumps, tubercles or poorly developed spines. The body is covered with short, scale-like hairs. It is similar to *Trachymyrmex* and *Acromyrmex*, which have sharply pointed spines on the mesosoma. A number of other similar small ants in other genera occur in other states and in Latin America which may be similar to *Cyphomyrmex* but as they do not occur in New Mexico and will not result in confusion.

Key to the workers, females and males of the genus *Cyphomyrmex*

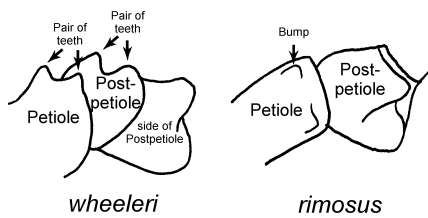


Fig. 147. Postpetiole of workers of *C. wheeleri*, and *C. rimosus*, as seen obliquely from the front and side.

1. Petiole and postpetiole with a deep, dorsal, longitudinal depression, with 2 lateral teeth on each (Fig.) ***wheeleri* Forel**
- Petiole and postpetiole without longitudinal depression, without lateral teeth (Fig.) ***rimosus* (Spinola)**

Cyphomyrmex rimosus (Spinola)

Discussion. All three castes are easily separated from *C. wheeleri* by the lack of a strong longitudinal impression on the upper surface of the postpetiole. Otherwise they are nearly identical.

Distribution. USA: Southeastern United States west to CA, south to Brasil and Argentina; **NM:** we are not aware of any records from New Mexico, but it probably occurs in the state.

Habitat. Usually found in mesic habitats.

Biology. This species cultivates a yeast???, using caterpillar dung as a substrate, and nests in soil or under stones or logs.

Weber, 1972

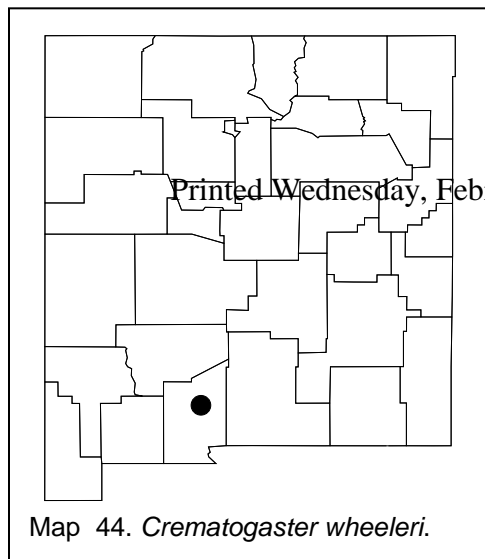
Cyphomyrmex wheeleri Forel

Discussion. All three castes are easily separated from *C. rimosus* by the strong longitudinal impression in the postpetiole. This is the most common species in New Mexico.

Distribution. USA: CA east to TX; **NM:** Doña Co., 45 k NE Las Cruces (Long Term Ecological Research site). MEXICO: check Weber 1972, Durango

Habitat. Arid environments, desert shrublands and grasslands.

Biology. This species nests in the soil or under stones in creosotebush scrub. Nests consist



Map 44. *Crematogaster wheeleri*.

of a few dozen workers and a single queen. Fungal gardens can be located a few centimeters under the soil surface in small chambers a few centimeters in diameter. Workers forage primarily at night or on moderately warm days in the spring and fall. They move slowly and feign death and are thus difficult to see. These ants are most commonly collected under stones or in pitfall traps. Males are attracted to lights.

Wheeler, 1907, Mallis, 1941, Weber, 1972, Wheeler and Wheeler, 1973, Rojas-Fernández and Fragoso, 1994, 2000

Genus *Formicoxenus*

(Key: ???)

This genus is very similar to the subgenus *Leptothorax* of the genus *Leptothorax*. It can be easily separated as the eyes have several erect hairs and the hair on the scape is suberect. Figures???

Key to the workers of the genus *Formicoxenus*

1. Dorsum of postpetiole shining, sculpture consisting of widely spaced, small punctures with surface between them smooth or delicately shagreened (covered with rough surface) *provancheri* (Emery)
- Dorsum of postpetiole opaque or nearly so, surface densely punctate or punctate-granulose *hirticornis* (Emery)

Formicoxenus hirticornis (Emery)

Discussion. The eyes have several erect hairs and the clypeus of the worker is weakly depressed in the middle near the anterior border of the clypeus, and is without a medial carina, although several poorly developed lateral carinae are present. The propodeal spines are well developed, and thickened throughout (Fig.). The anterior face of the petiole meets the dorsum in an angle, the posterior face is convex and rounded. The dorsum of the postpetiole is completely covered with punctures. The mesosoma has dense punctures. The depressed clypeus could cause confusion only with *F. provancheri* and *Leptothorax muscorum*. It can be separated from *F. provancheri* as dorsum of the postpetiole is completely and roughly sculptured, whereas the dorsum of the postpetiole of *L. provancheri* is finely sculptured and predominantly

smooth and shining. It can be separated from *L. muscorum* (and all of the other members of *Leptothorax* that occur in New Mexico) by the erect hairs on the eyes.

Distribution. USA: ND, SD south to CO, west to CA. May occur in northern New Mexico.

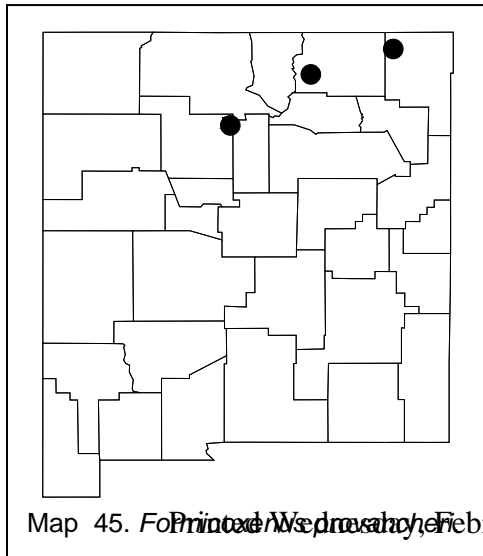
Habitat. Pine forests.

Biology. This ant nests in colonies of *Formica obscuripes* and possibly *F. integroides*.

Weber, 1935, Wheeler and Wheeler, 1963, Gregg, 1963, Snelling, 1965

***Formicoxenus provancheri* (Emery)**

Discussion. This species has several erect hairs on the eyes and the clypeus of the worker is weakly depressed in the middle and is without a medial carina, although several lateral carinae are present. The scapes have numerous suberect hairs. The propodeal spines are well developed, and thickened throughout. The anterior face of the petiole meets the dorsum in a sharp angle, the posterior face is also straight (Fig.). The dorsum of the postpetiole is nearly completely free of sculpture. The mesosoma has heavy and dense sculpture, consisting of punctae interspersed among poorly defined striae. The depressed clypeus could cause confusion only with *L. hirticornis* and *Leptothorax muscorum*. It can be separated from *L. hirticornis* as the dorsum of the postpetiole is nearly completely smooth, whereas the dorsum of the postpetiole of *L. hirticornis* is punctate. The hairs on the eyes separate it from *L. muscorum*, and all of the other species of *Leptothorax*.



Distribution. USA: Eastern United States south and west to NM; NM: **Los Alamos Co.** Camp May, **Colfax Co.** 11 mi N Eagle Nest (2,740 m on Red River Road), Capulin National Monument.

Habitat. Riparian meadows in pine forests and grasslands.

Biology. This species is a guest in the nests of *Myrmica incompleta* and *M. fracticornis*. Apparently it cannot live without

its host in the laboratory, although it can be found nesting alone in the field. Sexualls occur in the nests in July and August.

Wheeler, 1901, 1903, 1907, 1910, Kanno, 1957, Wheeler and Wheeler, 1963, Gregg, 1963 (*L. provancheri glacialis*).

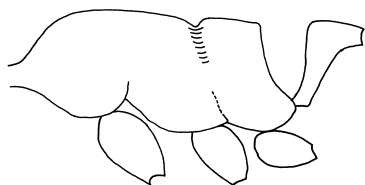
Genus *Leptothorax*

(Key: Mackay, 2000)

This genus is difficult to distinguish from others due to the heterogeneity of the species. The antenna consists of 11 or 12 segments with a three jointed, poorly defined club. The propodeum is usually armed with a pair of spines. Eliminating all other genera usually identifies these ants. They can be distinguished from *Myrmica* by the lack of pectinate tibial spurs on the mid and hind tarsi. Workers of *Tetramorium* usually have carinae that extend parallel to the scapes. *Stenamma* has a poorly defined 4 segmented club. The petiole of most species is not (or scarcely) pedunculate (Fig.). The most difficult problem with this genus is the separation of *L. pergandei* from workers of some species of *Pheidole*. Both have 12 antennal segments with a three-segmented club. The mesosoma of both is similar in structure. The petiole of both is pedunculate. It is important to collect soldiers of *Pheidole* in order to separate these two genera. Fortunately *L. pergandei* is very rare in New Mexico.

This is a reasonably common group that occurs in nearly all New Mexican habitats, but is not often collected except by the specialist, due to their inconspicuous habitats. They are small ants found nesting in rotten wood or under stones. Many species are found nesting within colonies of other species of ants, especially those of the genus *Formica*. Colonies are small and usually difficult to find. Cole (1953b, 1954a, 1958) includes the species from New Mexico.

Key to the workers of the genus *Leptothorax*



1. Petiole with elongate peduncle (Fig. 2); dorsum of promesonotum strongly convex in profile; mesopropodeal suture deeply impressed (Fig. 3); rarely

Fig. 148. Mesosoma and petiole of a worker of *L. pergandei* (From Mackay, 2000).

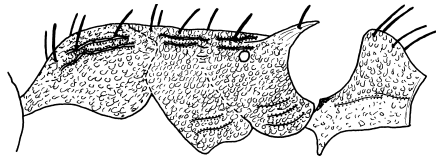


Fig. 150. Side view of a worker of *L. rugatulus*, showing a relatively short petiolar peduncle (From Mackay, 2000).

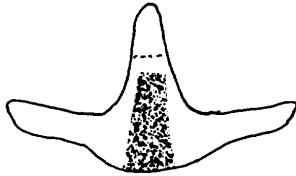


Fig. 149. Clypeus of a worker of the subgenus *Leptothorax*, with the depressed area indicated by stippling (From Mackay, 2000).

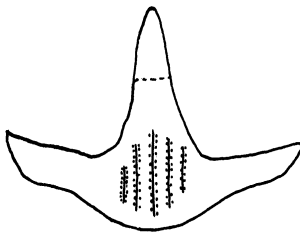


Fig. 151. Clypeus of a worker of the subgenus *Myrafant* showing the longitudinal carinae on clypeus (From Mackay, 2000).

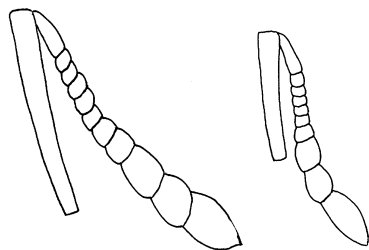


Fig. 153. Antennae of a worker of the subgenus *Myrafant* (left) and 11 segments (right) of workers of the subgenus *Myrafant* (From Mackay, 2000).

collected in New Mexico

..... ***pergandei* Emery**

- Petiole without elongate peduncle (Figs.), or dorsum of promesonotum flat or feebly convex in profile; mesopropodeal suture at most feebly impressed (except for *L. hispidus*, see Fig.)

..... **2**

2(1). Clypeus without carinae on medial surface, but usually with carinae present anterior to frontal carinae, middle of clypeus usually concave with longitudinal depression (Fig. 6); antennal scapes often with erect or suberect hairs (**Subgenus *Leptothorax* and genus *Formicoxenus***)

- Clypeus may be concave, but has at least a medial carina (Fig.), usually with 2 or more lateral carinae; scape rarely with erect or even suberect hairs (**Subgenus *Myrafant***)

..... **5**
3(2). Eyes with at least a few erect hairs (Fig.); hairs on scapes semierect (Fig.) **genus *Formicoxenus***

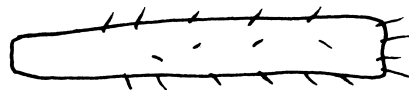


Fig. 152. Scape of a worker with erect hairs (From Mackay, 2000).

- Eyes without erect hairs; hairs on scapes decumbent or appressed

..... **4**
4(3). Erect body hairs numerous, long and usually pointed; intrarugal punctures on mesosoma heavy and dense, surface feebly shining or

opaque *crassipilis* Wheeler

- Erect body hairs sparse, short and usually clavate; intrarugal punctures on mesosoma shallow and rather sparse, the surface where they occur moderately shining *muscorum* (Nylander)

5(2). Antennae with 12 segments (Fig. 9) (usually easier to count with funiculus held at an oblique angle) 6

- Antennae with 11 segments (Fig. 10) 25

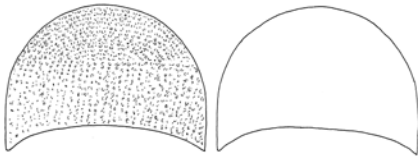


Fig. 154. Reticulo-punctate sculpture on first gastral tergite (left) and smooth gastral tergite (right) (From Mackay, 2000).

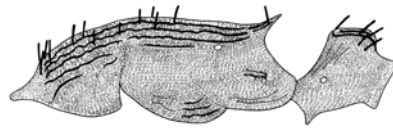


Fig. 155. Propodeum and petiole of a worker with well developed propodeal spines (*L. silvestrii*) (From Mackay, 2000).

6(5). Disc (at least basal 1/3) of first tergum of gaster predominantly reticulo - punctate (Fig. 12, left), (sculpture may be very weak and difficult to see); Nevada to Colorado, Arizona to west Texas south to northern México 7

- Entire disc (except possibly for region immediately posterior to connection of postpetiole) of first tergum of gaster completely smooth, polished and shining (Fig. 12, right); widely distributed in North America

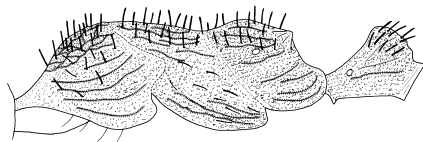


Fig. 156. Side view of a worker of *L. hispidus* (From Mackay, 2000).

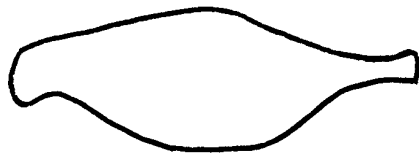


Fig. 157. Hind femur of a worker of *L. silvestrii* (From Mackay, 2000).

..... 9

7(6). Propodeal angles dentiform or bump-like (Fig.13); mesosomal outline varies, often impressed (Fig.13); mesosoma somewhat impressed at the mesopropodeal suture (Fig. 9); head mostly rugose with few punctures .. *hispidus* Cole

- Propodeal spines well formed, often half as long as, or longer than, distance between their bases (Figs 10 & 12); mesosoma not impressed at mesopropodeal suture (Fig. 1); sculpture of head varies

..... 8

8(7). Eye oval in shape (Fig.16, left); dorsum of mesosoma with coarse longitudinal rugae; hind femur greatly thickened (Fig. 11); petiolar node in profile nearly as broad apically as basally (Fig. 10); propodeal spines nearly as long as distance between them; southeastern Arizona

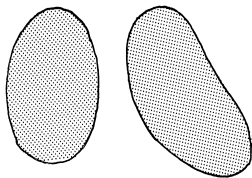


Fig. 158. Oval (left - *L. liebi*) and kidney shaped (right - *L. obliquicanthus*) eyes of workers (From Mackay, 2000).

***obliquicanthus* Cole**

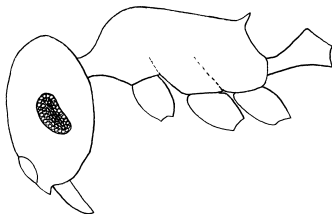


Fig. 159. Side view of a worker of *L. obliquicanthus* (From Mackay, 2000).

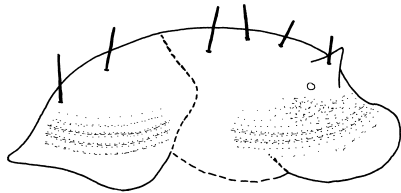


Fig. 160. Side view of the mesosoma of a worker of *L. nitens* (From Mackay, 2000).

area smooth and shining and petiolar node is angulate in profile, with relatively sharp apex (Fig.)

..... 11

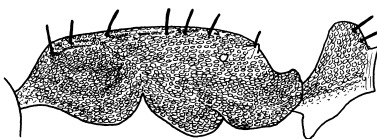


Fig. 162. Mesosoma and petiole of a worker of *L. cokendolpheri* (From Mackay, 2000).

..... ***silvestrii* (Santschi)**

- Eye elongate and kidney shaped (Fig.); dorsum of mesosoma finely punctate with no evidence of rugae; petiolar node in profile with a relatively sharp apex (Fig. 1); hind femora not greatly thickened; NV, CO, NM, TX

9(6). Dorsum of mesosoma very smooth and shiny, entirely devoid of sculpture except for small and widely spaced piligerous punctures

..... ***nitens* Emery***

- Dorsum of mesosoma sculptured, or at least never entirely smooth and shining, if mostly smooth and shining, at least dorsum of propodeum sculptured

..... **10**

10(9). Dorsum of head at least in part smooth and shining; if head is partly sculptured, at least central

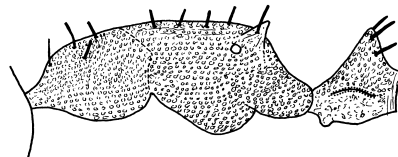


Fig. 161. Side view of a worker of *L. mariposa* (From Mackay, 2000).

- Head largely or entirely sculptured, surface feebly shining or

completely opaque; if head is partially smooth and shining, then petiolar node is rounded and blunt in profile (Fig. 14), or propodeal spines are about 1/2 as long as the distance between their bases

..... 15

11(10) Petiolar node blunt in profile; nearly entire head smooth and shining, area adjacent to polished central strip with very fine sculpture; central region of dorsum of head mostly free of sculpture, region adjacent to central strip with fine punctures or costulae; dorsal surface of postpetiole densely punctate; eyes small, distance from insertion of

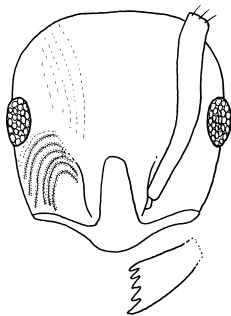


Fig. 163. Head of a worker of *L. cokendolpheri* (From Mackay, 2000).

mandible to anterior border of eye about 1.2 X maximum diameter of eye ***cokendolpheri* Mackay**

- Petiolar node with angulate apex in profile; entire dorsum of head often smooth and shining, at least posterior half of head in part smooth and shining, with broad, central strip which is free of sculpture, extending posteriorly to vertex; sculpture of postpetiole and diameter of eye varies

..... 12

12(11). Much of the dorsum of head smooth and shining; petiolar node in profile with very sharp apex (Fig. 15); posterior surface of petiolar node with punctures; New Mexico

..... 13

- Head usually with only a

central strip free of sculpture; petiolar node in profile with a relatively sharp apex (Fig. 16)

..... 14

13(12). Posterior surface of petiolar node with punctures (Fig. 33, left); ***melinus* Mackay**

- Posterior surface of petiolar node with fine rugulae (Fig. 33,

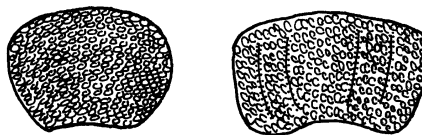


Fig. 165. Nodes of the postpetioles of a paratype worker of *L. melinus* (left) and of a cotype worker of *L. mariposa* (right) (From Mackay, 2000).

right); SE Arizona *mariposa* Wheeler

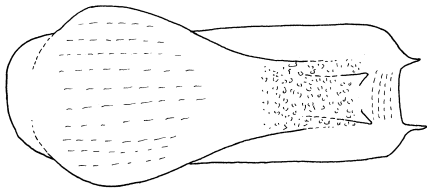


Fig. 166. Top of the mesosoma of the holotype worker of *L. nitens* (From Mackay, 2000).

14(13). Dorsum of pronotum mostly glossy with a few longitudinal fine striae, but with no evidence of punctures; region between propodeal spines finely punctate, nearly smooth

***nitens* Emery**

- Dorsum of pronotum punctate with little evidence of striae; dark brown; region between propodeal spines with fine transverse rugae, smooth and shining lower on posterior face of propodeum; known only from the state of Chihuahua, Mexico, nesting under bark of cottonwood trees ***adustus* Mackay***

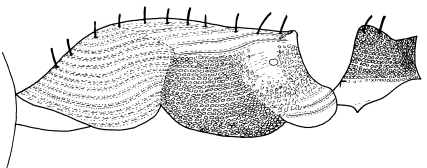


Fig. 167. Propodeum and petiole of a worker of *L. adustus* (From Mackay, 2000).

15(10). Head densely and evenly punctate, never with central strip free of sculpture (Fig.), without striae or rugae, or with punctures in rows that may form weak striae; pale yellow to light brown with black eyes **16**

- Head usually with striae or rugae as well as punctures, (if primarily punctate, central strip is smooth and shining), the entire dorsal surface usually feebly shining, often a central strip is without sculpture; color yellow, yellow brown to dark brown

18

16(15). In profile, the node of the petiole is blunt or rounded (Fig. 18); ; hairs on petiole blunt and thickened (Fig.); eyes relatively large (maximum diameter > 0.20 mm), maximum diameter about equal to distance from insertion of mandible; found in desert in west Texas **17**

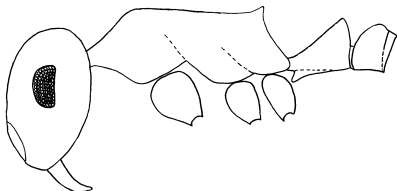


Fig. 168. Propodeum and petiole of the holotype worker of *L. calceus* (From Mackay, 2000).

- In profile, node of petiole relatively sharp (Fig. 19); color pale yellow; propodeal spines less than 1/2 distance between bases (Fig. 19); anterior peduncle of petiole with well developed flange

ending anteriorly with ventrally projecting tooth (Fig. 19); southern New Mexico *coleenae* Mackay

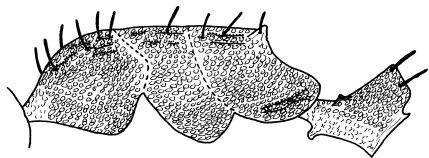


Fig. 169. Side view of a worker of *L. liebi* (From Mackay, 2000).

right) *bestelmeyeri* Mackay

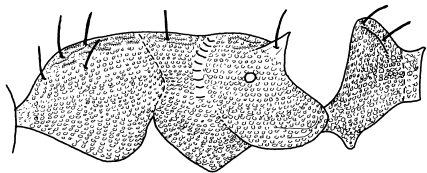


Fig. 170. Side view of a worker of *L. bestelmeyeri* (From Mackay, 2000).



Fig. 171. Top view of the petiole and postpetiole of a worker of *L. stenotyle*, as seen from the top (From Mackay, 2000).

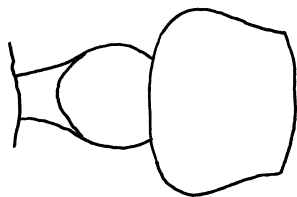


Fig. 172. Petiole and postpetiole of holotype worker of *Leptothorax neomexicanus* (From Mackay, 2000).

17(16). Color nearly white; dorsum of pronotum with poorly developed rugulae; petiolar node truncate (Fig. 42, left) *liebi* Mackay

- Color pale brown; dorsum of pronotum with distinct rugae; node of petiole rounded (Fig. 42,

18(15). Postpetiole less than 1.5 times as wide as total width of petiole, as seen from above (Fig.)

..... 19

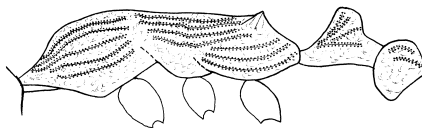


Fig. 174. Propodeum, petiole and postpetiole of *L. stenotyle*, as seen in profile (From Mackay, 2000).

- Postpetiole at least 1.5 times as wide as total width of petiole (Fig.), occasionally twice as wide 22

17(16). Petiole and postpetiole

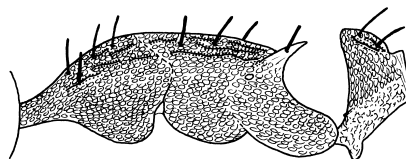


Fig. 173. Side view of a worker of *L. nevadensis* (From Mackay, 2000).

with coarse, long, thick, strongly clavate hairs (Fig.), about 4 - 10 on petiole and 12 - 20 on postpetiole; dorsum of head with rugae, with intrarugal spaces shining; dorsum and

especially sides of mesosoma with well defined rugae; node of petiole strongly truncate; southeastern Arizona (Cochise Co.)..... ***stenotyle* Cole**

- Without all of above characteristics; hairs on petiole and postpetiole slightly spatulate, or only blunt tipped; dorsum of head strongly striate, mixed with punctures or with fine rugulae **20**

20(19).Propodeal spines about 1/2 as long as distance between bases; petiolar node rounded and almost truncate in profile; nests under stones and duff, and is common and widely distributed in western U.S.A. ***nevadensis* Wheeler***

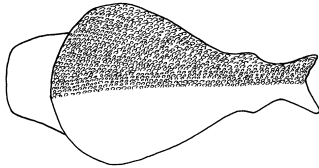


Fig. 177. Top of the mesosoma of a worker of *L. andrei* (From Mackay, 2000).

- Length of propodeal spines usually less than 1/2 distance between bases, usually consisting of

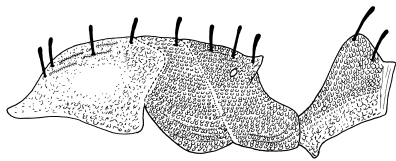


Fig. 175. Side view of a worker of *L. andrei* (From Mackay, 2000).

tiny spines or simply angles (Fig 40) (if longer, apex of petiole sharp as seen in profile), pale yellow or light yellowish brown, head and part of gaster may be light-brown **21**

21(20).Petiole in profile with sharp apex; propodeal spines nearly 1/2 length of distance between bases; mesosoma with evidence of striae, especially on sides; Colorado, Wyoming ***furunculus* Wheeler**

- Petiole in profile with rounded or somewhat truncated apex (Fig.); propodeal spines short, flattened, much shorter than 1/2 distance between bases (Fig.); mesosoma completely punctate with no evidence of striae ***andrei* Emery**

22(18).Dorsum of postpetiole coarsely and predominantly transversely reticulo-rugose (Fig.); node of postpetiole nearly twice as wide as node of petiole (dorsal

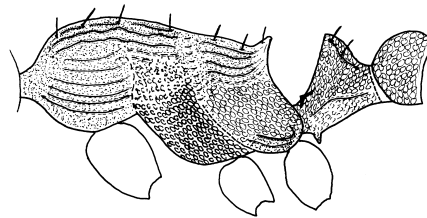


Fig. 176. Propodeum and petiole of a worker of *L. furunculus*, as seen from the side (From Mackay, 2000).

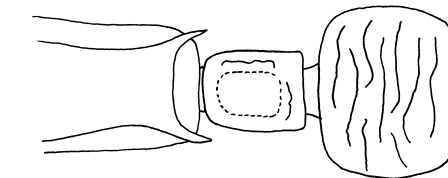


Fig. 178. Top view of the propodeum, petiole and postpetiole of a worker of *L. ravanus* (From Mackay, 2000).

view, Fig. 13); node of petiole truncate in profile (Fig.)
texanus Wheeler

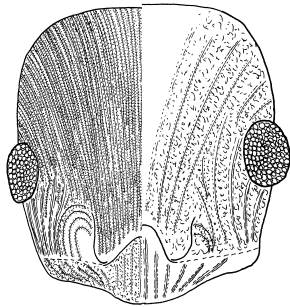


Fig. 181. The head of a worker of *L. schaumii* (left) and of a paratype worker of *L. whitfordi* (right), showing the sculpture (From Mackay, 2000).

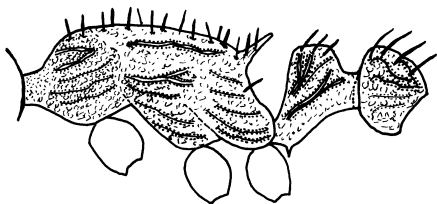


Fig. 179. Mesosoma, petiole and postpetiole of a worker of *L. texanus* (From Mackay, 2000).

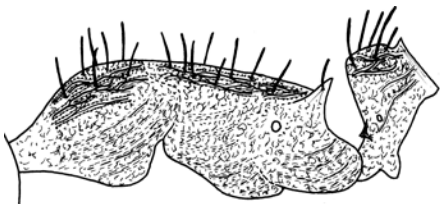


Fig. 182. Mesosoma and petiole of a worker of *L. tricarinatus* (UT), as seen from the side (From Mackay, 2000).

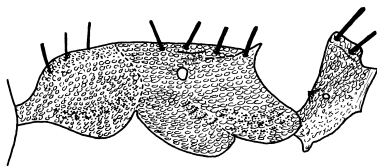


Fig. 183. Propodeum and petiole of a worker of *L. newmexicanus*, seen from the side (From Mackay, 2000).

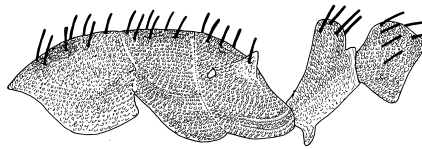


Fig. 180. Side view of a worker of *Leptothorax carinatus* (From Mackay, 2000).

- Dorsum of postpetiole punctate or granulose (Fig.), rarely reticulo-rugose, rugae often present on sides of node; node of postpetiole less than twice as wide as petiole, or node of petiole in profile with sharp apex (Fig.)

23

23(22).Sculpture on dorsum of head consisting primarily of striolae or very fine rugulae (or finely punctate) (Fig. 58, left); side of petiole without rugae or rarely with rugulae (Fig. 60); often concolorous pale yellowish - brown (rarely dark brown), gaster often slightly darker

24

- Sculpture on head consisting of fine rugae (Fig. 58, right); side of petiole with rugae which are not obscured by punctures (Fig. 59); concolorous dark brown; middle and western USA **tricarinatus** Emery 24(23).Concolorous pale yellowish brown (rarely dark brown), gaster slightly darker; sculpture on

dorsum of head consisting primarily of fine rugulae (or finely punctate); clypeus often somewhat depressed in form of shallow longitudinal trough, although median keel and several parallel carinae may be somewhat developed; Propodeal armature consisting of simple angles (Fig. 61); sides of petiole and postpetiole punctate without rugae or rarely with rugulae; side of pronotum dull and granulate or punctate, with poorly defined parallel striae; southwestern USA and NW México ***carinatus* Cole**

- Concolorous dark brown; sculpture on head consisting of rugae; median keel on clypeus well developed; sides of petiole and postpetiole with rugae which are not obscured by punctures; propodeal spines well developed (Fig. 62), length at least $\frac{1}{3}$ distance between bases of the spines; petiole obliquely truncate (Fig. 62) ***neomexicanus* Wheeler**

25(5). Propodeal spines short or dentiform (Fig. 63), length less than $\frac{1}{2}$ distance between bases; often concolorous dark brown..... **26**

- Propodeal spines longer than $\frac{1}{2}$ distance between bases (Fig. 64); ranging from yellowish-brown to concolorous dark-brown or bicolored **28**

26(25). Dorsum of head densely punctate, mixed with striae (Fig. 65, left); ***schaumi* Roger**

- Dorsum of head partially smooth and shining (Fig. 65, right) **27**

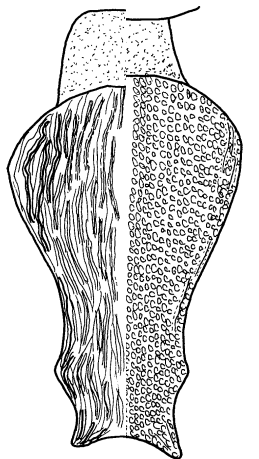


Fig. 184. Mesosomata of a paratype worker of *L. emmae* (left) and a paratype worker of *L. whitfordi* (right) (From Mackay, 2000).

27(26). Dorsum of pronotum with rugae (Fig. 67, left); bicolored (head and gaster black, mesosoma, legs, petiole & postpetiole orange) ***emmae* Mackay**

- Dorsum of pronotum ranging from smooth to punctate (Fig. 67, right); concolorous dark brown ***whitfordi* Mackay**

28(25). Head with very delicate longitudinal rugae, not much coarser than intrarugal sculpture and often forming reticulations with it; propodeal spines set close together at bases, spines about twice as long

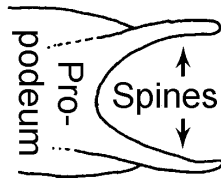


Fig. 185. Propodeal spines of a worker of *L. curvispinosus* as seen from above (From Mackay, 2000).

sculpture and do not form reticulations with it; propodeal spines well-separated at bases **30**

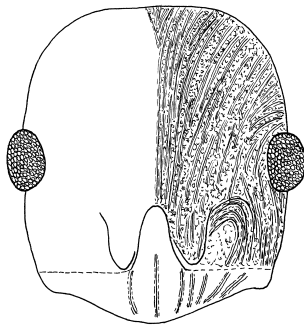


Fig. 186. Head of a worker of *L. rugatulus* (From Mackay, 2000).

as distance between bases (Fig. 34); postpetiole, from above, subquadrate, slightly broader than long

curvispinosus* Mayr

- Head with coarse longitudinal rugae which are notably heavier than the intrarugal

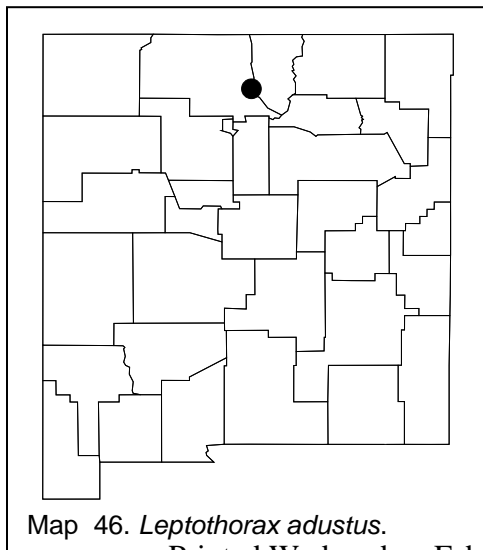
30(29). Relatively small, total worker length approximately 2.5 mm, yellowish-brown with dorsum of head slightly darker, rarely bicolored; nests under stones

***rugatulus* Emery**

- Large ants, total worker length over 3 mm; bicolored, head and gaster black, mesosoma dark reddish brown; nests in branches of oak trees

***josephi* Mackay**

***Leptothorax adustus* Mackay**



Map 46. *Leptothorax adustus*.

Discussion. This is a small, dark species with very tiny propodeal spines, the node of the petiole has a relatively sharp apex and the ventral surface of the peduncle has a small tooth or at least a bump. The antenna has 12 segments. The head is usually partially smooth and shining, although this lack of sculpture may be restricted to only a slender strip.

Distribution. USA: NM: Taos Co., Ojo Caliente.

Habitat. Riparian sites with cottonwood trees.

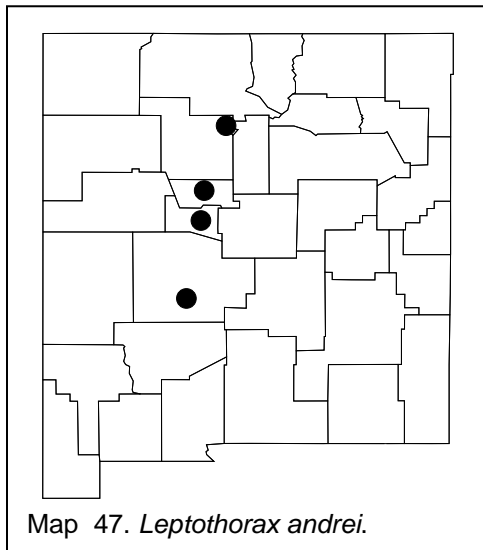
Biology. These ants nest under and in the bark of live cottonwood trees (*Populus fremontii*), in parts of the tree damaged by other insects.

***Leptothorax andrei* Emery**

Discussion. This is a small, light yellow or brown species with a 12-segmented antenna; striae are on the head, except for a narrow, central strip, which is smooth and shining. The entire mesosoma, petiole and postpetiole are punctate. The clypeus has a number of poorly defined carinae, the medial carina is poorly developed. The subpeduncular tooth is well developed, the petiolar node is blunt and rounded in profile, and the gaster is entirely smooth and shining. The propodeal spines consist of small angles. The postpetiole is not broadened. The hairs on the petiole and postpetiole are somewhat clavate.

It would be easily separated from *L. bestelmeyeri* by the smaller eyes, from *L. terrigena* in that the head has striae (not punctate) and from *L. furunculus* by the very different sculpture of the clypeus (numerous, poorly developed carinae, instead of a single medial carina and 2 prominent lateral carinae).

Distribution. USA: CA north to NV, southeast to NM: **Bernalillo Co.**, Albuquerque, **Los Alamos Co.**, Rio Grande, **Socorro Co.**, Bosque del Apache, **Valencia Co.**, Belen; MEXICO: Baja California Norte (Map 4).



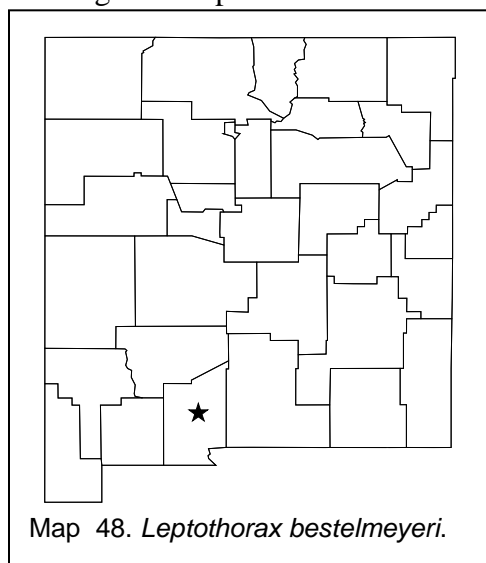
Habitat. This species occurs in riparian desert areas to relatively dry coniferous forests, oak woodland, laurel forest, pinyon-juniper or even cool deserts.

Biology. These ants nest under stones with 32 - 109 workers in the nest. Sexuials were present in nests in June and July. This species occasionally lives in nests of *Camponotus yogi* as well as with other *Camponotus* and *Formica* including *Formica occidua* and the thatched nests of *Formica ravidia*.

Mann, 1911, Mallis, 1941, Creighton and Snelling, 1966, Cole, 1966, 1958, Wheeler and Wheeler, 1973, 1986, Mackay and Mackay, 1984, Mackay et al., 1987

***Leptothorax bestelmeyeri* Mackay**

Discussion. This is a small, pale yellow species with large, black eyes and a 12-segmented antenna. The dorsum of the head is covered with striae formed by closely placed punctures that are in rows. The carinae on the clypeus are poorly formed, the middle carina is lacking, but the entire surface of the clypeus is convex. The top of the mesosoma is covered with fine rugae. The petiolar node is moderately sharp in profile, with the edge



Map 48. *Leptothorax bestelmeyeri*.

formed by a ruga. The subpeduncular process is well developed. The postpetiole is more than 1.5 X the width of the petiole.

This pale yellow ant with large, black eyes would be confused with few other species, except for *L. andersoni*, *L. cokendolpheri*, *L. liebi* and *L. coleenae* from the Chihuahuan Desert. See the discussion of *L. coleenae* for characteristics to separate these species. The large eyes would also separate it from *L. terrigena*, *L. furunculus*, and *L. andrei*.

Distribution. USA: NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site, type locality) (Map 5).

Habitat. Desert grassland.

Biology. The single worker was collected in a pitfall trap.

***Leptothorax carinatus* Cole**

Discussion. This is a yellow brown species with a 12-segmented antenna. The dorsum of the head is usually finely striolate, but is still moderately shining. The top and side of the mesosoma are mostly punctate, although there may be fine rugulae along the lower border of the pronotum. The propodeal armature consists of small angles. The petiolar

node is blunt and both the petiole and postpetiole are punctate, without any sign of rugulae or costulae. The subpetiolar process is well developed. The postpetiole is at least 1.5 X as wide as the greatest width of the petiole. The gaster is completely smooth and shining.

This species superficially resembles *L. andrei*, but can be easily distinguished by a number of characters. The postpetiole is 1.5 - 1.65 X the width of the petiole, whereas in *L. andrei* it is about 1.2 times the width of the petiole. The node of the petiole in profile has anterior and posterior faces that are almost parallel, whereas the faces of the node of *L. andrei* converge towards the apex. This species could be confused with *L. tricarinatus* or *L. neomexicanus*, but differs most obviously in being lighter in color. The sides of the petiole and postpetiole are punctate (rugose or rugulose in *L. tricarinatus* and *L. neomexicanus*). It is much lighter in color than either of these 2 species and the propodeal spines are poorly developed, as compared to the latter 2 species. It can be separated from *L. rugulosus* as the hairs on the scape are nearly all closely placed on the surface, those of *L. rugulosus* are partially raised, nearly suberect. The dorsum of the mesosoma is mostly punctate, whereas the sculpture of the top of the mesosoma of *L. rugulosus* has fine rugulae. It is similar to *L. neomexicanus*, but differs in being yellow or orange (*L. neomexicanus* is dark or black), the propodeal spines are usually poorly developed, consisting of tiny angles (small, but well developed spines in *L. neomexicanus*) and the subpeduncular process consists of an elongate lobe (tiny tooth in *L. neomexicanus*). *Leptothorax carinatus* has fine striolae on the dorsum of the head, and has a well-developed subpeduncular tooth, and seems to occur in more mesic sites. *Leptothorax neomexicanus* has at least part of the dorsum of the head finely punctate, the subpeduncular process is poorly developed, and is generally found in more arid sites.

Distribution. USA: WY, NV, southeastern AZ (Chiricahua Mountains); western TX (Davis Mountains, Chisos Mountains); Mexico: Chihuahua (Map 10). We have no records from New Mexico, but would expect this species to occur in the state.

Habitat. Nests occur in habitats ranging from desert grasslands, to juniper forests with cholla to desert riparian sites up to pine forests.

Biology. This species nests beneath stones, with populations ranging between 29 - 182 workers. Nests are monogynous, with sexuals in nests from June to August.

Cole, 1958b, Van Pelt, 1983, Wheeler and Wheeler, 1988, Frumhoff and Ward, 1992

***Leptothorax cokendolpheri* Mackay**

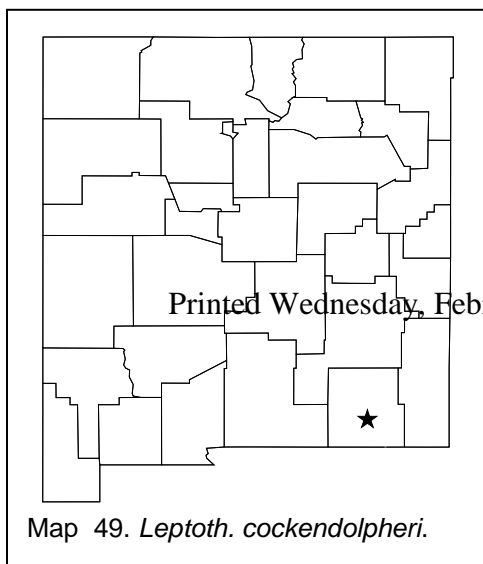
Discussion. This species has a 12-segmented antenna and is a small, light brown species in which the dorsum of the head is nearly smooth and shining. The sides of the head have fine striae, which pass to the dorsum. The eyes are small, with about 7 ommatidia in the maximum diameter and the maximum diameter is equal to or less than the minimum distance from the anterior border of the eye to the insertion of the mandibles. The mesosoma is punctate, with the sides of the pronotum having striae. The propodeal spines are small and poorly developed. The petiole and postpetiole are punctate, and the postpetiole is usually about 1.5 X the maximum diameter of the petiole, although there is a lot of variation. The dorsum of the gaster is polished and shining.

Leptothorax cokendolpheri is similar to *L. punctithorax*, and differs in that the postpetiole is noticeably broadened, the propodeal spines are smaller and the eyes are smaller. It is pale yellow in color whereas *L. punctithorax* is dark brown. The propodeal armature consists of simple angles, whereas the spines of *L. punctithorax* are small, but developed and acute. It appears to be closely related to *L. carinatus*, but can be separated as the eyes are smaller (7 - 8 ommatidia in maximum diameter vs. 8 - 9 in *L. carinatus*), the distance from the anterior margin to the insertion of the mandibles is equal to or greater than the maximum diameter of the eye (equal to or less than in *L. carinatus*) and the dorsum of the head is mostly smooth and shining (mostly striate or lightly punctate in *L. carinatus*). The females of *L. cokendolpheri* and *L. carinatus* are similar, but can be easily separated as the katepisternum (lower half of mesopleuron) is completely striate (at least partially smooth in *L. carinatus*) and the propodeal spines are well developed (less developed in *L. carinatus*). The width of the postpetiole ranges from 1.41 to 1.67 times as wide as the petiole in the type series workers. This species could be confused with other light colored species in the Chihuahuan Desert, including *L. andersoni*, *L. bestelmeyeri*, *L. coleenae*, and *L. liebi*. See the discussion of *L. coleenae* for hints as to how these species could be separated.

Distribution. USA:

southern New Mexico, western Texas; **NM: Eddy Co.**, Hidden Cave (type locality).

Habitat. Collected in a cave, the specimen from Brewster



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Co., TX was in mixed hardwood litter.

Biology. The type series was collected in a cave, the specimen from Big Bend National Park was collected mixed hardwood leaf litter.

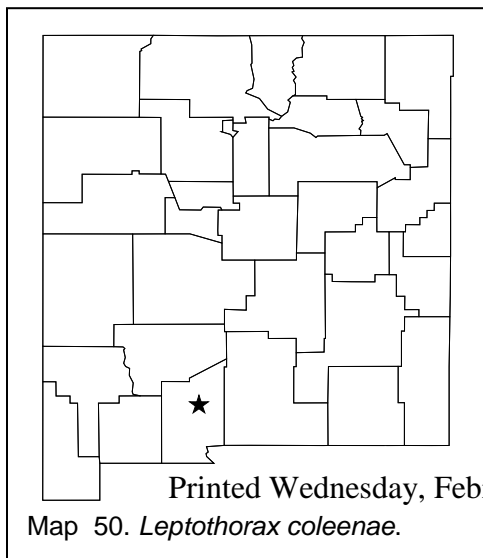
***Leptothorax coleenae* Mackay**

Discussion. This is an easily recognized, small, light yellow species with strongly contrasting black eyes and a 12-segmented antenna. Only a few species have this combination of colors and occur in the Chihuahuan Desert. This species is clearly distinct from all other *Leptothorax* species. Although a small region posterior to the frontal area is somewhat smooth and shining, the head is almost completely punctated which would preclude any confusion with species such as *L. carinatus*, *L. mariposa*, *L. nitens* or *L. adustus*, which usually have a large portion of the dorsum of the head smooth and shining and always have at least some striae on both sides of this shiny region. Also these 4 species are much darker than *L. coleenae*. There are no striae on the head of *L. coleenae*, except on the malar area, which would eliminate confusion with any of species such as *L. carinatus* or *L. furunculus*. It is also much lighter in color than these species. The well-developed ventral flange on the anterior peduncle of the petiole also separates it from most of the other similar *Leptothorax*. This species can be easily distinguished from the light colored *L. bestelmeyeri* and *L. cokendolpheri*, which have heads with fine striolae, and which are partially smooth and shining. The eye of *L. bestelmeyeri* is much larger than the eye of *L. coleenae* (compare Figs. 88 & 102). It could be confused with *L. liebi* and *L. andersoni*, in which the heads are also punctate. Both of these species have blunt petiolar nodes, which would allow separation of these species from *L. coleenae*.

Distribution. USA: NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site, type locality).

Habitat. The habitat where the holotype was collected was a creosotebush (*Larrea tridentata*) desert bajada.

Biology. The holotype was collected in a pitfall trap on 6 July 1984. The specimen was collected

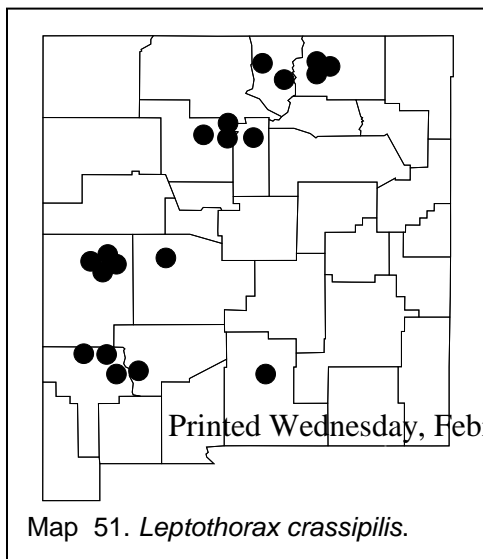


along the Long Term Ecological Site Control Transect, a few meters west of the diagonal dirt road which crosses the transect in the creosotebush zone. Despite extensive pitfall trapping in the area and numerous collecting trips made in all seasons and during both day and night, by numerous individuals, over several years, only the single specimen was collected. This is one of the 7 species which occur in typical Chihuahuan Desert vegetation (the others are *L. andersoni*, *L. bestelmeyeri*, *L. cokendolpheri*, *L. neomexicanus*, *L. liebi*, *L. bristoli*). It may be nocturnal as it is light colored and has large black eyes as other nocturnal desert ants.

***Leptothorax crassipilis* Wheeler**

Discussion. The clypeus of the worker is depressed in the middle and is without a medial carina, although several lateral carinae are present. The propodeal spines are well developed, and thickened at the bases. The anterior face of the petiole meets the dorsum in an angle, the posterior face is convex and rounded. The dorsum of the postpetiole is completely covered with punctate-granulose sculpture. The mesosoma has heavy and dense sculpture. There are numerous long (most over 0.1 mm), pointed (occasionally blunt) tipped hairs. The depressed clypeus could cause confusion only with members of *Formicoxenus* and with *L. muscorum*. It can be separated from *Formicoxenus*, as the hairs on the scapes are all appressed or decumbent, whereas the same hairs in *Formicoxenus* are suberect. There are no erect hairs on the eyes. Additionally, the dorsum of the postpetiole is completely and roughly sculptured, whereas the dorsum of the postpetiole of *Formicoxenus provancheri* is finely sculptured and predominantly smooth and shining. It can be separated from *L. muscorum* by the longer hairs on the pronotum. Additionally the dorsum of the mesosoma is more roughly sculptured, with distinct rugulae or rugae.

Distribution. USA: WY south to NM W to NV and AZ; **NM: Catron Co.**, near Datil, 15.3 K NW Datil, Ox Spring Canyon, **Colfax Co.**, 16 k E Eagle Nest. 4 mi E Eagle Nest, 4 mi W Eagle Nest, **Grant Co.**, Gila Mts., Mogollon Mts. (Trail 206), Wright's Cabin, **Los Alamos Co.**,



Map 51. *Leptothorax crassipilis*.

Mortandad Canyon, 8 k NE Los Alamos (in Chupaderos Canyon), **Otero Co.**, near Timberon, **Sandoval Co.**, Jémez Mts., **Santa Fe Co.**, 12 k NE Santa Fe, **Sierra Co.**, Gila Mts. (Iron Creek), **Socorro Co.**, 43 k SE Datil, Magdalena Mts. (Water Canyon), **Taos Co.**, 6 k SW Tres Piedras, 7 mi E Taos.

Habitat. Oak woodland, deciduous forests, ponderosa pine-riparian, Chihuahua pine, Douglas fir, spruce and fir forests, grasslands, subalpine fir.

Biology. These ants nest in the soil, under stones or rarely in logs and stumps, in sandy loam to rocky loam soils. Brood and reproductives were found in nests from June to August, flights occurred in August. Most nest females are found simply under the stone, one gyne was at a depth of about 10-cm in the soil. This species may be polygynous, as one nest contained 2 dealate females. Colonies were found together with *Myrmica hamulata*, *Camponotus vicinus*, *Formica lasioides* and *F. occulta*.

Gregg, 1963, Cole, 1954

***Leptothorax curvispinosus* Mayr**

Discussion. This is a small yellow ant with an 11-segmented antenna. The very long, inwardly curved, closely spaced propodeal spines make this species immediately recognizable. The propodeal spines are often narrow and about the same diameter throughout. The top and side of the mesosoma is covered with coarse rugae. The head is strongly punctured with delicate, longitudinal rugae.

Distribution. USA: Eastern United States and AZ; NM: No collections in the state

Habitat. The species is widely distributed in many different habitats forested areas

Biology. Nests were found in plant cavities including hollow stems, under bark of living trees, in reeds, twigs, logs, acorns, nut shells, insect galls, puffballs, pine cones and under stones. Nest populations are about 80 - 100 workers with several queens, up to a total of all members of 727, and nest densities of 0.6 nests per square meter. Alates are present from June to August, flights occur in early July. Larvae are found within nests throughout the year. Nests are polygynous and polydomous. The nest site may change after slight disturbances. It eats honeydew on leaves of trees and plants, but apparently does not tend aphids, and carries seeds and presumably eats at least part of them. They also feed at the axillary

nectaries of bracken fern and on dead insects. Foraging involves tandem running. Seasonally, foraging rate is highest in the spring and early summer, dropping off in the fall and being absent in the winter. It is most active during the daylight hours. It is the host of *Leptothorax duloticus* Wesson, *Protomognathus americanus* (Emery), possibly *L. minutissimus* (Smith, 1942), and *Limulodes parki* (Coleoptera - Seevers and Dybas, 1943).

The habits of this species are well known (Emery, 1895, Wheeler, 1903a, 1905, 1916, 1917, Smith, 1924, Dennis, 1938, Cole, 1940; Wesson and Wesson, 1940, Headley, 1943, Buren, 1944, Gregg, 1944, Talbot, 1934, 1957, 1965, Kanno, 1959, Van Pelt, 1963, Wilson, 1974a, Wilson and Fagan 1974, Möglich, 1978, 1979, Alloway and del Rio Pesado, 1979, 1983, Heithaus, 1981, Alloway et al., 1982, Fellers and Fellers, 1982, Douglas, 1983, Herbers, 1983, DuBois, 1985, Stuart, 1985, 1987a, Fellers, 1989, Williams, 1989, Frumhoff and Ward, 1992).

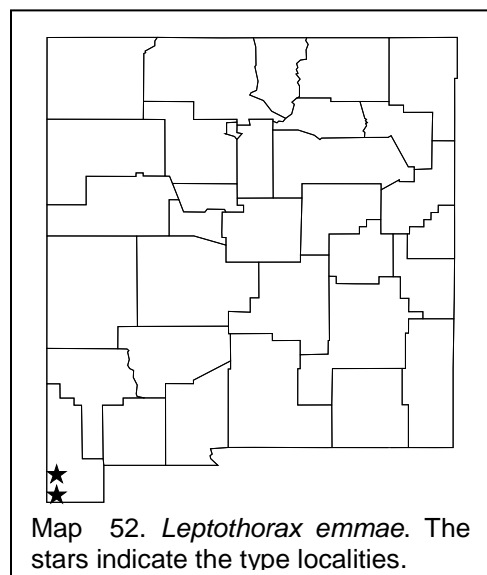
***Leptothorax emmae* Mackay**

add to key

Discussion. The 11-segmented antenna, well-developed medial clypeal carina, with two prominent lateral carinae, the thick, blunt petiole and the well-developed suprapeduncular process would separate *L. emmae*

from all of the other species in the subgenus, except *L. whitfordi*. It could be separated from these latter species as the mesosoma has longitudinal striae (punctate or partially smooth and shining in the latter species). Additionally, it is bicolored, whereas the other species is dark brown.

Distribution. USA: NM: **Hidalgo Co.**, Coronado National Forest, (Peloncillo Mts., 31°30'58"N 109°00'04"W, Cloverdale Creek, 31°26'25"N 108°58'29"W, 1491 m, and



Clanton Draw, 31°31'00 108°58'56").

Habitat. Oak forests.

Biology. This species nests in 3 cm diameter dead branches of Emory oak (*Quercus emoryi*). The ants attempt to escape when the nest is opened. The trees were located in the bottom of a draw, in a flat area of oak-juniper grassland. A complete nest population consisted of a single female and 116 workers.

***Leptothorax furunculus* Wheeler**

(check smith, why didn't include this species before

Discussion. The workers of this species are yellow brown with a 12-segmented antenna. The clypeus has a single median carina, 2 prominent lateral carinae and a few others, which are poorly defined. The head has wavy rugae, forming concentric semicircles around the insertion of the antennae, the striae posterior to the eyes are directed posteriorly to the occipital lobes, the central area of the head has poorly defined striae and is partially smooth and shining. The top of the mesosoma is covered with punctures and fine rugae, the sides near the top have somewhat coarse rugae. The pronotum has striae, the mesopleuron and side of the propodeum is covered with punctures. The propodeal spines are small, but well formed. The petiolar node is moderately sharp, as seen in profile. The subpeduncular process is large and well developed. The surface of the petiole and postpetiole are covered with punctures. The dorsum of the gaster is smooth and polished. This species could be confused with *L. nevadensis* or *L. andrei*. It differs from these species in that the petiolar node is moderately sharp at the apex (rounded in *L. nevadensis* and *L. andrei*) and the hairs on the petiole and postpetiole are only very slightly spatulate, or simply truncate. It is similar in color to *L. andrei*, but has propodeal spines, which are about 1/2 the length of the distance between their bases, not simply angles as in *L. andrei*. The clypeus is completely different from that of *L. andrei* possessing a single medial carina and two prominent lateral carinae, not a series of poorly defined carinae as in *L. andrei*. It can be separated from *L. neomexicanus*, but is lighter in color and has a much more developed subpeduncular process. Wheeler (1909) states that *L. furunculus* has distinct mesopropodeal impression, which is correct, although the impression is poorly developed and not much more notable than in most of the other species in the subgenus.

Distribution. USA: WY, CO; NM: Not known to occur in the state, but was collected in SW Colorado Williams Canyon near Manitou, 7,500'.

Habitat. Pinyon-cedar woodland.

Biology. This species nests under stones. Wheeler (1909) mentions the type series had a peculiar oily appearance not seen in any of the other species of the genus.

Wheeler, 1909, Gregg, 1963

***Leptothorax hispidus* Cole**

Discussion. This is a large species (3 - 4 mm total length) with a 12-segmented antenna, dark brown, with the mesosoma depressed at the area of the mesopropodeal suture, although the sculpture is not broken in the region. The top and side of the mesosoma are covered by coarse, reticulated rugae. The propodeal armature is represented by bumps. The node of the petiole is low and truncate. The petiole and postpetiole are covered with reticulated rugae. The strongly reticulo-punctate disc of the first gastral tergite, the depressed mesosoma, and the large size will separate this species from all other species in the subgenus. Cole (1957) stated that this species is most closely related to *L. silvestrii*, which is incorrect (Mackay, 2000). It can be easily distinguished from *L. silvestrii*, as the hind femur in *L. silvestrii* is greatly incrassate, which is not the case in *L. hispidus*. In addition, the impression at the mesopropodeal suture is absent in *L. silvestrii*; the scapes are longer in *L. hispidus*, as compared to *L. silvestrii*. The eye is normal in shape for the genus, which easily separates this species from *L. obliquicanthus*, which has a kidney-shaped eye. In addition the propodeal spines are simple angles in *L. hispidus* and are well developed in the other two species.

Distribution. USA: West TX southeast into Mexico, may occur in NM.

Habitat. High elevation forests.

Biology. This ant nests under stones or in soil.

Cole 1957, Van Pelt, 1983

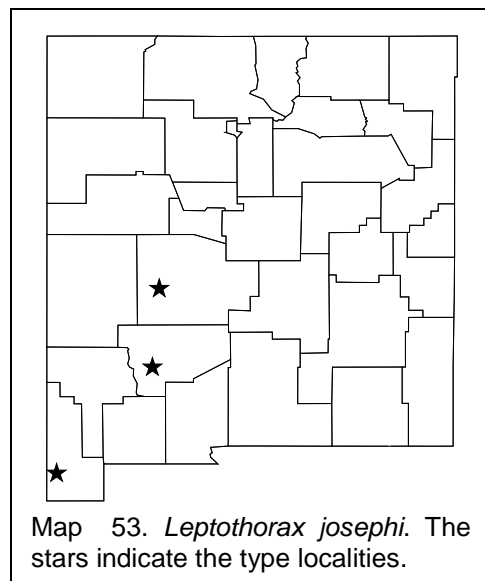
***Leptothorax josephi* Mackay**

Discussion. This is a large, bicolored (head and gaster black, mesosoma reddish brown) species which is easily confused with the bicolored form of *L. muscorum* in the field. The antenna is 11 segmented,

the propodeal spines are large, and the mesosoma has coarse rugae. The clypeus has a well-developed medial carina, and 2 prominent lateral carinae. The dorsal surface of the gaster is strongly shining. It is most closely related to *L. rugatulus*, but the worker is larger, the female is also larger (5 mm total length vs. 3.5 mm total length in *L. rugatulus*), and the male has numerous parallel carinae on the clypeus (*L. rugatulus* males have reticulated and partially transverse rugae on the clypeus). It differs from two other closely related species, *L. bradleyi* and *L. smithi*, in that the intrarugal spaces of the head are punctate, but shining. The long propodeal spines are much longer than those of *L. bradleyi*. *Leptothorax smithi* is never bicolored, usually being a concolorous pale brown to

yellow. It can be separated from *Leptothorax muscorum* by the convex clypeus with the well-developed medial carina.

Distribution. USA: NM: **Hidalgo Co.**, Coronado National Forest, (Clanton Draw), **Sierra Co.**, 21 k SW Hillsboro (Road 888 off Highway 26, just inside the Gila Wilderness, 32°45'34.9" 107°40'13.7", 1720 meters), **Socorro Co.**, near Mount Withington, (33°48'32.2" 107°22'57.2", 2185 meters).



Map 53. *Leptothorax josephi*. The stars indicate the type localities.

near streams with pinyon pines and junipers or grassy areas with scattered oaks within a pine forest.

Biology. This species nests in dead branches attached to trunks of the oak *Quercus arizonicus*. The ants are timid and attempt to hide, larvae and pupae were present in the nest. This species seems to prefer the driest dead branches of *Q. arizonica*. The nests contain brood throughout the summer. Nest populations ranged from 41 - 76 workers, with a single dealate female in each nest.

Habitat. Oak forest, often

***Leptothorax liebi* Mackay**

Discussion. This is a small, pale yellow ant with large, dark eyes. The antenna has 12 segments, the head is heavily and densely punctate, with the punctures forming weak striae. The eyes are very large, located about one maximum diameter from the insertion of the mandibles. The propodeal spines are poorly developed, forming small angles. The petiolar node is truncate. It is soft bodied, and usually becomes distorted when dried on a point. These characters will actually separate it from all other members of the genus. This species could be confused with *L. terrigena* or *L. punctatissimus*, and could be easily separated with the characters in the diagnosis. It somewhat resembles *L. coleenae* in terms of sculpture, but differs in having the large eyes and a blunt petiolar node. The discussion of *L. coleenae* includes suggestions as to how to distinguish the pale, desert species, including *L. andersoni*, *L. bestelmeyeri*, *L. cokendolpheri*, *L. coleenae*, and *L. liebi*. The large eye may cause it to be confused with *L. obliquicanthus*, but the eye is not kidney shaped and the first tergum of the gaster is entirely smooth and shining, not sculptured as in *L. obliquicanthus*. Therefore there is little likelihood that this species would be confused with any other. This is another species of the Chihuahuan Desert that is pale yellow in color with dark eyes. These are presumably adaptations to nocturnal foraging, although the specimens at Van Horn were collected actively foraging at the nest entrance during the day. This coloration appears to be the result of convergent evolution, as these pale, desert species seem to have little in common morphologically other than color.

Distribution. USA: west Texas (Culberson Co., Hudspeth Co.), may occur in New Mexico.

Habitat. Nest was found in soil, in desert scrub.

Biology. This species nests in soil in creosotebush scrub in the Chihuahuan Desert. Both specimens of the type series were collected in the same pitfall trap station, but one in August and the second in October. The site is a low flat area covered with loose, volcanic ash. They are probably active primarily at night, based on the light color and large eyes.

***Leptothorax mariposa* Wheeler**

add to key

Discussion. This is a small species with a 12-segmented antenna, usually light brown, the petiolar node has a sharp apex, the subpetiolar

process is usually a poorly formed, angulate structure, most of dorsum of the head is smooth and polished, the side has striae or rugulae, the propodeal spines well formed, acute, but short (about 1/3 length or less of distance between bases), the mesosoma is predominantly punctate, but with fine striolae, especially obvious on the pronotum and top of the mesonotum. This species can be separated from the others in the *nitens* group by the extremely acute petiolar node as seen in profile, and the smooth and polished dorsum of the head. The head is more quadrate than that of *L. nitens* (Cole, 1958a states the cephalic index of *L. mariposa* is 96, that of *L. nitens* is 79). The sculpture is rougher than in *L. nitens*, consisting of coarse punctures as well as prominent longitudinal rugae. It is larger than *L. nitens* (Cole, 1958a states the total thoracic length of *L. mariposa* is 0.95 mm, that of *L. nitens* is 0.71 mm). It is closely related to *L. melinus* from which it can be separated by having rugulae on the posterior face of the node (see *L. melinus* discussion).

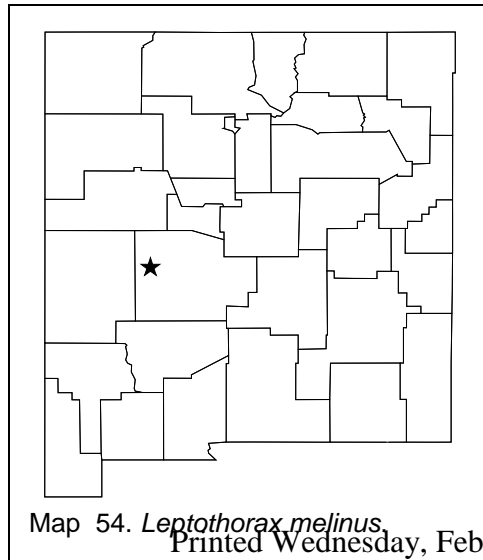
Distribution. USA: OR, CA, AZ (Cochise Co., Chiricahua Mountains); NM: We have no records, but this species may be found in the southwestern part of the state.

Habitat. Pine-fir forests Douglas fir, *Rhododendron*, live oak and laurel (Anderson, pers. obs.). This species is also found in relatively dry sites.

Biology. This species nests under stones, with a nest population ranging from 37 - 97 workers.

Wheeler, 1917, Cole, 1958a, Mackay, 2000

***Leptothorax melinus* Mackay**



Map 54. *Leptothorax melinus*.

Discussion. This is a small species of honey colored *Leptothorax* with a 12-segmented antenna, in which the head is nearly completely smooth and shining and the mesosoma is completely and densely punctate. This species is most similar to *L. mariposa*, and differs in that the posterior surface of the petiole is primarily punctate, whereas the posterior surface of the *L.*

mariposa has fine rugulae. It may be shown to be a synonym of *L. mariposa*, when the variability of this new species is better known. It is also similar to *L. nitens*, but is easily recognized in being much lighter in color and having the mesosoma completely and densely punctate. *Leptothorax nitens* has a mesosoma of which the dorsum is primarily smooth and polished.

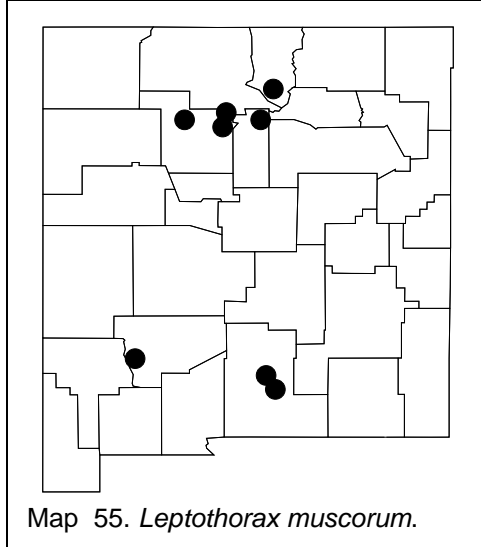
Distribution. USA: West central NM: Socorro Co., Beartrap Canyon (42.7 k SE Datil) (Map).

Habitat. Recently burned slope with ponderosa pines.

Biology. A nest was collected under a small, hard log in the soil on a south-facing slope. The soil was fine sand with scattered stones. Brood was found in the nest in August. The ants are very timid and feign death. Only one nest of this species was found at the site. A *Myrmica* sp. female was under the same log. Another nest was found in the same log as a nest of *Myrmica lobifrons*.

***Leptothorax muscorum* (Nylander)**

Discussion. This is apparently a species complex and is in need of clarification. The clypeus of the worker is depressed in the middle and is without a medial carina, although several lateral carinae are present. The propodeal spines are well developed. The anterior face of the petiole is weakly concave, and meets the dorsum in an angle, the posterior face is convex and rounded. The dorsum and sides of the mesosoma, petiole and postpetiole are completely covered with punctate-granulose sculpture. There are numerous short (0.01mm), blunt-tipped hairs. The depressed clypeus could cause confusion with members of the genus *Formicoxenus* and with *L. crassipilis*. It can be separated from *Formicoxenus* as it lacks the erect hairs on the eyes, and the hairs on the scapes are all appressed or decumbent, whereas the same hairs in *Formicoxenus* are suberect. It can be separated from *L. crassipilis* as the hairs on the dorsum of the mesosoma are shorter, and the sculpture on the dorsum of the mesosoma is finer, without distinct rugulae.



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Distribution. USA: AK south to CA, east to CT; **NM:** **Grant Co.**, Gila Mts (Wright's Cabin), **Los Alamos Co.**, Camp May, Los Alamos, Mortandad Canyon, **Otero Co.**, 4 mi N Cloudcroft, 14.4 k N Timberon (Spring Canyon), **Sandoval Co.**, Bandelier National Monument; 45 k SE Cuba, **Santa Fe Co.**, 12 k NE

Santa Fe, **Taos Co.**, 20 k S Taos.

Habitat. Woodlands, ponderosa pine-riparian; ponderosa pine; aspen, spruce forests, mixed forest.

Biology. This is one of the most common *Leptothorax* spp. in northern New Mexico. It nests in rotten logs (usually ponderosa pine) throughout the area. Logs may range from 15 cm to 1 m in diameter. Nests may also be located below stones. Brood and reproductives were found in the nests in July and August and nests may contain more than one queen. It shares nests with *Myrmica fracticornis*, *M. emeryana* and *Tapinoma sessile*.

Mallis, 1941, Cole, 1942, Kanno, 1959, Gregg, 1963 (*L. canadensis*), Wheeler and Wheeler, 1963, Chapman, 1969, Möglich et al., 1974

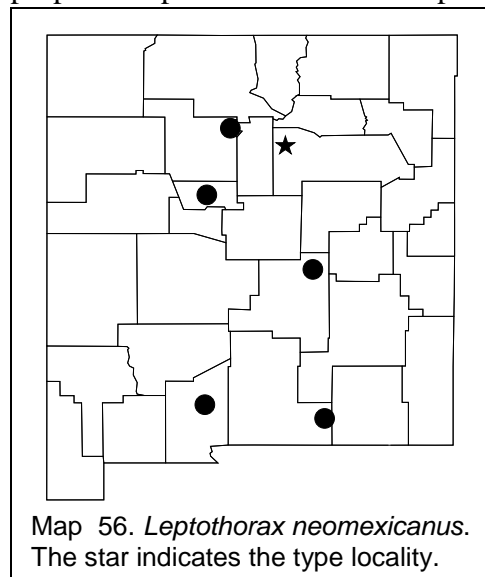
***Leptothorax neomexicanus* Wheeler**

Discussion. Workers of this species have a 12-segmented antenna, the medial clypeal carina is well developed; the lateral carinae may be somewhat weakly developed. The anterior edge of the medial clypeal lobe is usually somewhat delineated by 1 or more transverse carinae. The head is covered with fine striolae, except for a central strip, which is partially smooth and shining. The node of the petiole is rounded or weakly truncate. The postpetiole is broad as seen from above (more than 1.5 times the width of the postpetiole), but much less than ½ the width of the gaster. The propodeal spines are short and dentiform. The side of the mesosoma, petiole and postpetiole are more or less uniformly covered with a granulate or punctulate sculpture, which is so delicate that much of these areas, especially the mesosoma, are shiny under various lighting conditions. The top of the mesosoma is covered with fine rugulae, which

nearly form foveolate punctures. The subpeduncular process is poorly developed, consisting of a tiny bump (Fig. 136).

This species could be confused with *L. tricarinatus*, which has an opaque to subopaque head (owing to heavy sculpture, see Gregg, 1963), whereas *L. neomexicanus* has a head which is largely smooth and shining, especially in the median and posterior regions (because of weak sculpture). The dorsum of the mesosoma of *L. tricarinatus* is also opaque and weakly shining, whereas in *L. neomexicanus* it is rather strongly shining. *Leptothorax neomexicanus* has longer propodeal spines, they are more stout, triangular and toothlike in *L. tricarinatus*. Although *L. neomexicanus* is similar to *L. tricarinatus*, they both appear to be valid species, as they are sympatric throughout much of their ranges (compare Maps 30 & 54), with no apparent evidence of hybridization.

The lateral carinae of the clypeus of both *L. neomexicanus* and *L. nevadensis* are very similar, in that they curve medially at the anterior part of the medial lobe of the clypeus, and connect. They can be easily separated as the head of *L. neomexicanus* is at least partly smooth and shining, whereas the dorsum of the head of *L. nevadensis* is nearly completely sculptured. It can be separated from *L. carinatus* in being much darker in color (*L. carinatus* is pale brown or brown-orange). The propodeal spines are well developed, but short ($\frac{1}{3}$ to $\frac{1}{2}$ length of distance between bases), whereas the propodeal armature of *L. carinatus* consists of poorly developed angles.



Distribution. USA: AZ, NV, UT, CO, NM, TX; NM: **Bernalillo Co.**, Albuquerque, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Lincoln Co.**, 25 m SE Vaughn **Los Alamos Co.**, Los Alamos, **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), **San Miguel Co.**, Manzanares (type locality); MEXICO: Chihuahua.

Habitat. Open, dry grassy areas, riparian desert streams, to ponderosa pine forests, occasionally found in arid, desert sites.

Biology. This species nests in the soil, or under stones, in open areas. Nests are monogynous and are marked by a hole in the ground, occasionally with a light, asymmetrical scattering of fine soil. Colonies are small.

Wheeler, 1906, Smith, 1952, Cole, 1953, 1954, Gregg, 1963, Van Pelt, 1983, Wheeler and Wheeler, 1986, Mackay et al., 1987, Frumhoff and Ward, 1992

***Leptothorax nevadensis* Wheeler**

Discussion. This species has a completely and strongly striated head with punctures between the striae, and rarely with a slender median strip without sculpture. The sides of the pronotum are distinctly and coarsely rugose, with the background weakly punctate, but shining. The dorsum of the mesonotum is striate to finely rugose, but mixed with background punctures and not as shiny as the background of the sides of the pronotum. The petiole and postpetiole are primarily punctate, but fine rugulae can be seen on the dorsum of the petiole. There is usually a single ruga on the side of the petiole. Some larger specimens have several poorly defined rugae on the side of the petiole (making it look "wrinkled"), and occasionally on the anterior face. These larger specimens usually have longer propodeal spines, sometimes as long as the distance between the bases. These specimens were referred to as *L. nevadensis* subsp. *melanderi* in the past.

Leptothorax nevadensis and *L. neomexicanus* have similar lateral clypeal carinae, which usually curve and connect on the anterior part of the medial lobe of the clypeus. They are thus apparently closely related. They can be easily separated as the dorsum of the head of *L. nevadensis* is nearly completely sculptured, whereas part of the head of *L. neomexicanus* is smooth and shining.

Note Wheeler (1903a) stated that *L. nevadensis* was closely related to *L. andrei*, without actually seeing specimens of *L. andrei*. This is incorrect. The three clypeal carinae of *L. nevadensis* are well developed; *L. andrei* has a number of poorly developed carinae on the clypeus. Additional, more superficial characters that would separate these 2 species would include the punctae or striae on the dorsum of the head of *L. nevadensis*, which contrast with the rugulae on the head of *L. andrei*. The propodeal spines of *L. nevadensis* are well formed and elongate; the armature of *L. andrei* consists of simple angles.

Distribution. USA: Eastern Washington and Oregon east to western MT, northwestern Wyoming south to Nevada, Colorado w to southern California. **NM:** We have no records of this species in New Mexico, but it may occur in the northwestern part of the state.

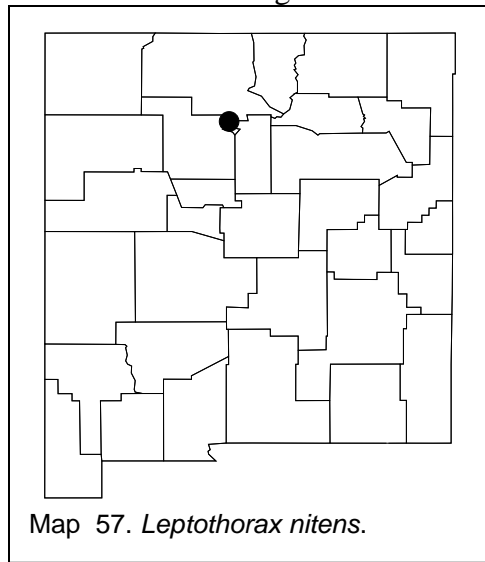
Habitat. Nests in soil in moist areas, usually under stones, or in rotten wood, from communities including cool desert, pinyon- juniper, coniferous forest and alpine areas. Specimens were collected in litter in a number of plant communities, including tanbark oak, oak leaf litter near a spring, maple and oak litter, Douglas fir, and laurel.

Biology. This species nests in soil in moist areas, usually under stones, or in rotten wood. It may be involved in plesiobiosis (association approaching symbiosis), as it nests at the entrance of *Trachymyrmex turrifex* nests and at the edge of nests of *Pheidole tepicana* (= *P. instabilis*). Insecticide treatments for the spruce budworm in eastern Oregon had little impact on this species.

Wheeler, 1903a, Cole, 1934, 1942, Wheeler and Wheeler, 1973a, 1986, Murphy and Croft, 1990

***Leptothorax nitens* Emery**

Discussion. This species has a 12-segmented antenna. The tops of the mesosoma and head are nearly always smooth, glossy and shining, or finely punctate with fine, longitudinal costulae. The propodeal armature consists of small angles. The node of the petiole is sharp. Color ranges from concolorous yellow to medium tan.



Map 57. *Leptothorax nitens*.

This species appears to be closely related to several others, including *L. mariposa*, *L. melinus* and *L. adustus*. Based on the holotype, it can be separated from these other species by the nearly smooth and polished dorsum of the mesosoma, as all of the other species have mesosomata that are densely sculptured. We are not convinced that we really know the true identity of *L. nitens* and it is possible that some of the records

from the literature are based on misidentifications.

Distribution. USA: Western United States; **NM: Los Alamos Co.**, Los Alamos, Mortandad Canyon; **MEXICO:** Durango.

Habitat. Ponderosa pine-riparian; grasslands, highly disturbed areas, pinyon-cedar-oak-juniper woodland.

Biology. This species nests under stones, or rotten logs. One nest was found in a termite nest. Nests contain 69 - 276 workers and are monogynous. Sexu- als are found in the nest from June to August. It is one of the last ants to colonize a disturbed area.

Wheeler, 1903a, 1906, Cole, 1942, 1958a, Gregg, 1944, 1963, Wheeler and Wheeler, 1973a, 1986, Moody and Francke, 1982; Wheeler and Wheeler, 1986, Mackay et al., 1987, 1993b, Frumhoff and Ward, 1992, Rojas-Fernández and Fragoso, 1994

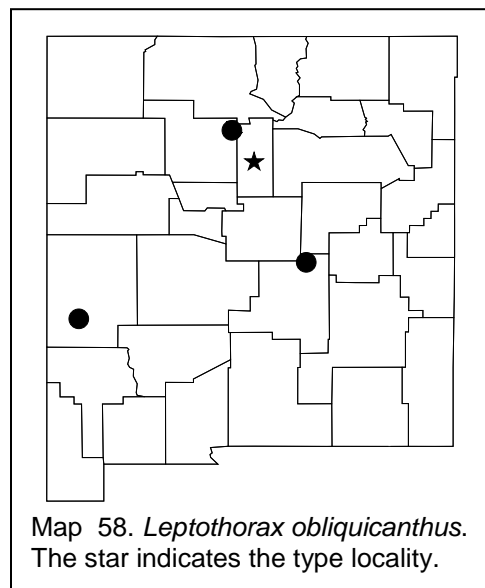
***Leptothorax obliquicanthus* Cole**

Discussion. The worker of this species is easily recognized due to the large, kidney shaped eye. In addition, nearly all surfaces are densely and coarsely punctate. The entire first tergum is punctate, but the punctures are fine and difficult to see unless the light is placed to reflect from the surface. The antenna has 12 segments.

This species is easily recognized and separated from all other known North America *Leptothorax* by the large, oblong eyes. It could only be confused with *L. liebi*, which is pale yellow, with black eyes and has a completely smooth first tergum of the gaster.

Distribution. USA: NV, CO, TX, **NM: Catron Co.**, Mogollon Mts., **Lincoln Co.** 25 mi SE Vaughn, **Los Alamos Co.**, Los Alamos, **Santa Fe Co.**, 10 mi S Santa Fe (type locality).

Habitat. Dry, grassy areas to semi-moist meadows, and



highly disturbed site

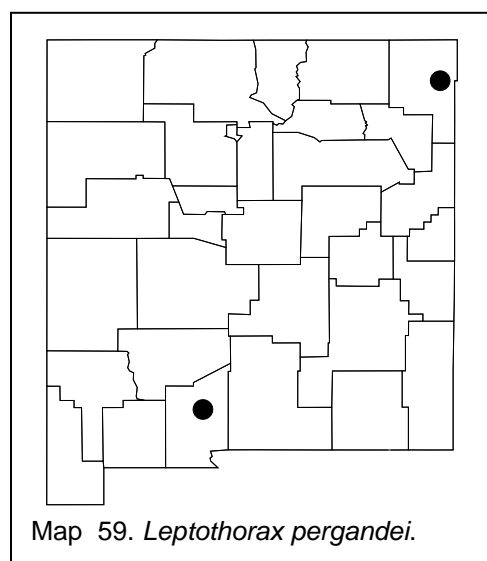
Biology. This species nests under stones. It is found in dry grassy areas (Mackay, pers. obs.) to semi-moist meadows (Gregg, 1953) and to sagebrush or highly disturbed areas () and high, dry short-grass plains above a river valley (Gregg, 1953). One nest was in an exposed area surmounted by a 10-cm crater (Wheeler and Wheeler, 1986). One nest in New Mexico was in the soil together with *Pheidole* sp. Nests are monogynous (Frumhoff and Ward, 1992). The large eyes may be connected with the diurnal habitats of the ants in open areas, where the workers could scan the surrounding area before exiting the nest (Gregg, 1953). Cole (1954) was unable to locate this species at the type locality in 1952 (year after initial collection).

Cole, 1953, 1954, Gregg, 1953 Gregg, 1953, 1963, Mackay et al., 1987.

***Leptothorax pergandei* Emery**

Discussion. This species is very distinct from the remainder of the members of the genus *Leptothorax* (Mackay, 1993). The clypeus has a medial carina and a few poorly defined lateral carinae, similar to members of the subgenus *Myrafant*. It differs from *Myrafant* in having the metanotal suture deeply depressed on the dorsum of the mesosoma. In addition, the peduncle of the petiole is very elongate, similar to members of the group that was previously referred to as the subgenus *Macromischa*. These characters would easily separate it from all of the other members of *Leptothorax* which are found in the state. It can be confused with the

minors of the genus *Pheidole*. Both genera have 3 segmented antennal clubs, the depressed region at the metanotal suture, and an elongate peduncle of the petiole. It differs in that the 2 apicalmost teeth are well developed as they are in *Pheidole*, the other 3 or 4 teeth are also well developed, much more so than in minor workers of *Pheidole*. *Leptothorax pergandei* could also be confused with workers of *Stenamma*, but can be separated by the well developed, 3-segmented



antennal club (moderately defined 4-segmented club in *Stenamma*).

Distribution. USA: eastern United States west to AZ; **NM: Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Union Co.**, Kiowa National Grasslands (Map).

Habitat. Usually mesic forests and grasslands, but in the Chihuahuan Desert it occurs in arid creosotebush scrub in southern New Mexico and southeastern Arizona (Mackay et al, 1995). It was also found in the grasslands of northern New Mexico.

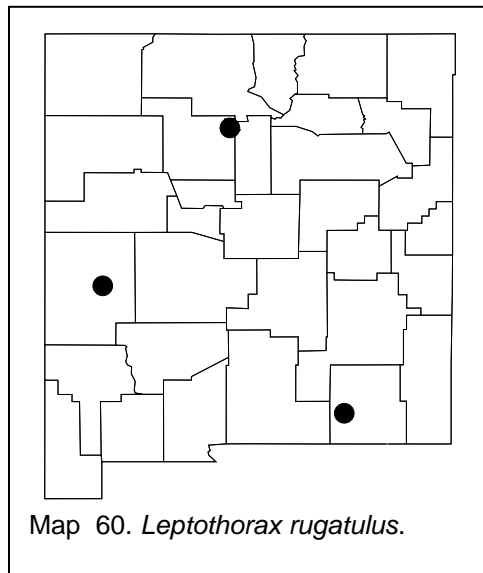
Biology. This species nests in the soil in New Mexico, although it also nests in stumps, logs and nutshells in more mesic habitats. It is active diurnally and throughout the year, at least in Florida. Nests contain 36 or more workers and are monogynous. Sexualls were present in nests in southern United States from April to December. A flight in North Carolina occurred in June. Although it is not common in New Mexico, finding it in arid sites shows how little we know about the distribution and natural history of ant species.

***Leptothorax rugatulus* Emery**

Discussion. Workers of this species have an 11-segmented antenna, a coarsely rugose dorsal surface of the head, the dorsum (and sides to a lesser extent) of the mesosoma and petiole are rugose as the head, the propodeal spines are well developed, longer than the distance between their bases, the dorsum of the postpetiole has rough punctures.

This species is smaller than *L. josephi* and is basically concolorous medium yellowish-brown, often with dark infuscation on the head and mesosoma. The subpetiolar process is often about as wide at the tip as it is at the base. The propodeal spines are well developed, which separates it from *L. schaumii*, and *L. whitfordi*.

Distribution. USA: western North America as far south as **NM: Catron Co.**, 35 k E Horse Springs, **Eddy Co.**, Hidden Cave, **Sandoval Co.**, Bandelier (Cole 1953b).



Map 60. *Leptothorax rugatulus*.

Habitat. High elevation coniferous or deciduous forests in moist habitats, in shaded grassy slopes with pines, or grasslands. It also occurs in pinyon-juniper forests and cool desert habitats.

Biology. This species usually nests in the soil or under stones, in decaying wood or even in trees. One nest had more than 100 workers and eight females,

nests are monogynous (single nest queen) or polygynous (multiple females in nest). There are 2 queen morphs in this species, with mostly macrogynes (large queens) found in monogynous colonies and microgynes (small queens) in polygynous colonies. Sexualls occurred in nests in July to September. This species moves the nest if it is disturbed. It may form a plesiobiotic relationship with *Lasius umbratus*. The beetle *Amecocerus* sp. (Melyridae) occurred in a nest in Nevada. Insecticide treatments for the spruce budworm in eastern Oregon had little impact on this species.

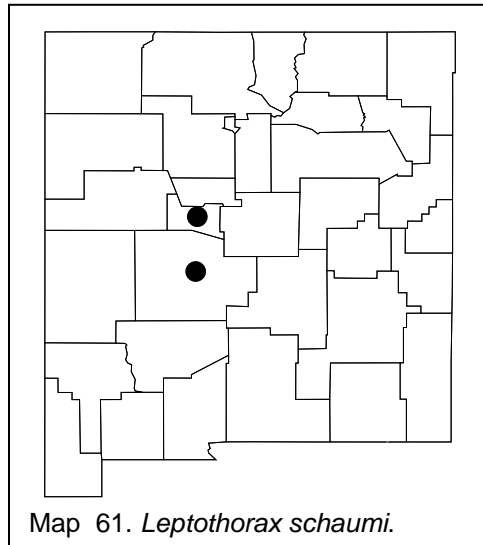
Wheeler, 1903a, 1917, Gregg, 1963, Cole, 1934, 1942, 1953, 1954, Wheeler and Wheeler, 1963, 1986, Borchart and Anderson, 1973, Möglich, 1978, Moody and Francke, 1982, Van Pelt, 1983, Mackay et al., 1988, Rüppell et al., 1998, Murphy and Croft, 1990, Frumhoff and Ward, 1992

***Leptothorax schaumii* Roger**

Discussion. These ants have 11 segmented antennae and are usually concolorous dark brown, but are occasionally concolorous yellow. The head is nearly completely covered with fine striae, which merge with the dense punctures. Occasionally there is a central strip, which is partly free of sculpture and somewhat shining. The top of the mesosoma is mostly punctate, with a few striae, the side of the mesosoma has numerous striae with punctures between them. The propodeal spines range from tiny angles to small spines, which are dull and rounded. The petiole and postpetiole are punctate and the node of the petiole is weakly truncate, with round edges.

The 11-segmented antenna and tiny propodeal spines separate this species from all other species with an 11-segmented antennae in the

subgenus, except *L. whitfordi*. It can be easily distinguished from *L. whitfordi* as the head and pronotum are predominantly punctate (predominantly smooth and shining in *L. whitfordi*, but the pronotum may be punctate as in *L. schaumii*). The punctures on the pronotum of *L. schaumii* are fine and completely cover the surfaces, whereas in *L. whitfordi* they are coarse and do not densely cover the surface. The small spines separate it from the others in the *schaumii* species complex.



Map 61. *Leptothorax schaumii*.

Distribution. Eastern USA, as far west as KS and TX.

NM: Bernalillo Co., Bosque Forest, Socorro Co., Sevilleta National Wildlife Refuge.

Habitat. This species occurs in many habitats ranging from desert canyons in trees (), to grasslands, to shaded deciduous forests.

Biology. This species nests in bark of living trees, in branches, logs and oak galls of trees. One nest contained 143 workers, 35 larvae and a single queen, although nests may have more than a single

queen. The nest entrance is simply a small hole.

Wheeler, 1903a, 1905, 1916, Cole, 1940, Gregg, 1944, Carter, 1962, Moody and Francke, 1982, Van Pelt, 1983, DuBois, 1985, Wheeler and Longino, 1988, Frumhoff and Ward, 1992

***Leptothorax silvestrii* (Santschi)**

Discussion. This species is yellow-brown in color with a 12-segmented antenna. The head is completely and coarsely punctate, with fine rugae interspersed among the punctures. The tops of the mesosoma and petiolar node have similar sculpture. The side of the mesosoma, side of the petiole and entire postpetiole are similarly punctate, with reduced extensive rugae when compared to the top of the mesosoma. The entire dorsum of the first tergum is evenly, but finely punctate. The petiolar spines are sharp and well developed. The peduncle of the petiole is elongate and the top of the node is truncate and square in shape. All of the

femora, especially the hind femur, are incrassate. The maxillary palp has 5 segments, the labial palp 3 segments, the mandible has 5 teeth.

The reticulo - punctate disc of the first gastral tergite separates this species from all others in New Mexico, except *L. hispidus* and *L. obliquicanthus*. It differs from *L. hispidus* in that the propodeal spines are well developed and the hind femora are greatly thickened. It differs from *L. obliquicanthus* in that the eye is normal in shape and the petiolar node is very blunt in profile.

Distribution. USA: Southeastern AZ (Pima Co.: Tucson, Santa Catalina Mts., Baboquivari Mts.; Santa Cruz Co., Ruby), may occur in NM.

Habitat. Oak forests.

Biology. Arboreal nests are found in large branches of oaks, especially *Quercus emoryi*. Nests contain 50 - 70 workers, and a single queen.

Creighton 1953

***Leptothorax stenotyle* Cole**

Discussion. This is a roughly sculptured, relatively large, dark brown ant, with a 12 segmented antenna. The head, mesosoma, petiole and postpetiole are covered with coarse rugae, the intrarugal spaces are shining. There may be a central area at the vertex without sculpture. The propodeal spines are poorly developed and are essentially elongate angles (approximately 0.05 mm in length). The petiole is thick in profile with a blunt apex (Fig. 171).

This species can be distinguished from *L. tricarinatus*, as it has a more slender mesosoma and a narrower postpetiolar node. It differs from *L. neomexicanus* in that it is longer, more rugose and has an opaque head, which lacks distinct punctures and smaller postpetiole. It differs from *L. obliquicanthus* as the eye is of normal size and shape for the genus.

Distribution. USA: Southeastern AZ (Cochise Co., Chiricahua Mountains), may occur in NM.

Habitat. Pine and spruce forests.

Biology. This species nests under stones. Nest populations range from 53 - 55 workers. Alate females were found in a nest in August.

Cole, 1956a

***Leptothorax texanus* Wheeler**

Discussion. This is a small (total length 2.25 mm), dark brown species with a 12-segmented antenna, in which the postpetiole is more than 1.5 X the width of the petiole. The entire ant is roughly sculptured, with rugae on the head, top and side of the mesosoma, on the petiole and on the postpetiole. The gaster is smooth and glossy. The subpeduncular process is poorly defined and consists of a tiny tooth. The node of the

petiole is truncate. The propodeum has well-developed spines. The massive postpetiolar node, which is coarsely reticulo-rugose or punctate, separates this taxon from all others in New Mexico.

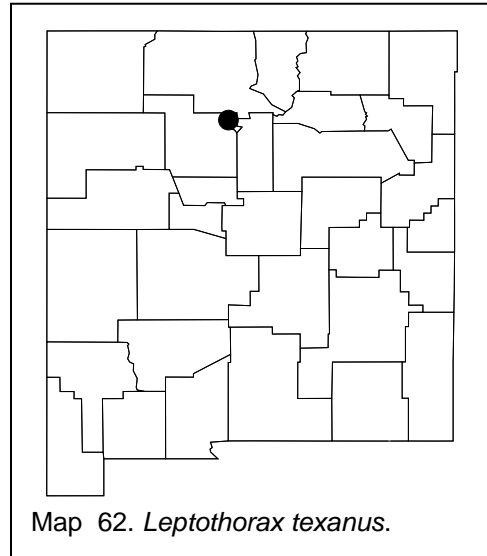
Distribution. USA: eastern United States west to TX; **NM: Los Alamos Co.,** Mortandad Canyon.

Habitat. Ponderosa pine/riparian.

Biology. This species forms small colonies in sandy soil or even sand dunes, or clay soils in damp spots under post-oaks, cedars

and pines and even in the driest sites. They often nest at the base of a grass clump. Males have been collected from late May to late July in the nests. These ants form foraging trails, which are nearly invisible, across sand dunes and moss, and apparently use tandem running.

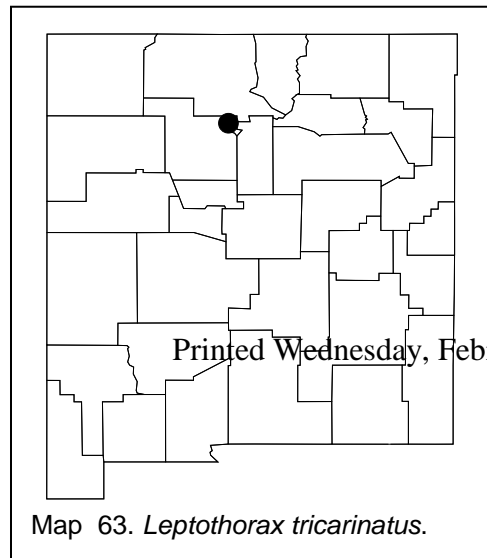
Wheeler, 1903a, Smith, 1932, 1952, Talbot, 1934, Wesson and Wesson, 1940, Buren 1944, Gregg, 1944, Cole, 1952, Carter, 1962, Wheeler and Wheeler, 1963, Mackay et al., 1988



Map 62. *Leptothorax texanus*.

***Leptothorax tricarinatus* Emery**

Discussion. Workers have a 12-segmented antenna, the scape nearly reaches the occipital corner, the clypeus has three well-developed carinae, including a medial carina and two lateral carinae, the area between the



Map 63. *Leptothorax tricarinatus*.

carinae is mostly smooth and shining, the dorsum of the head is rugulose, with the intrarugal spaces shining, the area around eye has nearly foveolate punctures. The dorsum of mesosoma is finely rugulose, with a nearly smooth background, the side of the mesosoma is rugose, and the propodeal spines are well developed, the length about $\frac{1}{2}$ the distance between bases of spines. The subpetiolar process is moderately well developed, the top of node is obliquely truncate, the top of the petiole and postpetiole have rugae, the background surfaces smooth, dorsum of gaster shiny.

Leptothorax tricarinatus could be confused with other species, especially with *L. stenotyle*. It can be separated from *L. stenotyle* as the postpetiole is noticeably widened when compared with the petiole. The clypeus of *L. tricarinatus* has the medial and 2 lateral clypeal carinae well developed, more developed than in most of the other similar species.

Distribution. USA: Western United States as far east as Iowa and as far south as NM: Los Alamos Co., Mortandad Canyon.

Habitat. Open grassy areas, including foothill meadows, canyon deciduous forests, oak woodlands, cedar forests, ponderosa pine forests, shortgrass prairie, sagebrush communities and areas with scant vegetation. It appears to do well in disturbed sites.

Biology. This species nests under stones and in moist soil. Nests are small and are monogynous. Males have been found in nests from July to September.

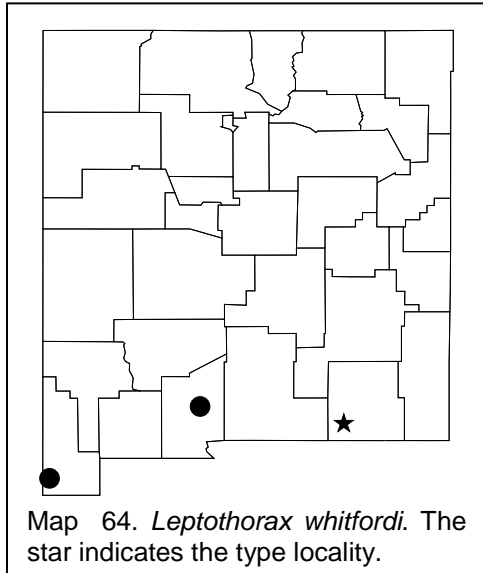
Wheeler, 1906, Buren, 1944, Cole, 1952, Cole 1953, Gregg, 1963, Wheeler and Wheeler, 1963, DuBois, 1985, Frumhoff and Ward, 1992

***Leptothorax whitfordi* Mackay**

Discussion. The workers of this species are small, dark brown specimens with an 11-segmented antenna. The dorsum of the head is mostly smooth and shining, the pronotum is nearly completely covered with coarse punctures. The propodeal spines consist of tiny angles. The petiole is thickened with a round node.

The presence of an 11-segmented antenna easily separates *L. whitfordi* from all of the other species with similar sculpture. The smooth dorsum of the head and partially smooth pronotum would separate it from *L. schaumi*. The specimen from near Las Cruces differs from the type series in that the propodeal spines are more developed, the subpeduncular process is poorly developed (well developed in the type series), and the

pronotum is covered with larger punctures that approach the form of foveolae (punctures in “normal” *L. whitfordi*, with a few wavy striae and areas that are nearly smooth and shining).



Distribution. USA:

western Texas, southeastern NM: **Doña Ana Co.**, 18 KNE Las Cruces, Rancho La Cueva, **Eddy Co.**, Guadalupe Mts. (5.3 k SE Sitting Bull Falls, 32°12'15"N 104°40'23"W, 1559 meters), **Hidalgo Co.**, Peloncillo Mts., south into eastern Mexico.

Habitat. Creosote bush scrub, desert scrub, with *Yucca* sp., *Prosopis* sp., and *Opuntia* spp., to oak forests, mixed pine-juniper-oak forests.

Biology. This species nests in branches of *Quercus* oaks (gray

oak, Arizona oak) and other trees, including mesquite (*Prosopis glandulosa*), which was full of tunnels, at a height of 3 meters. Brood was found in nests in August. One nest contained 1 queen, 2 males and 35 workers, a second contained 1 queen and 116 workers. A single worker was collected loose in an unspecified tree, in a desert arroyo with oaks and *Celtis*.

When the nests are disturbed, they primarily attempt to rescue the brood. They are also much more aggressive than the typical *Leptothorax*, attacking and stinging. The sting is surprisingly painful, similar to that of the thief ants in the genus *Solenopsis* or *Wasmannia*. *Liometopum apiculatum* also nests in branches of the oaks, and this *Leptothorax* may be so aggressive as it must protect nests from the former species, which were attempting to prey on the brood of *Leptothorax* during opening of nests.

Genus *Manica*

(Key: Wheeler and Wheeler, 1986)

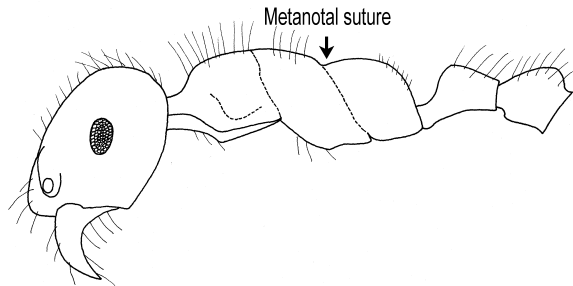


Fig. 188. Head, mesosoma, and petiole of a worker of *Manica invidia*.

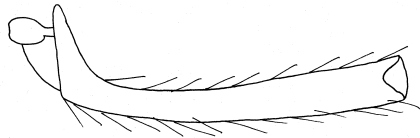
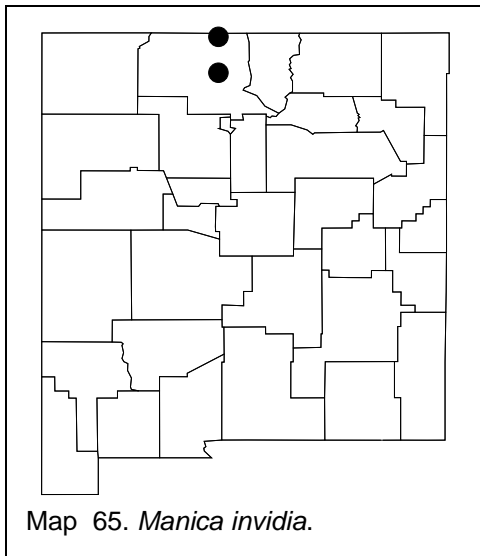


Fig. 187. Scape of a worker of *Manica mutica*, as seen from the side.

This is a small genus of five species, four of which are found in North America. They are rarely collected and form small colonies in the soil, usually surrounded by a small mound of soil. Principal morphological characteristics would include: hind tibial spurs pectinate (difficult to see, see discussion of *Myrmica*), the top of the mesosoma is strongly depressed (Fig.), and there are no spines on the propodeum. These characters separate this genus from all others in North America.

It would be only confused with *Myrmica*, in which the mesosoma is not strongly compressed.

***Manica invidia* Bolton**



Discussion. This is the most common species in the genus and the only species known to occur in New Mexico, and is very rarely collected. The characters listed for the genus will separate it from all other species in New Mexico. In the field, it appears to be a large, golden colored *Myrmica*. This species was previously referred to as *Myrmica mutica* Emery.

Distribution. USA: Western United States south to NM: Rio Arriba Co., 7 mi S

Cebolla, 4 k N Chama.

Habitat. Occurs in a number of habitats, usually forests (aspen, spruce), but may occur in areas with sagebrush or in grasslands.

Biology. This species nests under stones and logs or simply in the soil. Workers feed on living insects and seeds. This species is the host of *Formicoxenus* (= *Symmyrmica*) *chamberlini*. Reproductives are found in the nest from August to October, a nest founding female was captured in June. These ants are capable of stinging, although they are not very aggressive. They were very common in the site near Cebolla.

Gregg, 1963, Wheeler and Wheeler, 1963

Genus *Monomorium* (Key: DuBois, 1986)

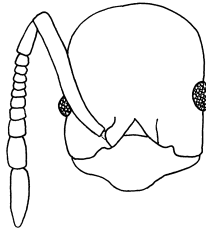


Fig. 189. Head of a worker of *M. cyaneum*.

This is a common group of tiny, shiny, black ants (rarely roughened yellow ants), which occur in many different plant communities. The antenna has a 3-segmented club. The propodeum is rounded between the dorsal and posterior faces. The petiole and postpetiole are nearly the same size and shape.

They can be confused with the genus *Solenopsis*, but are easily separated by the black color (few *Solenopsis* are shiny black) and the antennal club is composed of three segments (two in *Solenopsis*). The antenna has 12 segments in *Monomorium*, 10 in *Solenopsis*. They could be confused with an undescribed species of *Tranopelta* (see *Tranopelta* discussion). They could be confused with minor workers of some of the smaller, shiny black species of *Pheidole*. They differ in that even the minor workers of *Pheidole* have at least angles on the propodeum (*Monomorium* may be angulate at the same position, but does not have spines) and the mandibles have a large apical tooth, a smaller subapical tooth and several small teeth, whereas *Monomorium* has a mandible with 3 or 4 teeth which are almost equal in size or only the apical tooth is larger than the others. The clypeus of *Monomorium* has a pair of carinae which

extend past the anterior border of the clypeus as small teeth, which are absent in *Pheidole*. ??? *Monomorium* is monomorphic, *Pheidole* possesses soldiers. check all of this above

Both of our species nest in the soil and are usually seen under stones. Occasionally ants of this genus are house pests in New Mexico. Cole (1953c) deals with the species in New Mexico.

Key to the workers of the genus *Monomorium*



Fig. 190. Mesosoma of a worker of *M. pharaonis*.

- Dorsum of head and sides of mesosoma mostly or entirely smooth and shining; shiny black in color; very common in New Mexico 2

2(1). Mesopleuron usually partially punctate (Fig.); usually with fewer than 12 hairs projecting above dorsum of mesosoma; unmated females without wings; usually found in arid environments *cyaneum* Wheeler

- Mesopleuron not punctate (at least not central portion - Fig.); usually more than 10 hairs projecting above mesosoma (Fig.); unmated females with wings; usually in mesic or urban habitats *minimum* (Buckley)

1. Dorsum of head and sides of mesosoma covered with dense punctures, light brown in color; rare in New Mexico *pharaonis* (Linnaeus)

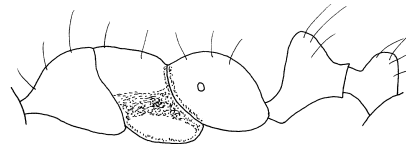


Fig. 191. Mesosoma of a worker of *M. cyaneum*.

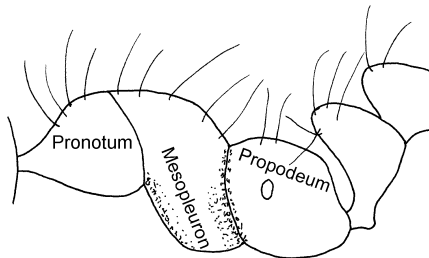
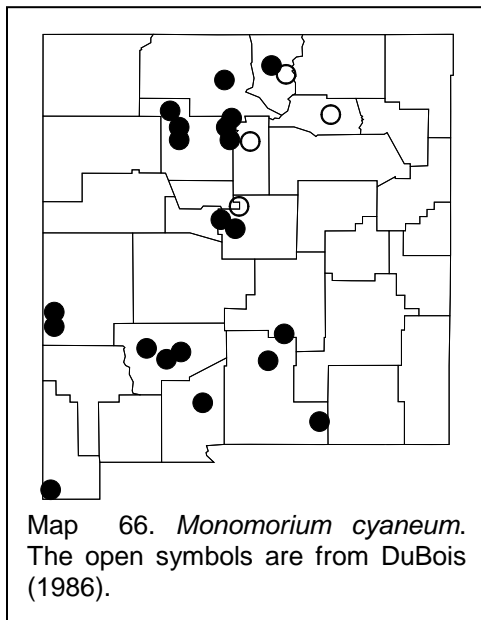


Fig. 192. Mesosoma of a worker of *M. minimum*.

Monomorium cyaneum Wheeler

Discussion. There are two small, shiny black species in New Mexico, which are very difficult to separate. If you can collect several females in the nest, and they lack wings, they are possibly this species. You must look closely to see if they lack any vestiges of wings. If not, be sure the sclerites near the wing bases are fused. If they are, then you can be relatively certain of the correct identification. The males can be separated as those of *M. cyaneum* have 5 hairs on the cuspis of the volsella, *M. minimum* has 3 hairs on the same structure. The key (above) is somewhat useful for the identification of workers, but they are difficult to separate.



Distribution.

USA:

southwestern United States; **NM:** **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Hidden Cave, **Hidalgo Co.**, Guadalupe Canyon, **Lincoln Co.**, Sacramento Mts. (Bailey Canyon), **Los Alamos Co.**, Los Alamos, Rio Grande, **McKinley Co.**, Zuni Mts (southeast of Gallup), **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, 4 k W Cuba, **Sierra Co.**, 4 k W Hillsborough, 6 k W Kingston, **Socorro Co.**, Magdalena Mts. (Water Canyon), 25 k N

Magdalena (Bear Mts.), 17 k S Magdalena, **Taos Co.**, 20 k NW Taos, **Torrance Co.**, 24 k S Mountainair.

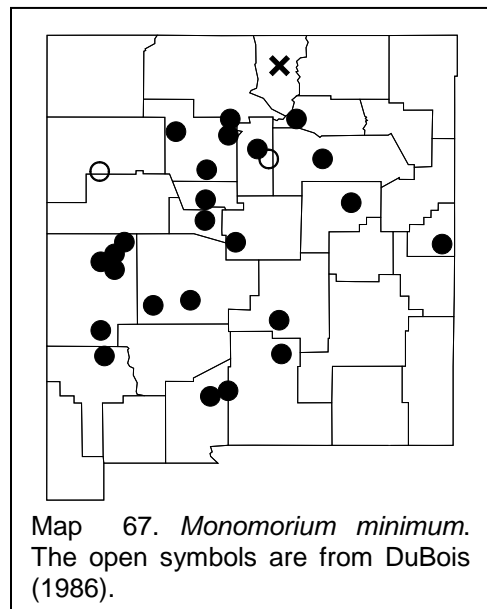
Habitat. This species occurs in essentially all habitats from arid zones to grasslands, sagebrush, pinyon-pine and to wet mid altitude ponderosa pine forests, to urban habitats, it is most common in semiarid habitats.

Biology. This species normally nests under stones (or logs), but may have a simple nest in the soil, surrounded by a small mound. Brood was found in nests in June to August, sexuals were in nests in July. A dealate female was collected in August. One colony was collected

together with *Formica fusca*, a second with *Acanthomyops coloradensis*. Gregg 1963 (*M. viridum peninsulatum*).

***Monomorium minimum* (Buckley)**

Discussion. This is another common, small, shiny black ant, which is difficult to separate from *M. cyaneum*. See the discussion of the latter species for hints on how to separate them. Specimens from the Sacramento Mts. (Otero Co.) differ in being larger than the typical specimen and slightly lighter in color, and may represent an undescribed species.



Distribution. USA: Most of United States; **NM:** Bernalillo Co., NW Albuquerque, Catron Co., 15 k NW Datil, 12 k E Datil, 14 k E Datil, Ox Spring Canyon, Snow Lake, Curry Co., near Clovis, Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Grant Co., Gila Mts. (Iron Creek), Guadalupe Co., Santa Rosa State Park, Lincoln Co., Sacramento Mts. (Bailey Canyon), Los Alamos Co., Mortandad Canyon, Rio Grande, Mora Co., 10 k SE Mora, Otero Co., Sacramento Mts., White Sands National Monument, Sandoval Co., Bandelier National

Monument, Coronado State Park, 26 k S Cuba, San Miguel Co., 20 k NW Las Vegas, Santa Fe Co., Santa Fe, Socorro Co., Bosque del Apache, San Mateo Mts., Taos Co., without locality, Torrance Co., 24 k S Mountainair, Valencia Co., Belen; MEXICO: Chihuahua, Durango, Nuevo León, Coahuila.

Habitat. Essentially all habitats, ranging from arid grasslands and shrubs to pinyon-juniper forests to ponderosa pine-riparian sites. It is found most often in open areas. It is apparently more common in urban habitats than is *C. cyaneum*.

Biology. This species nests in soil under stones and logs. Nests have multiple queens. This species feeds on nectar, dead insects and tends

aphids. This ant may be a house pest in some areas. It nests together with other species including *Camponotus vicinus*, *Acanthomyops claviger*, *A. murphyi*, *Lasius crypticus*, *L. sitiens*, *Monomorium minimum*, *Pogonomyrmex occidentalis*, *Solenopsis molesta* and *Formica argentea* and *F. fusca*.

Gregg 1963, Rojas-Fernández and Fragoso 1994, 2000

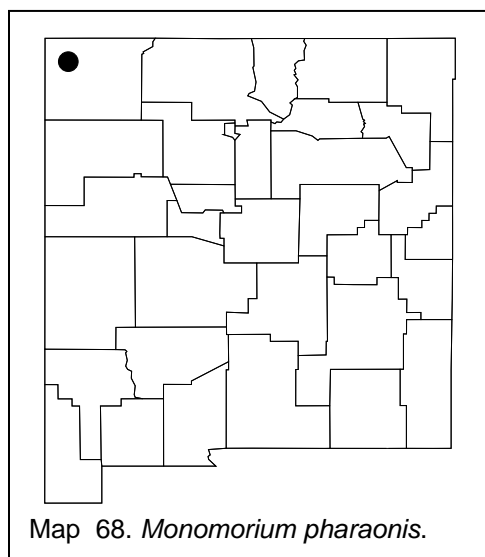
***Monomorium pharaonis* (Linnaeus)**

Discussion. This is a yellow-red ant with a heavily punctate head, mesosoma, petiole and postpetiole. The gaster is finely sculptured and shiny.

The rough sculpture and pale color would easily separate this species from the other two species in the genus. It could be confused with the genus *Solenopsis*, by the shape of the mesosoma, petiole and postpetiole, but the 3-segmented club of the antenna would separate it from *Solenopsis* with a 2-segmented club. Confusion could occur between this species and minor workers of *Pheidole*, which also have a 3-segmented club. Minors of most species of *Pheidole* have propodeal spines (lacking in *Monomorium*), and the petiole and postpetiole are very different in shape, with a long peduncle on the petiole (similar in shape in *Monomorium*). *Monomorium pharaonis* has four mandibular teeth, the outer (apical) tooth is larger than the other three, which are all about the

same size. In *Pheidole*, the apical tooth is very large, the subapical (next from outer) is smaller, but well developed, and several more teeth are present which are very poorly developed.

Distribution. This is an Old World pest that has been introduced throughout the world. In the United States it is found throughout the country, at least in major cities; occurs away from cities apparently only in Florida; **NM: San Juan Co.**, Farmington, numerous workers were collected in a house by Richard Fagerlund.



Map 68. *Monomorium pharaonis*.

Habitat. This is a very rare species in New Mexico, although it is common in other areas. It will probably occur only within houses and urban areas in the state. It is found away from houses in more mesic areas of the United States.

Biology. The pharaoh ant is one of the most annoying and difficult pest to eradicate. It is found in restaurants, hotels and other similar areas. When it is found in hospitals it is a vector of infectious diseases. It nests under stones or in piles of trash in field situations.

Smith, 1951, Wheeler and Wheeler, 1963, Fowler et al., 1993

Genus *Myrmecina*

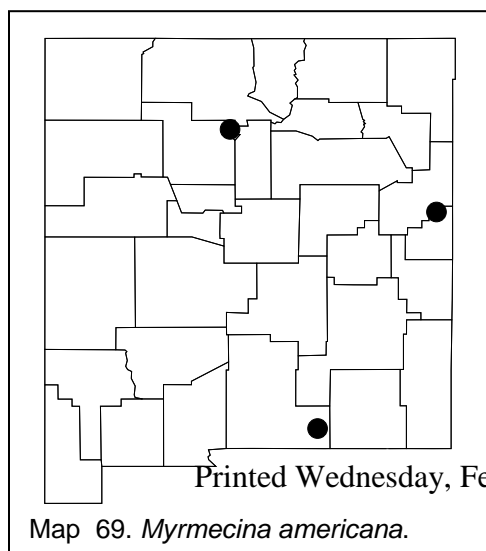
This genus is easily recognized as the propodeum has two sets of spines, the anterior most pair smaller than the posterior most pair (total of four spines, see Fig.). The antenna is composed of 12 segments with a three-segmented club. When the mandibles are closed, they leave a large space before the anterior border of the clypeus (Fig.). The petiole is not pedunculate, with a poorly developed node (Fig.). This genus may be confused with *Myrmica*, but the two pairs of spines on the propodeum and the lack of the pectinate tarsal spurs easily separate these two genera. It may also be confused with *Tetramorium*, but the antenna has 12 segments (11 in New Mexican species of *Tetramorium*) and *Tetramorium* has a single pair of propodeal spines.

This is a rarely collected genus in New Mexico. The single species in the genus in North America nests in the soil. Cole (1953c) treats the distribution of this genus in New Mexico.

Myrmecina americana Emery

Discussion. This is the only species of the genus in New Mexico, and it can thus be recognized by the characterization of the genus (above).

Distribution. USA: Most of United States; NM: Curry Co., Grady, Eddy Co., Hidden Cave, Los Alamos Co. Mortandad Canyon. Check Cole.???



Habitat. Usually found in grassy areas near forests, ponderosa pine-riparian, deciduous canyon forest.

Biology. This species nests under stones and in the soil. Workers are predaceous and are not known to tend Homoptera.

Wheeler, 1905, 1906, 1917, Talbot 1934, Dennis 1938, Gregg 1963

Genus *Myrmica*

(Key: Creighton, 1950)

These are very common ants in pine forests in New Mexico. The nests are usually located under stones and are usually composed of only a

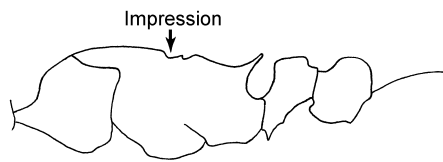


Fig. 193. Side view of the mesosoma, petiole and postpetiole of a worker of *M. lobifrons*.

few individuals. It can be distinguished from all other genera with the following characteristics: middle and hind tibial spurs pectinate (difficult to see without a high quality microscope); without psammophore (long, curved hairs on the underside of the head);

mesosoma with well defined constriction in the mesopropodeal region; propodeum with well developed spines; 12 segmented antenna. The pectinate mid and hind tibial spurs and the other characters will separate this genus from all others except *Pogonomyrmex*. It can be separated from most species of *Pogonomyrmex* by the lack of psammophore (long, curved hairs on the underside of the head), in addition the mesosoma of *Pogonomyrmex* is not strongly constricted in the mesopropodeal region. *Myrmica* spp. have stings, but rarely or never use them. Most *Pogonomyrmex* will readily sting without hesitation.

The pectinate tibial spur is difficult to see, but well worth the effort, as it will separate several genera from all the others in the Myrmicinae. Once it is seen, it can be more easily recognized with a low quality microscope and possibly even a hand lens, at least in some of the larger *Pogonomyrmex*.

Cole (1953d, 1953e, 1957) discusses the genus in New Mexico. These ants are usually very difficult to identify to species, and it is usually necessary to have the males. Dr. André Francoeur is currently revising the

group. The key we provide may be of some use in identifying the species in the area.

Key to the workers of the genus *Myrmica*

1. Node of petiole high, distinctly set off from anterior and posterior peduncles and angular at crest; ventral surface of petiole with distinct, obtusely angular impression formed by the junction of anterior and posterior peduncles; Arizona and eastern New Mexico

..... *wheeleri* Weber

- Node of petiole not distinctly set off from anterior and posterior peduncles or, if so, it is low and much rounded above; ventral surface of petiole straight or very feebly convex 2

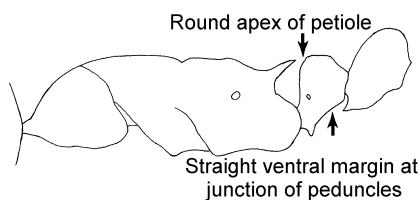


Fig. 194. Mesosoma and petiole of a worker of *M. hamulata*, indicating the rounded crest of the petiole, and the straight margin of the ventral surface of the petiole.

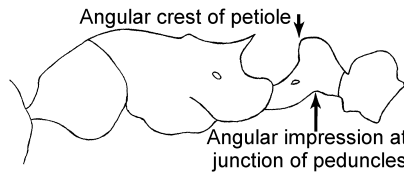


Fig. 197. Mesosoma and petiole of a worker of *M. wheeleri*, indicating the angular crest of the petiole, and the angular impression at the junction of the peduncles.

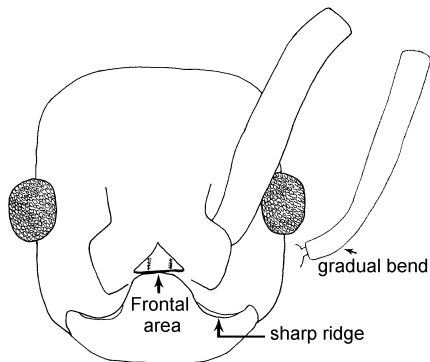


Fig. 195. Head of a worker of *M. rugiventris*. The inset shows the scape as seen from the side.

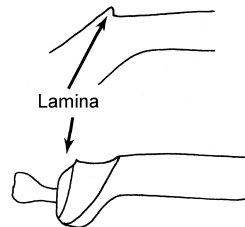


Fig. 196. Base of the antennal scape of a worker of *M. fracticornis*, as seen from the side (top) and from the front. The arrow shows the lamina as seen from the side and from the front.

2(1). Antennal scape evenly bent at base, upper surface never forming right angle at bend (sometimes about

80 degrees); lamina, if present, forming low, inconspicuous ridge at side of bend **3**

- Antennal scape suddenly bent at base, upper surface forming right angle; lamina always present and of varying shapes (Figs.) **10**

3(2). Frontal area mostly smooth and glossy with 1 or 2 rugae; lateral portion of clypeus raised into carina which forms abrupt, semi-circular boundary at front of antennal fossa (as in *Tetramorium*) (Fig.) **rugiventris (Smith)***

- Frontal area roughly sculptured, with several rugae; clypeus not as above (Fig.) **4**

4(3). Gaster with longitudinal striae extending about 2/3 the length of first gastral tergum, sparsely, but distinctly punctate; inquiline in nest of *M. striolagaster*; Texas (Davis Mountains) **colax (Cole)***



Fig. 199. Antennal scape of a worker of *M. incompleta*.

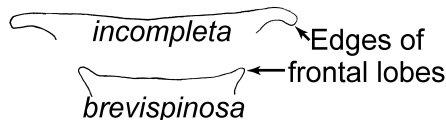


Fig. 198. Edges of the frontal lobes of a worker of *M. incompleta* and of a worker of *M. brevispinosa* as seen from the top of the head.

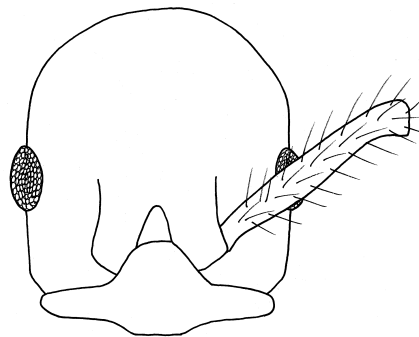


Fig. 200. Head of a worker of *M. discontinua*.

- Gaster without longitudinal striae, or striae extend less than first

$\frac{1}{3}$ of tergum **5**

5(4). Lateral margins of frontal lobes strongly angular, thick and slightly, but definitely deflected downward; antennal scapes of male not longer than 3 following segments taken together and straight at base **6**

- Lateral margins of frontal lobes rounded, thin, moderately strongly elevated; antennal scape of male varies in length **8**

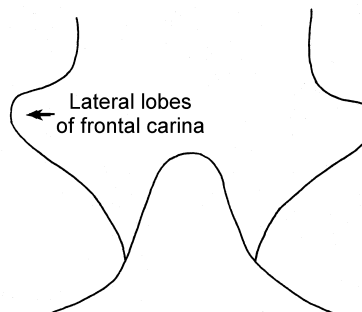


Fig. 201. Frontal carina (arrow) of a worker of *M. incompleta*, showing the strongly angular lateral lobes.

6(5). Antennal scape of male slightly bent at base and as long as following 4 or 5 segments or more taken together; commonly collected **7**

- Antennal scape of male straight at base and shorter than following 3 segments; rarely collected **wheeleri Weber**

7(6). Sculpture fine, color reddish brown over most of body and appendages. **incompleta Provancher**

- Sculpture of head and mesosoma coarse; color dark brownish black to black, legs, mesosoma and antennae lighter **whymperi Forel**

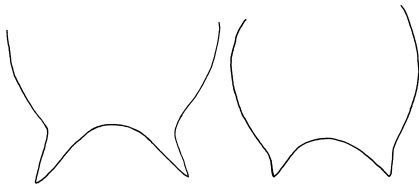


Fig. 203. Propodeal spines of 2 workers of *M. brevispinosa*, showing the variation in the length of the propodeal spines.

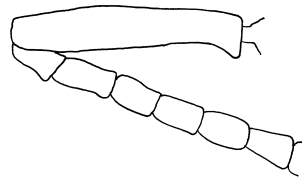


Fig. 202. Antenna of a male of *M. discontinua*.

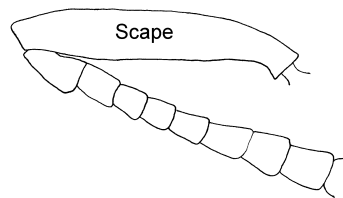


Fig. 205. Antenna of a male of *M. mexicana*

8(5). Color often orange yellow but variable; propodeal spines slightly less than $\frac{1}{2}$ as long as distance which separates their tips **brevispinosa Wheeler**

- Color dark brown;

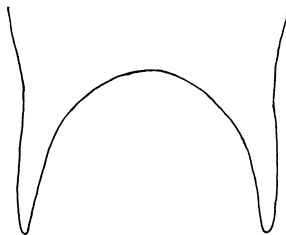


Fig. 206. Propodeal spines of a typical worker of *M. discontinua*.

propodeal spines more than $\frac{1}{2}$ as

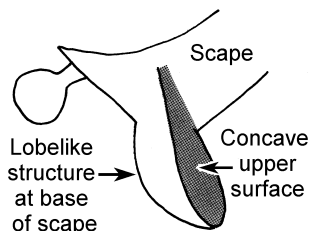


Fig. 204. Base of the scape of a worker of *M. monticola*, as seen from the side. The arrows indicate the thick, lobelike structure at the base of the scape with the concave upper surface (stippled).

long as distance which separates tips 9

9(8). Antennal scape of male approximately as long as 5 funicular segments (Fig.); area between lateral ocellus and eye of male mostly punctate ***discontinua* Weber**

- Antennal scape of male approximately as long as 7 funicular segments (Fig.); area between lateral ocellus and eye mostly with reticulate rugae; reported from AZ and eastern Mexico

..... ***mexicana***
Wheeler

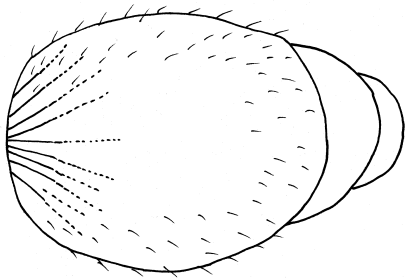


Fig. 208. Striae on the dorsum of the first gastral tergum of a worker of *M. striolagaster*.

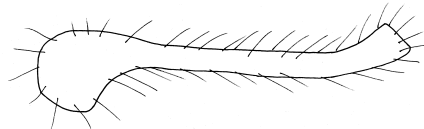


Fig. 207. Scape of a worker of *M. monticola*, as seen from the front.

10(2). Bend of antennal scape with large, thick, lobiform lamina, which extends posteriorly along the basal third of scape (Fig.)

..... ***monticola* Creighton**

- Bend of antennal scape with small, transverse lamina or with thin lamina which surrounds bend as collar and does not extend posteriorly along basal third of scape

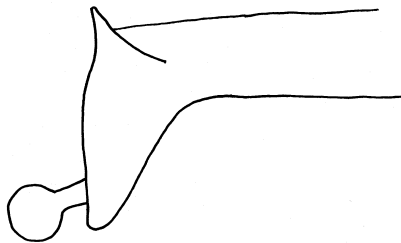
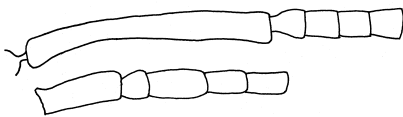


Fig. 209. Base of the antennal scape of a worker of *M. striolagaster*, as seen from below.

..... **11**
11(10).Scape covered with longitudinal rugae; gaster with longitudinal striae on first tergum, obvious at least near point of attachment of post petiole (gradient exists with less developed striae in

western populations); gaster with coarse punctures with diameters about 5X diameter of hairs, AZ (Chiricahua Mts.), NM (entire state), West TX, Chihuahua (entire state), CO ***striolagaster* Cole**



- Scape usually with fine sculpture, mostly punctate; gaster without striae and with punctures

Fig. 210. Scapes and first funicular segments of males of *M. americana* (top) and *M. hamulata* (bottom).

Mackay, W. P. and E. E. Mackay

whose diameter is less than 3X diameter of hairs **12**
 12(11). Ventral surface of postpetiole seen in profile flat or nearly so and not forming projection in front;

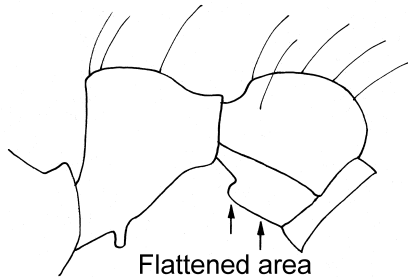


Fig. 211. Petiole and postpetiole of a worker of *M. americana*, as seen from the side. The arrows indicate the flattened base of the petiole. label arrows

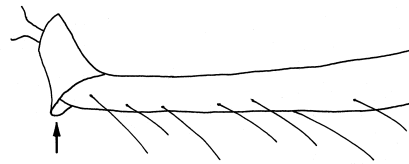


Fig. 212. Base of the scape of a worker of *M. latifrons*, showing the small lamina (arrow).

antennal scapes of male as long or longer than following 4 segments taken together

americana Weber

- Ventral surface of postpetiole seen in profile convex or forming prominent anterior projection which thrusts forward under anterior peduncle; antennal scapes of male distinctly shorter than above

..... **13**

13(12). Lamina of antennal scape forming a high, semicircular welt which surrounds scape at the bend; antennal scape of male bent at base and usually shorter, never longer, than 3 following segments taken together (Fig.) **hamulata Weber**

- Lamina of antennal scape not forming high, semicircular welt; antennal scape of male straight at base or if bent its length is equal to following 5 segments taken together **14**

14(13). Lamina of antennal scape small and diagonally transverse on upper surface of scape, but continued as prominent transparent flange along inner surface of that part of scape that lies below bend; antennal scape of male straight at base and as long as 3 following segments taken together **latifrons**

Stärcke

- Lamina not forming prominent median flange as above

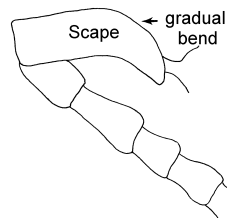


Fig. 213. Antenna of a male of *M. hamulata*.

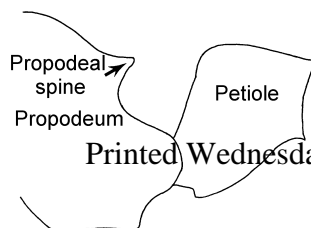


Fig. 214. Propodeum and petiole of a male of *M. lobifrons*, showing the well developed propodeal spine (arrow).

or if small median flange is present, lamina is not transverse on upper surface of scape **15**

15(14). Antennal scape of male straight at base and as long as the following 3 segments taken together ***tahoensis* Weber**

- Antennal scape of male bent at base and at least as long as the following 5 segments taken together **16**

16(15). Antennal lamina encircling bend of scape in form of spoon-like or saucer-like flange; antennal scape of male abruptly bent at base with upper surface distinctly angulate at bend; propodeal spines of male well-developed, propodeum with prominent rugae ***lobifrons* Pergande**

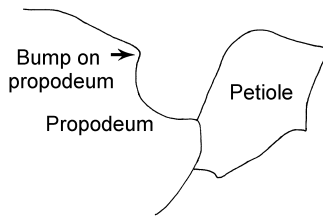


Fig. 217. Propodeum and petiole of a male of *M. fracticornis*, showing the poorly developed propodeal bump (arrow).

- Antennal lamina small, transverse, forming angular tooth-like projection on inner side of bend; antennal scape of male gradually bent at base and not forming distinct angle at bend; propodeal spines of male reduced to rounded angles, rugae of propodeum very feeble or lacking ***fracticornis* Forel**

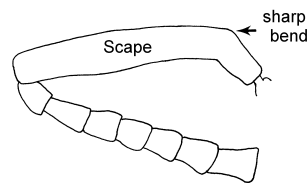


Fig. 215. Antenna of a male of *M. lobifrons*.

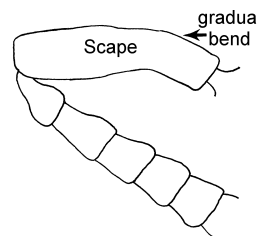
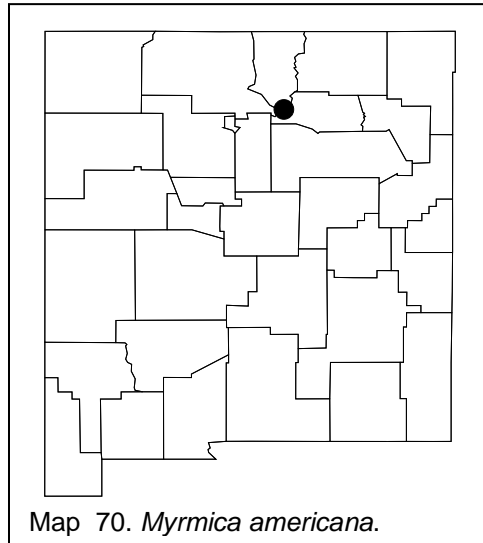


Fig. 216. Antenna of a male of *M. fracticornis*.

***Myrmica americana* Weber**

Discussion. In the field, workers of this species appear to be medium sized brown ants. Under the microscope the mesosoma is often lighter colored than the head and gaster. The ventral surface of the postpetiole is nearly straight, and is without a anterior directed projection. The scape of the male is longer than the first 4 segments of the funiculus.

It could be confused with several other species in the genus. It often occurs in dryer habitats than *M. monticola* and *M. fracticornis*. Both of these latter species also have anteriorly directed processes on the ventral surface of the postpetiole. It could be confused with *M. incompleta*. It differs in that the base of the scape is bent at almost a right angle, where a collar is present (Fig.).



Distribution. USA: Much of United States, including AZ; NM: **Mora Co.**, Pecos. Cole???

Habitat. Pine forests, oak forests, deciduous forests, grasslands, urban habitats.

Biology. This species nests under stones and logs, often in open habitats. Workers feed on dead insects and damaged fruits, together with juices from plants, they also tend aphids. Reproductives are found in nests from August to November; flights occur in August and September.

This is one of the few species of

Myrmica that is aggressive and can inflict a painful sting.

Kannowski and Kannowski, 1957, Wheeler and Wheeler, 1963, Gregg, 1963 (*M. sabuleti americana*), Ayre, 1968, 1969, 1971

***Myrmica brevispinosa* Wheeler**

Discussion. Most specimens of this species have relatively small propodeal spines (Fig.), although there is considerable variation in the length. They are generally noticeably shorter than $\frac{1}{2}$ the distance that separates their tips, which separates this species from all of the others of the genus that occur in New Mexico.

There are two subspecies or closely related species formally recognized: *M. brevispinosa* Wheeler and *M. discontinua* Weber, which are separated as *M. discontinua* has longer propodeal spines and is darker brown. We have found considerable variation in these characters, even from individuals from the same nest. One nest in our collection (Colorado, Conejos County, 81 k W Antonito) possesses individuals with only tiny

angles as propodeal spines and other individuals with spines as long as those found in "typical" *M. discontinua*. The two spines on an individual are often different in length. There are several other differences: *M. brevispinosa* has a more rounded node of the petiole, *M. discontinua* has a pointed node in the workers; the female *M. brevispinosa* is much lighter than the mature female of *M. discontinua*; the posterior end of the node of the postpetiole of the male is somewhat less truncated in *M. brevispinosa* than in *M. discontinua*. The scape of males from western North America are similar in length to those of *M. discontinua* (see Fig.), those from

eastern North America (Quebec) apparently have shorter scapes (about as long as first 3 funicular segments).

Distribution. USA:

Western United States, including AZ, CO; NM: Los Alamos Co., Camp May, Los Alamos, Santa Fe Co., Hyde Park, Socorro Co., Mt. Withington.

Habitat. Riparian, pinyon-juniper woodlands, grasslands, pine forests, aspen forests, spruce forests, deciduous forests, and urban areas.

Biology. This species nests

under stones, or logs, brood and reproductives were found in nests in July to early August, foundress females were also collected in August and September after the nuptial flight.

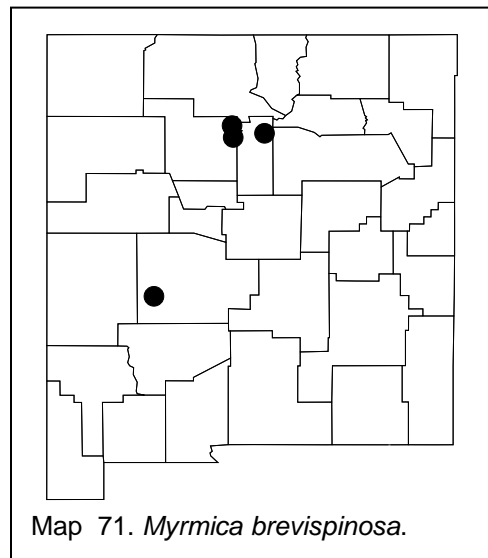
Gregg, 1963, Wheeler and Wheeler, 1963

***Myrmica colax* (Cole)**

Discussion. This species can be separated from all of the others as the anterior 2/3 of the first gastral tergum is covered with longitudinal striae.

Distribution. USA: TX, Davis Mts., may occur in mountains of New Mexico.

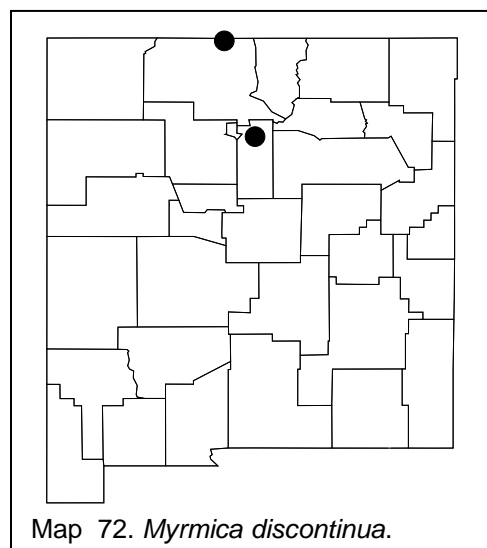
Habitat. ^^^ check Cole for data



Biology. This species as in inquiline in nests of *Myrmica striolagaster*.

***Myrmica discontinua* Weber**

Discussion. This species is very similar to *M. brevispinosa*, but can usually be distinguished by the longer propodeal spines (compare Figs.). Additional characteristics can be found in the discussion of *M. brevispinosa*. This species could be confused with *M. mexicana*, but can be separated as the scape of the male is only about as long as the first 5 funicular segments (the males of *M. mexicana* have scapes about as long as the first 7 funicular segments, and probably does not occur in New Mexico). The workers of *M. discontinua* and *M. mexicana* appear to be identical.



Distribution. Canada: Newfoundland, Nova Scotia; USA: most of mountains of continent, including WY; south to NM: **Rio Arriba Co.**, 4 k N Chama, **Santa Fe Co.**, 12 k NE Santa Fe.

Habitat. This species is usually found in higher elevation forests, including aspen-spruce forests and subalpine fir forests (*Abies lasiocarpa*).

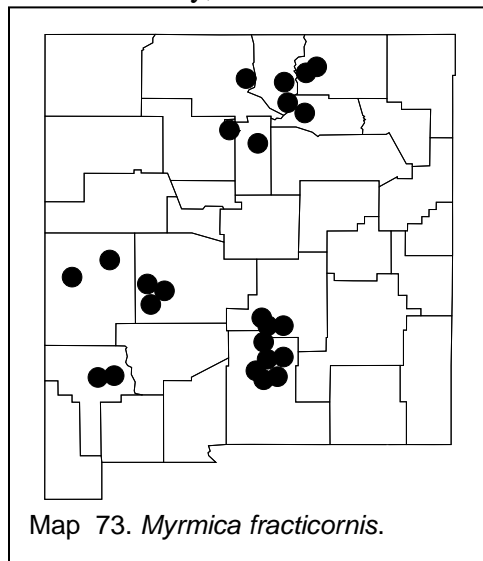
Biology. This species makes small mounds in fine, sandy-loam soil, or nests under stones. Brood was found in the nest

in July and August, sexuals in nests in August.

Cole, 1953, Gregg, 1963

***Myrmica fracticornis* Forel**

Discussion. The flange at the base of the scape of the workers is small, and poorly developed, but the scape is definitely sharply bent at the point of the flange. The surface of the scape has fine sculpture. The ventral surface of the postpetiole is only weakly convex, but the anterior projection is well developed. The antennal scape of the male is bent at the base, and is almost as long as the total length of the following 5 segments.



Distribution. USA: Most of United States including AZ, CO; NM: **Catron Co.**, 37 k N Apache Creek, 15.3 k NW Datil, **Colfax Co.**, 16 k E Eagle Nest, 4 mi W Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, 2 mi SE Alto, Sierra Blanca, **Los Alamos Co.**, Camp May, **Mora Co.**, 10 k SE Mora, **Otero Co.**, Camp Sleepy Grass, 3 mi E Cloudcroft, Sacramento Mts. (Bailey Canyon), Sierra Blanca, Timberon, 8.9 k N Timberon, 9 k N Timberon (Jim Lewis Spring),

12.9 k N Timberon, **Rio Arriba Co.**, 6 k SW Tres Piedras, **Santa Fe Co.**, 12 k NE Santa Fe, **Socorro Co.**, Beartrap Canyon, Mount Withington Lookout, Grassy Lookout, **Taos Co.**, 20k S Taos, 2 k W Tres Ritos.

Habitat. Most nests are in wet, swampy areas, or riparian sites in longleaf cottonwood forests, poplar forests, oak forests, spruce-fir forests, pine forests (ponderosa, pinyon), fir forests, and open grassy meadows.

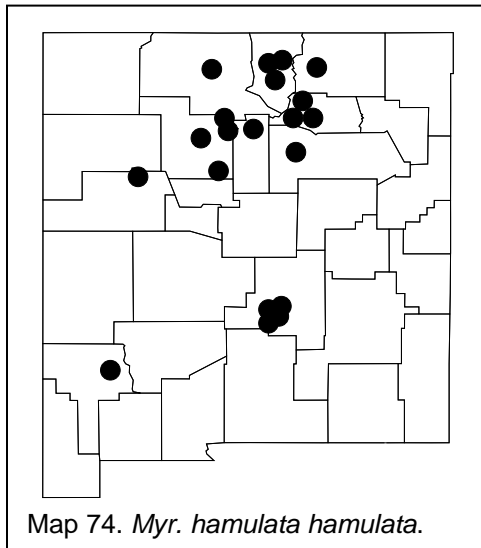
Biology. Nests are usually found under stones (occasionally very large) or branches and logs, or even “sticks” in areas with sandy soils or fine loam soils high in organic matter. Foragers feed on dead insects; workers move slowly and are not aggressive. Brood was found in nests in March, May, August and September. This species appears to be polygynous, with flights occurring in August. This species may live in the nests of *Formica fusca*, *Lasius pallitarsis*, or nest together with *Leptothorax muscorum* and *Stenamma diecki*.

Weber, 1941, 1942, Kanno, 1957, 1959, Wheeler and Wheeler, 1963, Gregg, 1963

***Myrmica hamulata* Weber**

Discussion. This species can be recognized by the hooked flange on the scape of the worker and female (Fig.) and the scape of the male, which is about equal in length to the first 2 funicular segments (Fig.). The ventral surface of the postpetiole has an anteriorly directed process (Fig.).

Distribution. USA: WY, UT, CO, AZ; NM: **Cibola Co.**, Mt. Taylor (9000'), **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, **Lincoln Co.**, Sacramento Mountains, Haynes Canyon (Type



Map 74. *Myr. hamulata hamulata*.

locality), 2 mi SE Alto, 4 k W Alto, Bonito Lake, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, Mortandad Canyon, Camp May, **McKinley Co.**, Zuni Mts (southeast of Gallup), **Mora Co.**, Coyote Creek State Park, Mora, 10 k SE Mora, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, Sandia Mts., **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, 12 k NE Santa Fe, **Taos Co.**, 6 k SW Tres Piedras, 20 k NW Taos, 20 k S Taos.

Habitat. Ponderosa pine-riparian, aspen forests, spruce forests, meadows, oak forests, pinyon pine, subalpine fir.

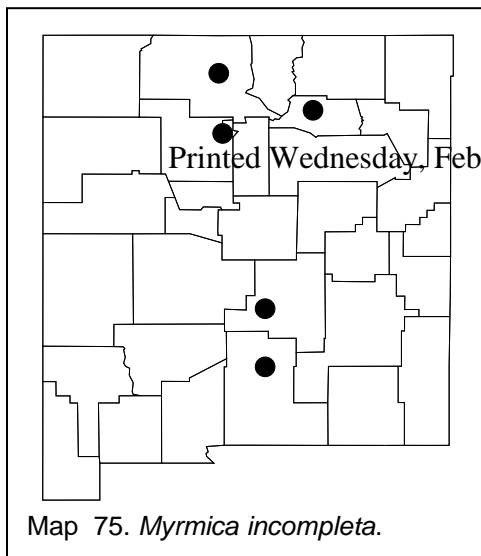
Biology. This species usually nests in open areas in the soil, or under stones, but are occasionally found under (and in) rotten logs and stumps, or even under manure. Brood was found in nests from June to September, sexuals in July. This species nests together with *Formica neorufibarbis*, *F. hewitti*, *F. occulta*, *Acanthomyops latipes*, *Lasius sitiens*, *L. pallitarsis*, *Leptothorax crassipilis*, and *Monomorium*. One nest was a mixture of this species and *Lasius sitiens*, *Acanthomyops latipes*, and *Formica occulta*.

Gregg, 1963

***Myrmica incompleta* Provancher**

Discussion. This species can be recognized as the frontal lobes are bend downward (towards the head as seen from the top of the head, see Fig.).

This species looks superficially like *M. americana*, as it is a medium sized brown ant in the field that is bicolored under the



Map 75. *Myrmica incompleta*.

Printed Wednesday, February 05, 2014, 4:17 PM

microscope (at least the gaster is darker than the mesosoma). It is easily separated from *M. americana* as the base of the scape is not bend into a right angle, as occurs in *M. americana*. It also occurs in moist habitats, whereas *M. americana* is usually found in mesic habitats. *Myrmica incompleta* is a synonym of this species.

Distribution. USA: Most of the United States, including Alaska south down the Rocky Mountains as far south as AZ, CO; **NM: Lincoln Co.**, Bonito Lake, **Los Alamos Co.**, Camp May, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, 4 mi N Cloudcroft, **Rio Arriba Co.**, 7 k S Cebolla.

Habitat. Ponderosa pine forests, Gambel oak forests, aspen forest, spruce forests, deciduous forest, grassy habitats, especially in boggy and swampy areas.

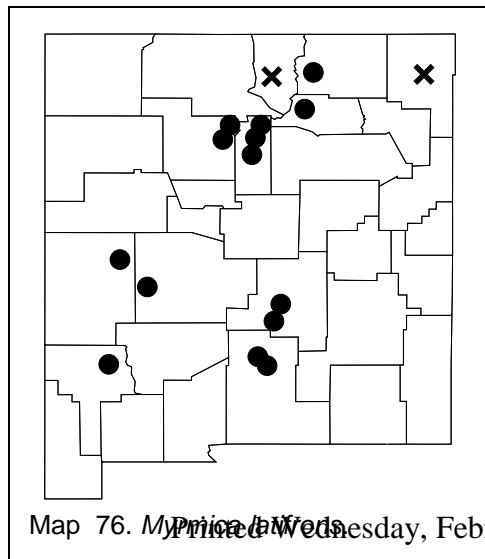
Biology. This species nests under stones or logs or in stumps. Brood was found in nests in August, sexuals in August and September. These ants are aggressive when a large nest is disturbed, but are not very effective at stinging. Workers tend Homoptera or feed on dead insects. They occasionally nest together with *Leptothorax provancheri*.

Gregg, 1963 (listed as *M. brevinodis*)

Myrmica latifrons Strcke

Discussion. These are medium sized, dull brown ants with a shiny black gaster (occasionally pale brown). These ants occur in more moist sites than *M. americana*, but not as wet as those habitats of *M. brevinodis*. Specimens from the White Mts. (South Fork, 16-viii-1982, C. H. Townsend # 11456) are larger, more robust and the petiolar node is quadrate in shape, and are considered by Dr. Francoeur to be an undescribed species. *Myrmica emeryana* is a synonym of this species.

Distribution. USA: Most of United States, including AZ; **NM: Catron Co.**, Ox Spring Canyon, **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, **Lincoln Co.**, 2 mi SE Alto, Bailey Canyon, Bonito Lake, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Camp May,



Mora Co., Coyote Creek State Park, **Otero Co.**, Bailey Canyon, **Sandoval Co.**, Bandelier National Monument, **Santa Fe Co.**, Hyde Park, Santa Fe, 12 k NE Santa Fe, **Socorro Co.**, Grassy Lookout, **Taos Co.**, without locality, **Union Co.**, without locality.

Habitat. Mesic woodlands, ranging from pinyon-pine forests to Gamble oak forests, deciduous forests, pine, spruce and aspen forests, riparian-ponderosa pine, up to subalpine fir up to 2700 meters elevation. They often nest in meadows in these forest communities.

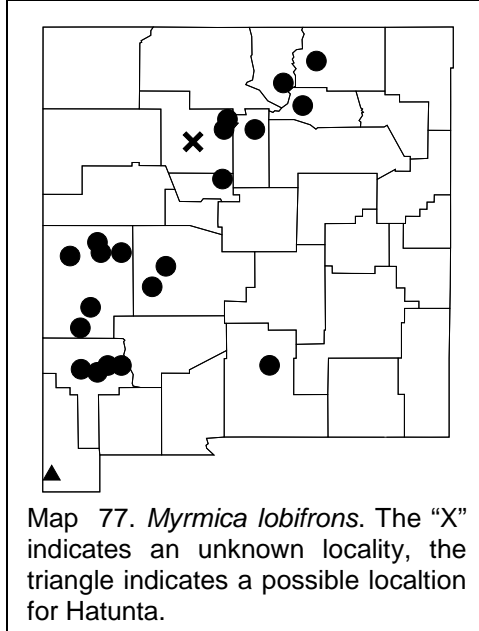
Biology. This species nest under stones logs and dung in shaded moist areas throughout much of montane New Mexico. Brood was found in nests in July and August, reproductives were in nests from July to August.

Talbot, 1945, Kannoowski, 1959, Medler, 1958, Wheeler and Wheeler, 1963, Gregg, 1963

***Myrmica lobifrons* Pergande**

Discussion. The base of the scape of the worker and female bends at about a 90° angle before attaching to the head. The flange at the bend is well developed, but does not form a high, semicircular welt, and is somewhat spoon shaped as seen from the top. The surface of the scape has fine sculpture. The propodeal spines of the worker are well developed, longer than the distance between their bases. The scape of the male is bent at the base, and about as long as the following 5 funicular segments taken together.

Distribution. USA: Much of western United States, including AZ, CO; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, 37 k NE Apache Creek, 15 k NW Datil, Mogollon Mts. (Trail 206), Ox Spring Canyon, Sawtooth Mt., Snow Lake, **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, Gila Mts. (Iron Creek), 16 k E Silver City, 77 k E Silver City, 88k E Silver City, **Hidalgo Co.**, Hatunta?, **Los Alamos Co.**, Camp May, Los Alamos, **Mora Co.**, 10 k SE Mora, **Otero Co.**, Cloudcroft, **Sandoval Co.**, Bandelier National Monument, without locality, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Beartrap Canyon, Water Canyon, **Taos Co.**, Tres Ritos.



Habitat. High altitude forests of all types (pinyon-juniper, Chihuahua pine, Gamble's oak, ponderosa pine, fir, spruce) mostly above 2450 meters elevation.

Biology. This ant nests under stones and logs in fine sandy soils to rocky loam. Brood was found in nests in July and August, reproductives were in nests from June to September, flights occur in August. One colony was nesting together with *Camponotus* another

with *Formica neogagates*, a third nest was in the same log as *Leptothorax melinus*.

Gregg, 1963, Wheeler and Wheeler, 1963 (as *M. brevinodis*)

***Myrmica mexicana* Wheeler**

Discussion. This species has the frontal lobes thin and elevated, and the scape the male is relatively long, approximately as long as the first seven funicular segments (Fig.). The propodeal spines of the worker are nearly as long as the distance between their tips. The scape of the worker is gradually bent at the base at about a 120° angle, the outer edge of the scape has a poorly defined carina. It would probably only be confused with *M. discontinua*, but could be separated by the latter species, in which the scape of the male is only about as long as the first 5 funicular segments. The workers of the 2 species appear to be identical. It is doubtful that this species occurs in western United States, although many other species occur in the Rocky Mountains and the mountains of eastern Mexico (for example, several species in the genus *Leptothorax*). We suspect that its report in Arizona is based on the misidentification of *M. discontinua*.

Distribution. USA: AZ, This species could be found in NM. MEXICO: NL, VC.

Habitat. Pinyon-pine, Pine and fir forest, mixed hardwoods, often in meadows.

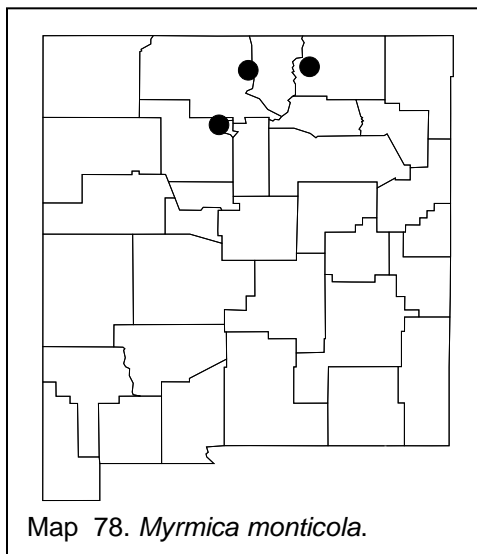
Biology. This species nests under stones in areas of rocky loam. Brood and sexuals were found in nests (in northeastern México) in

September. Two dealate females were found in a nest, suggesting that this species may be polygynous.

***Myrmica monticola* Creighton**

Discussion. The workers and females of this species are easily recognized by the large, lobiform flange at the base of the antennal scape (Fig.). This is a timid, slow moving, dark colored, small species, which has been referred to as *Myrmica scabrinodis schencki* var. *monticola* Wheeler, *M. sabuleti nearctica* Weber.

Distribution. USA: Much of western United States, including CO; NM: **Colfax Co.**, 16 k E Eagle Nest, **Los Alamos Co.**, Los Alamos, **Rio Arriba Co.**, 6 k SW Tres Piedras.



Map 78. *Myrmica monticola*.

Habitat. Woodlands of all types, at moderate elevations (1800 - 2600 meters), grasslands.

Biology. These ants nests under stones or logs; reproductives were found in nests in July, when flights occurred.

Gregg, 1963, Wheeler and Wheeler, 1963

***Myrmica rugiventris* (M. Smith)**

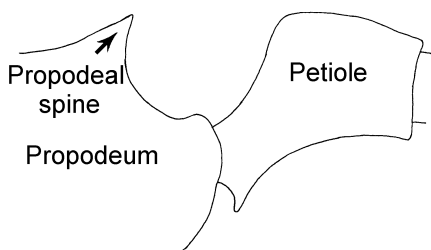


Fig. 218. Propodeum and petiole of a worker of *M. rugiventris*.

Discussion. This is an easily recognized species, as the part of clypeus anterior to the insertions of the antennae is raised up into a carina or boundary (Fig.). The medial part of the clypeus is depressed, compared to the surrounding lateral edges and as

seen from top of the head. The middle and posterior tibial spurs are pectinate, but not with a row of fine hairs as in *Myrmica*, but as branched appendages (Fig.). The node of the petiole is low and slopes posteriorly to the point of attachment of the postpetiole (Fig.). It was previously known as *Tetramorium rugiventris* Smith and *Paramyrmica rugiventris* (Smith).

The relationships between this genus and *Tetramorium* are in a state of confusion. Some of the species of *Tetramorium*, specifically *T. bicarinatum* and *T. caespitum*, appear to have finely pectinate middle and posterior tibial spurs, similar to *Myrmica*. It is possible that *Tetramorium* will be shown to be a synonym of *Myrmica*.

Distribution. USA: CA, CO, AZ (Chiricahua Mts.); NM: This species hasn't been collected in New Mexico, but may occur in the mountains in the southwestern corner, as it occurs in the adjacent Chiricahua Mts.

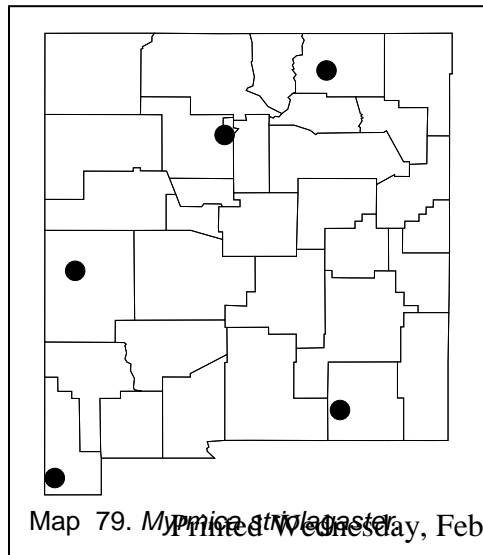
Habitat. Transition of deciduous forests to low elevation pines (1700m in SE Arizona, in oak-juniper-pine forests).

Biology. This species nests under stones in shady regions, and may be a parasite of other species of *Myrmica*.

Smith, 1943, Gregg, 1961

***Myrmica striolagaster* Cole**

Discussion. The workers of this species are easily recognized by the longitudinal striations at the base of the gaster and by longitudinally striated antennal scapes. The striations on the gaster are occasionally fine, and difficult to see, in which case the large punctures are generally obvious.



Map 79. *Myrmica striolagaster*

Distribution. USA: AZ, CO, TX; NM: Catron Co., 13.4 k N Apache Creek, Colfax Co., Cimarron Canyon (type locality), Eddy Co., Hidden Cave, Hidalgo Co., Clanton Draw, Sandoval Co., Bandelier National Monument; MEXICO: Chihuahua.

Habitat. Pinyon pine, ponderosa pine, cedar and oak woodlands (silver leaf, white oak), sycamore canyons, grasslands in

forests; this is one of the few *Myrmica* species which nests in moderately dry habitats.

Biology. This species nests under stones. Brood was present in nests in June. One nest was under a stone together with *Camponotus vicinus*.

Gregg, 1963, Cole, 1953

***Myrmica tahoensis* Weber**

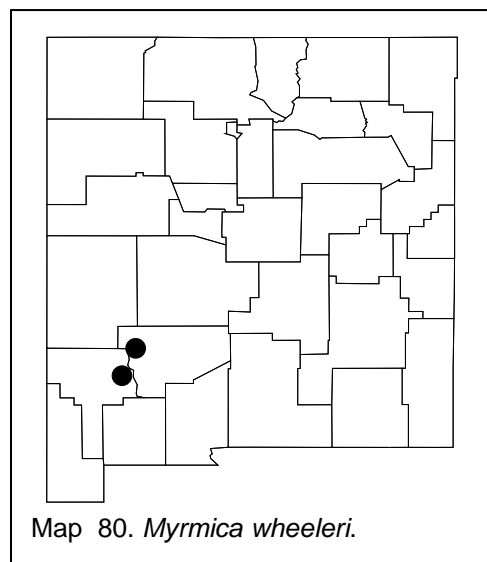
Discussion. The workers of this species are nearly impossible to separate from those of *M. lobifrons* and *M. fracticornis*. Often the mesosoma is reddish yellow and the head and gaster black, a combination rarely seen in the other two species. The propodeal spines are sometimes slightly bent downwards, but the spines on a single specimen may be different, whereas they are rarely bend down in the other two species. The shorter antennal scape of the male (about as long as first three funicular segments) easily separate it from the other two species (scape of these two species about as long as the first five funicular segments).

Distribution. USA: Most of western United States, including AZ; NM: We have no records of this species in the state.

Habitat. Shady forests.

Biology. This species nests under stones. Colonies are small.
Weber, 1948

***Myrmica wheeleri* Weber**



Discussion. This species is easily recognized by the shape of petiole. The node of the petiole is well separated from both the anterior and posterior peduncles (Fig.). The ventral surface of the petiole is strongly bent where the anterior and posterior peduncles meet (Fig.). (Similar in worker, female and male). The scapes are not modified at the base.

Distribution. USA: SE AZ (Chiricahua Mts); NM: **Grant Co.**,

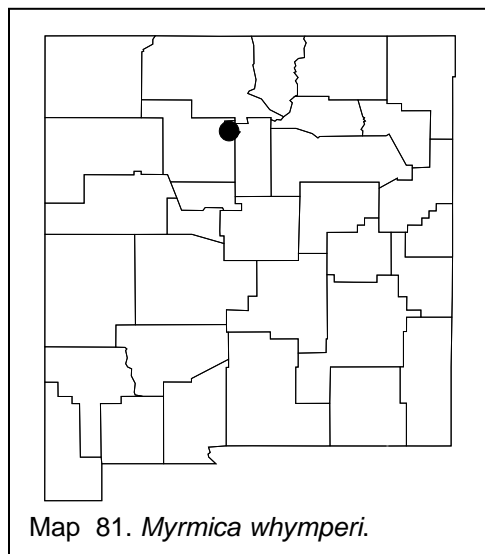
Gila Mts. (Wright's Cabin), **Sierra Co.**, Black Range.

Habitat. Ponderosa pine, Douglas fir forests.

Biology. This species nests under stones in rocky loam soils. Sexu-als were found in nests in mid August.

***Myrmica whymperi* Forel**

Discussion. This species is larger than most species in the genus (4.5 - 5.3 mm total length), is very dark and has coarse sculpture. The edges of the frontal lobes are deflected towards the head, similar to that of *M. incompleta*. *Myrmica sulcinodoides* is a synonym of this species.



Distribution. USA: Alaska south California, east to SD, south to NM; NM: **Los Alamos Co.**, Camp May.

Habitat. Variable in choice of habitat, including grasslands and meadows, cottonwood-willow forests, deciduous forests, aspen-spruce-fir forest.

Biology. This species nests under stones and logs. Reproductives were found in nests from July to September; nuptial flights probably occur in late summer.

Wheeler, 1915, Cole, 1934, Gregg, 1963 ***here checking maps.

Genus *Pheidole*

(Key: Gregg, 1958)

This is a common genus of easily recognized ants. There are two (or rarely more) separate worker castes, with soldiers having large heads (Fig.), which are often larger than the mesosoma. The mandibles of the soldiers (and most workers) have two large, well developed, acute teeth. The propodeum usually has two well-developed spines; the postpetiole often has lateral connules. It could be confused with *Aphaenogaster*, but can usually be distinguished as most *Pheidole* have a 3-segmented

antennal club (4 segments in *Aphaenogaster*). It is also easy to confuse this genus with *Leptothorax*. *Pheidole* has an antennal club, which is usually made up of 3 well-defined antennal segments, which are noticeably larger than the other segments, whereas the antennal club of *Leptothorax* is usually poorly defined. Additionally, the mesosoma of *Pheidole* is not continuous across the dorsum, it usually constricted at least at the metanotal suture, the mesosoma of most *Leptothorax* is nearly straight across the dorsum. The mandibles of *Pheidole* workers always have 2 prominent apical teeth, whereas the workers of *Leptothorax* have 4 - 6 teeth, which are about equal in size. The species of *Leptothorax* which causes the most confusion, is *L. pergandei*, in which the outline of the dorsum of the mesosoma is similar to that in many species of *Pheidole* (see (Fig.). It can be separated from species *Pheidole* by the form of the antennal club, as well as the teeth on the mandibles. *Pheidole* is superficially similar to the dimorphic or polymorphic species of *Solenopsis*, but is easily distinguished by the 12 segment antenna (10 segmented with two segmented antennal club in *Solenopsis*). Small *Pheidole* workers could possibly be confused with workers of *Monomorium*, but ants of the latter genus are shiny black and lack propodeal spines. *Monomorium* also has a 12-segmented antenna with a 3-segmented club. It is very important to collect a complete nest series, including the soldiers, for species identifications. Workers can only be identified by slow, tedious comparisons with other species, and the workers of some species cannot be distinguished.

This is a difficult group replete with taxonomic problems, but is currently under revision by Dr. E. O. Wilson. It is important to refer to his revision for nomenclatural changes and the descriptions of several new species from Arizona that may occur in New Mexico. Cole (1952, 1953f, 1955a, 1956) includes the New Mexican species. Most species nest in the soil with the entrance surrounded by a small mound. These ants also nest under stones and logs. Most species are seed harvesters; the soldiers usually do not defend the nest and are usually the first to hide when a nest is disturbed, but apparently break larger seeds with their mandibles. Workers of some species also harvest the corpses of dead insects.

Key to the workers of the genus *Pheidole* (see Gregg, 1963)

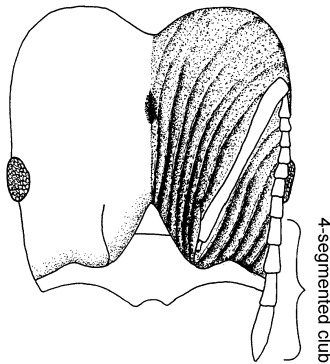


Fig. 220. Head of a major of *Ph. clydei*.

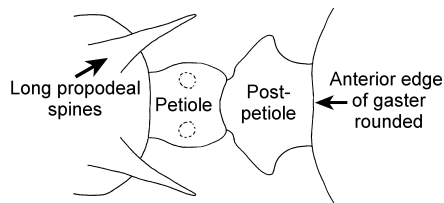


Fig. 219. Dorsal view of a major of *Ph. rhea*, showing the long propodeal spines and the rounded anterior margin of the gaster.

surpassing occipital borders

.....
***desertorum* Wheeler**

- Antennal scape of major not reaching occipital border 4

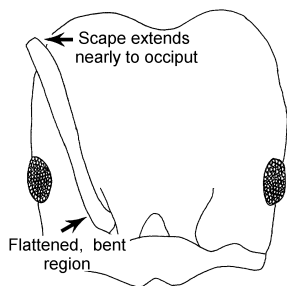


Fig. 222. Head of a major of *Ph. hyatti*. The arrows indicate the length of the scape and the flattened bend near the base of the scape.

1. Antennal club composed of 4 segments (Fig.); rarely collected

..... ***clydei* Gregg**

- Antennal club composed of 3 segments; very common **2**

2(1). Gaster truncate or subtruncate at base; species small to moderately large in size usually dimorphic **3**

- Gaster not truncate at base (rounded where postpetiole attaches to gaster - Fig.); giant species, polymorphic; propodeal spine unusually long and sharp

..... ***rhea* Wheeler**

3(2). Antennal scape of major

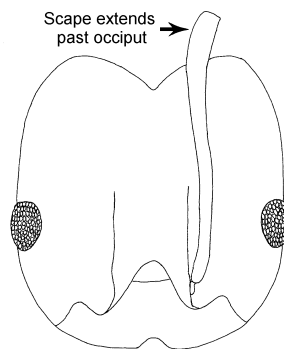


Fig. 221. Head of a major of *Ph. desertorum*. The arrow indicates the scape, which extends past the posterior margin of the head.

4(3). Scape of major abruptly bent at base so it turns toward midline of head in passing to antennal insertion, basal section of scape flattened and as broad or broader as distal portion

- 5
- Scape of major not abruptly bent towards midline of head, if basal section is flattened it is not as broad as distal portion 12
- 5(4). Antennal scape of major reaching $\frac{3}{4}$ or more of distance between insertion and occipital angle 6
- Antennal scape of major reaching $\frac{2}{3}$ or less of distance between insertion and occipital angle 9

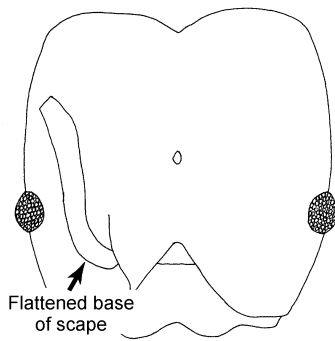


Fig. 223. Head of a major worker of *Ph. crassicornis*. The arrow indicates the flattened, bent base of the antennal scape.

length coarse, blunt at tips, and widely spaced **sciara** Cole

- Pronotal rugae of major weak and somewhat reticulated, with intrarugal spaces granular, subopaque; petiolar notch feeble; gastric hairs short, uneven in length, fine, pointed at tips, and more numerous **cockerelli** Wheeler

8(6). Head of minor densely punctate, opaque; erect hairs on gaster of majors sparse and widely spaced **vallicola** Wheeler

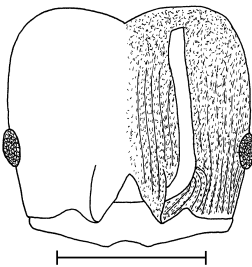


Fig. 224. Head of an intermediate sized major of *Ph. obtusospinosa*. The scale = 1 mm and is drawn to the same scale as Fig. 229.

6(5). Entire dorsal surface of head of major covered with reticulo-rugose sculpture, intrarugal spaces granulose 7

- Reticulo-rugose sculpture of head of major largely confined to anterior half, occipital lobes punctate or feebly granulose, surface moderately to strongly shining, at least on posterior half of head 8

7(6). Pronotal rugae of major coarse, transverse, and with intrarugal spaces notably shining; petiolar notch broad and shallow; gastral hairs long, nearly of equal

length coarse, blunt at tips, and widely spaced **sciara** Cole

- Head of minor workers smooth and shining; erect hairs on gaster of major numerous, long, and closely spaced **hyatti** Emery

9(8). Occipital lobes of major striato-granulose and scarcely shining **obtusospinosa** Pergande

- Occipital lobes of major strongly shining bearing the piligerous punctures only **10**

10(9). Flattened basal portion of scape of major notably broader than distal portion *porcula* **Wheeler**

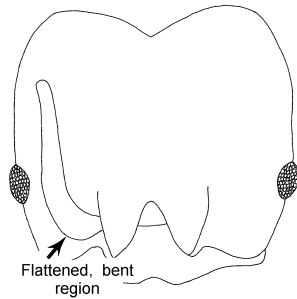


Fig. 227. Head of a major of *Ph. porcula*, the arrow indicates the flattened portion of the antennal scape.

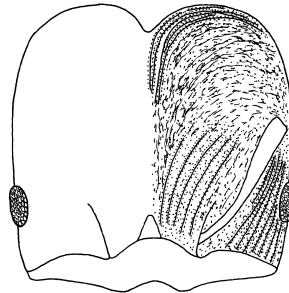


Fig. 226. Head of a major of *Ph. sitarches rufescens*.

- Flattened basal portion of scape of major no wider than distal portion **11**

11(10). Erect hairs on dorsum of gaster short, shorter than maximum diameter of eye, mostly of same length *diversipilosa* **Wheeler**

- Erect hairs on dorsum of gaster of various lengths, some longer than maximum diameter of eye

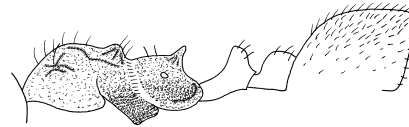


Fig. 225. Mesosoma pedicle and first gastral tergite of a major of *Ph. diversipilosa*.

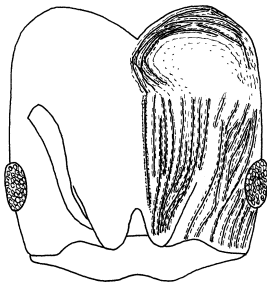


Fig. 228. Head of a major of *Ph. rugulosa*.

..... *tetra* **Creighton**

12(4). Tops of occipital lobes of major, and usually front faces as well, covered with sculpture, surface opaque or feebly shining **13**

- Tops of occipital lobes of major, and usually front faces and well, free from sculpture, except for piligerous punctures, surface in most cases strongly shining **18**

13(12). Anterior border of clypeus of

major with deep, semicircular emargination, which extends almost to level of frontal lobes ***tepicana* Pergande**

- Anterior border of clypeus of major entire, or if impressed, emargination is shallow and not semicircular **14**

14(13). Humeral angles of pronotum of major weak the developed and not forming lateral bosses **15**

- Humeral angles of pronotum of major strongly developed in and forming distinct, epaulet-like bosses **16**

15(14). Head and mesosoma punctate, opaque; hairs on promesonotum of major and especially minor strongly clavate ***rufescens* Wheeler**

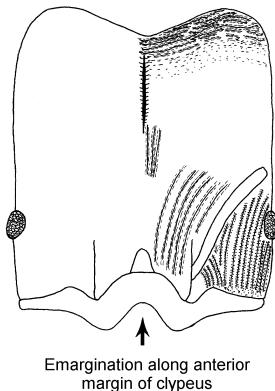


Fig. 229. Head of a major of *Ph. tepicana*.

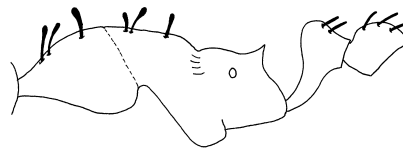


Fig. 230. Mesosoma of a minor of *Ph. sitarches rufescens*.

- Head and mesosoma of minor, at least in part, strongly shining; hairs not clavate

..... ***soritis* Wheeler**

16(14). Postpetiole of major lenticular in shape, lateral connules well-developed..... **17**

- Postpetiole of major trapezoidal lateral connules absent or poorly ***rugulosa* Gregg**

17(16). Transverse rugae on occiput of major pronounced and usually extending onto front faces of lobes ***senex* Gregg**

- Transverse occipital rugae of major much finer, resembling striations, and largely confined to top of occiput ***coloradensis* Emery**

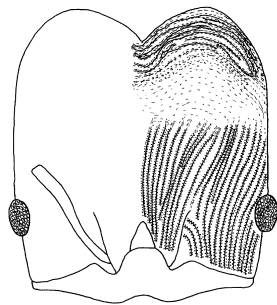


Fig. 231. Head of a major of *Ph. coloradensis*.

..... ***metallescens* Emery**

- Head, mesosoma, and gaster of minor (and major) without violaceous reflections**19**
19(18).Entire mesosoma all work of minor densely covered with granulose sculpture and completely opaque ***sciophila* Wheeler**
- At least part of promesonotum of minor shining, or if entire mesosoma is opaque, promesonotum is longitudinally striate and not densely granulose **20**
20(19).Large species, head of major (excluding mandibles) at least two mm in length and usually more **21**
- Small species, head of major not exceeding 1.5 mm in length and usually less our **24**
21(20).Pronotum of major with transverse striae**22**
- Pronotum of major without transverse striae ... ***militicida* Wheeler**
22(21).Head of major with longitudinal rugae confined to anterior half, posterior half without sculpture, except for piligerous punctures **23**
- Head of major with longitudinal rugae extending onto anterior portion of occipital lobes ***titanis* Wheeler**
23(22).Head of major with flattened, rugose area interposed between frontal lobe and eye, furnished with large, intrarugal foveolae; petiole with prominent lateral spiracles ***macclendoni* Wheeler**

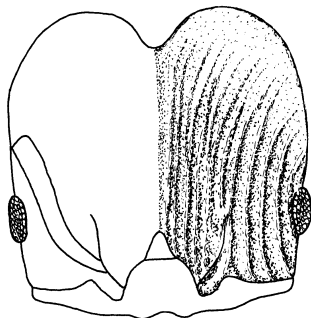


Fig. 233. The head of a major worker of *Ph. ceres*.

- Head of major without flattened, rugose area between frontal lobe and eye; petiole unarmed ***virago* Wheeler**
24(20).Sculpture on head of major extending to vertex, only occiput smoothed and shining

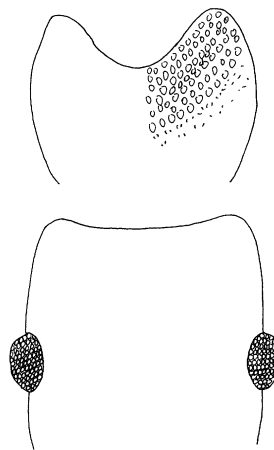


Fig. 232. Outline of the head of a minor worker of *Ph. cerebrosior*. The upper inset shows the punctures on the vertex.

..... *ceres* **Wheeler**

- Sculpture on head of major largely confined to anterior half of head, posterior half smooth and shining **25**

25(24). Eyes of major with 60 facets, or more **26**

- Eyes of major with 40 facets or less **27**

26(25). Major with dorsum of pronotum covered with numerous, coarse, reticulated rugae in addition to more nearly parallel transverse rugae on anterior face and on neck; intrarugal surfaces heavily coriaceous, opaque or nearly so *tucsonica* **Wheeler**

- Major with dorsum of pronotum bearing few or no rugae, rugae mainly restricted to anterior face and neck of pronotum, and not noticeably reticulate; intrarugal surfaces smooth to slightly coriaceous, moderately to strongly shining *xerophila* **Wheeler**

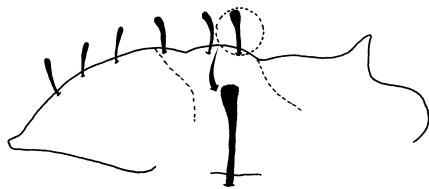


Fig. 235. Mesosoma of a minor of *Ph. marcidula*. The inset shows the details of the shape of a hair.

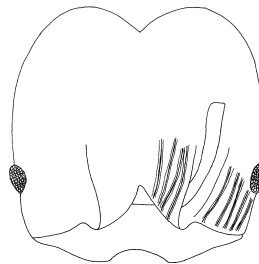


Fig. 234. Head of a major worker of *Ph. bicarinata vinelandica*.

27(25). Vertex and occiput of minor with small, close set punctures, which give surface a noticeably duller appearance on both parts than elsewhere on head **28**

cerebrosior **Wheeler**

- Vertex and occiput of minor strongly shining, or only slightly less shining than remainder of head, punctures widely scattered over entire head **28**

28(27). Erect hairs on mesosoma of minor short, sparse and strongly clavate (Fig.) *marcidula* **Wheeler**

- Erect hairs on mesosoma of minor long, abundant, and although often blunt tipped, not clavate *bicarinata* **Mayr**

material from Gregg 1963 list of species not included here???

add material from Wheeler and Wheeler 1973

Pheidole bicarinata Mayr

Discussion. The majors can be recognized as being small (slightly more than 2 mm total length), most of the dorsum of the head of the major is smooth and glossy, the area between the frontal carinae has coarse, parallel striae, the scapes extend about $\frac{1}{2}$ of the length of the head. The dorsum of the pronotum is covered with fine punctures, and is partially smooth and shining, the lateral bosses are well developed, the dorsal face of the propodeum is covered with punctures, and transverse striae. The propodeal spines are well developed and slightly bent downwards. They are often short (about 0.05 mm in length) and angulate in shape (Fig.). The mesopleuron and the side of the propodeum are punctate. The lateral connules are present, but are blunt and poorly developed. The head of the minor worker is mostly smooth and polished, as is the dorsum of the pronotum and most of the mesosoma.

This species is difficult to separate from *Ph. cerebrorior*. It differs in that the vertex of the head of the minor worker is smooth and polished,

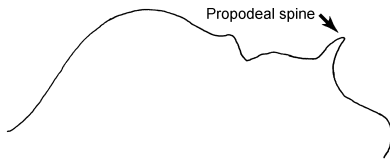
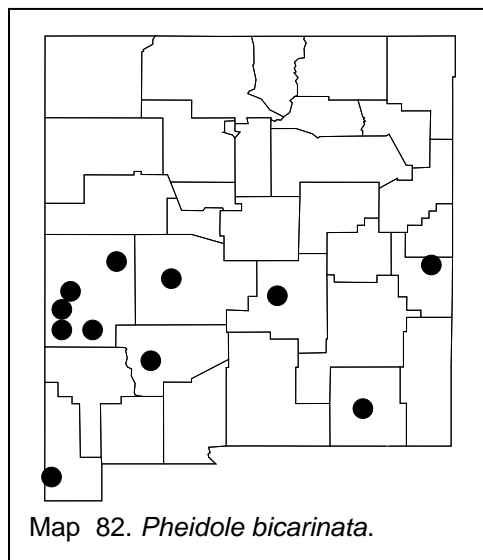


Fig. 236. Outline of the mesosoma of a major of *Ph. bicarinata*.

or finely, transversely striolate, whereas the vertex of *Ph. cerebrorior* is densely punctate. There is a considerable amount of variation in the sculpturing of the vertex of the minor worker, and it is often difficult to identify a series, as different workers may have characteristics of both species. *Pheidole bicarinata* could be confused with *Ph. marcidula*, but can be separated as the minor lacks the clavate hairs on the dorsum of the mesosoma. See the discussion of *Ph. marcidula* for more details.

Distribution. USA: Most of the country, from the East Coast as far west as WY, UT, CO, AZ, west TX; **NM: Catron Co.**, 4k NW Datil (2421 m), 2 mi N Frisco Springs, Glenwood, Mogollon Mts., 8 k NNE Reserve, **Eddy Co.**,



Carlsbad, **Hidalgo Co.**, Coronado National Forest (Clanton Draw), **Lincoln Co.**, 33°42'05.52"N 105°49'41.59"W, **Roosevelt Co.**, 1 k E Oasis State Park, **Sierra Co.**, 21 k SSW Hillsborough, **Socorro Co.**, Magdalena Mts. (Rd. 235).

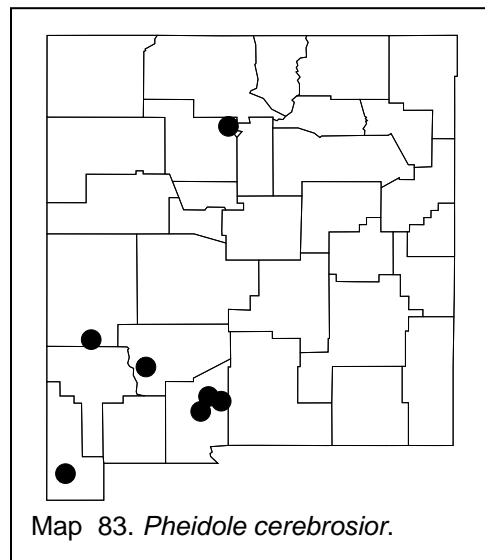
Habitat. Grasslands (including arid sites with yuccas), pinyon-juniper forests, oak forests, ponderosa pine forests.

Biology. This species nests in rotten logs, as well as in the soil and under objects (especially stones) in grassy areas with fine sand and stones. Brood was found in nests in March and August. They are attracted to baits on the soil surface (Vienna sausage).

***Pheidole cerebrosior* Wheeler**

Discussion. The major of this species is nearly identical to *Ph. bicarinata*. It differs in that the vertex of the minor is punctate (Fig.); it is smooth and shining to very finely striolate in *P. bicarinata*. There is a considerable amount of variation in the sculpture of the vertex of the minor worker and is often very difficult to separate this species from *Ph. bicarinata*.

Distribution. USA: CA, AZ; NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, Aguirre Springs, 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, Animas Mts. (San Luis Pass) (Creighton and Gregg, 1955), **Los Alamos Co.**, Rio Grande, **Sierra Co.**, 4 k W Hillsborough.



Habitat. Sagebrush, riparian, evergreen-oak associations. This species usually nests in mountain canyons (including riparian sites), between 550 and 1800 meters elevation, and is rarely found in the open deserts.

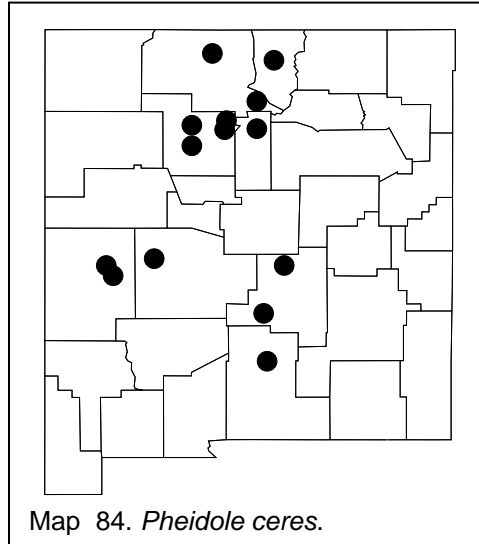
Biology. This species nests under stones or logs. There are seldom more than 12 majors

present in a nest.

Creighton and Gregg, 1955

***Pheidole ceres* Wheeler**

Discussion. This is a small species (majors < 2.5 mm total length). Most of the head is striated, only the posterior part of the head and the tops of the occipital lobes are shining. The mesosoma is predominantly punctate, the side and top of the pronotum are smooth and shining. The lateral connules of the postpetiole are weakly formed, but present. The dorsal surface of the gaster is smooth and glossy. The scapes extend about half of the length of the head. The scapes of the minor worker extend about one



Map 84. *Pheidole ceres*.

funicular segment past the occipital corners, the dorsum of the head is nearly completely glossy, the side as well as the top of the pronotum are smooth and glossy, much of the remainder of the mesosoma is densely, and coarsely punctate. The major and minor are generally dark brown. The sculpture of the dorsum of the head of the major worker generally separates it from all other species. It could be confused with *Ph. marcidula*, but can be separated, as the minors do not have clavate hairs on the dorsum of the mesosoma. See the discussion of *Ph. marcidula* for more details.

Distribution. USA: AZ, CO, TX; NM: **Catron Co.**, 12 k SW Datil, 14 k SW Datil, **Lincoln Co.**, Bonito Lake, Cibola National Forest, **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, **Otero Co.**, Bailey Canyon, **Rio Arriba Co.**, 7 k S Cebolla, Truchas, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 26 k S Cuba, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, Magdalena Mts. (Water Canyon), **Taos Co.**, 20 k NW Taos.

Habitat. Ponderosa pine, ponderosa pine-riparian, Gamble oak, highly disturbed areas, including burned areas, between 1500 - 2,800 meters. It is also found in pinyon-juniper and sagebrush communities in northern New Mexico, often on south-facing slopes.

Biology. This species normally nests under stones in open, sunny locations, in fine, sandy or loam soils. Brood and reproductives were collected from June to August. It is apparently able to adapt well to large-scale disturbance such as forest fires and waste site construction. It is a seed harvester and stores the seeds in the nests. It nests together with *Monomorium*. It is parasitized by the chalcid wasp *Orasema wheeleri*.

Wheeler, 1908

***Pheidole clydei* Gregg**

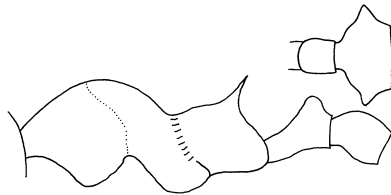


Fig. 237. Mesosoma of a major of *Ph. clydei*. The inset shows the petiole and postpetiole as seen from above.

Discussion. The four segmented antennal club (Fig.) in the major and minor separates this species from all other species of *Pheidole* found in New Mexico. The scape reaches about $\frac{2}{3}$ of the distance to the tops of the occipital lobes, the eyes are large, containing about 80, ommatidia. Nearly the entire head is coarsely sculptured, becoming glossy and shining at the

tops of the occipital lobes. The dorsal surface of the promesonotum is rounded, in a single unit, with the promesonotal suture poorly marked. The propodeal spines are slender and elongate (Fig.). The lateral connules on the postpetiole are very well developed (Fig.). The dorsum of the gaster is finely punctate, but appearing smooth and glossy.

The antennal club of the minor is similar to that of the major, consisting of 4-segments. The scape is long, extending about $\frac{1}{3}$ length past the occipital corner. The propodeal spines are long and slender, being about the same diameter along the entire length.

Distribution. USA: southern CA, NV, AZ; NM: Smith (1982) lists New Mexico, although we are not aware of any specific localities. It would be expected to occur along the western side of the state adjacent to Arizona.

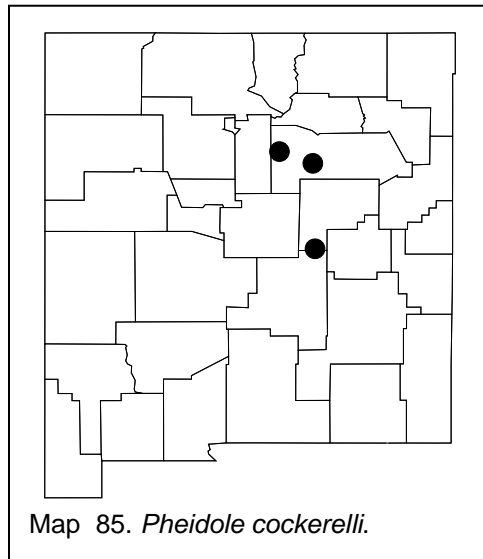
Habitat. Desert canyons, especially in riparian areas, to the typical cholla - palo verde and agave - ocotillo communities, from 150 meters to 2200 meters in elevation.

Biology. This is a fascinating species of *Pheidole*, which nests in cracks and crevices in rock walls. They collect pieces of arthropods and do

not appear to be seed harvesters. Only the minor forage, the majors remain in the nest and only help move larger pieces of food into the nest. The majors do protect the nest entrance. This species does not appear to be common, and is usually collected loose on the soil surface.

Wheeler and Wheeler, 1973

***Pheidole cockerelli* Wheeler**



Map 85. *Pheidole cockerelli*.

Discussion. The majors of this species could be confused with the intermediate sized workers of *Ph. obtusospinosa*. They differ in that the front faces of the occipital lobes are covered with reticulo-rugose sculpture, with the intrarugal spaces granulose, whereas the lobes of *Ph. obtusospinosa* are predominantly granulose only.

Distribution. USA: AZ, CO, OK, TX; NM: **Guadalupe Co.**, 25 mi SE Vaughn, **San Miguel Co.**, Arroyo Pecos, Las Vegas (Map 82); MEXICO:

Durango.

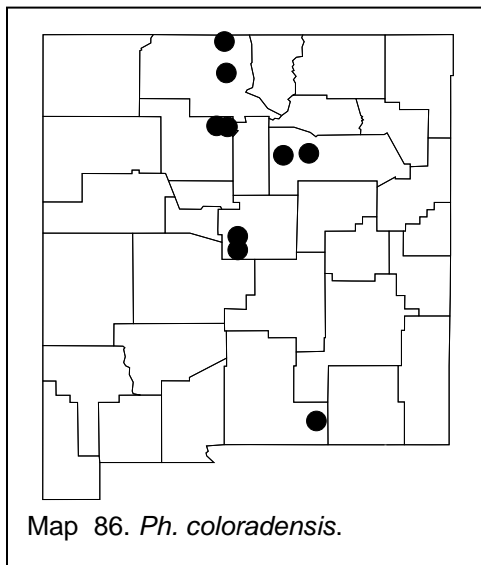
Habitat. Pines, junipers, oaks, desert scrub and arid grasslands.

Biology. This species nests under stones. Brood was found in a nest in July.

Rojas-Fernández and Fragoso, 1994, 2000

***Pheidole coloradensis* Emery**

Discussion. The majors of the species are small (about 2.6-mm total length, head length about 1.4 mm). The anterior half of the head is longitudinally striate the posterior half is finely, but transversely striate, the tops of the lobes are transversely striate. The scapes are short, reaching about $\frac{1}{3}$ of the distance to the occipital lobes. The humeral angles are well developed (Fig.), and the lateral connules are well developed (Fig.). The minor worker is a small, pale brown specimen, with a shiny head, shiny pronotum, with the remainder of the mesosoma finely sculptured.



Distribution. USA: ND east to NV, south to NM: **Los Alamos Co.**, Chupaderos Canyon, Los Alamos, 4 k N Los Alamos, **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **San Miguel Co.**, Pecos, Old Pecos Pueblo, Las Vegas, **Torrance Co.**, 13 k NW Mountainair, 24 k S Mountainair, 13 k S Mountainair.

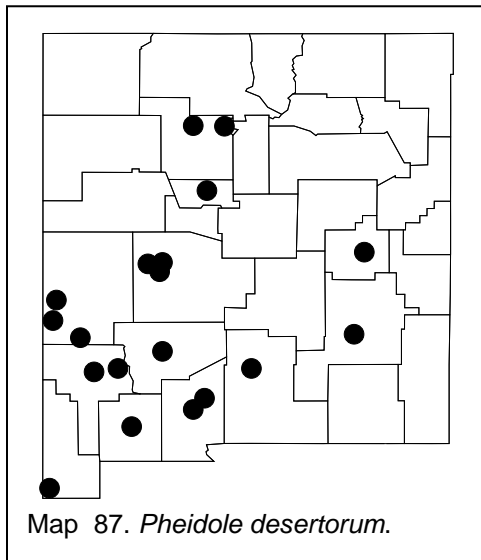
Habitat. Grassy areas in pinyon-juniper forests.) ponderosa pine-riparian forests, disturbed urban areas.

Biology. Nests are usually found under stones, or simply in the soil, with the entrance surrounded by a small mound. Brood was present in nests in June and August. This species harvests grass seeds, as well as other seeds, which are stored in the nest.

Wheeler, 1908

***Pheidole desertorum* Wheeler**

Discussion. The majors of this species are easily recognized by the long scapes, which extend nearly to the occipital corners, or even past the corners. The dorsum of the head is rugose, the regions between the rugae



are mostly shining, although they may be somewhat granulose. The elongate scapes will separate it from all other species, except *Ph. vistana* (= *Ph. grallipes*), from which it can be separated as the upper surface of the head of the major of this latter species is densely sculptured and dull, and *Ph. vistana* has not been reported from New Mexico. It may be confused with the intermediate sized majors of *Ph. obtusospinosa*, but can be separated as the scapes

usually extend past the occipital corners (fail to reach the occipital corners in *Ph. obtusospinosa*), the front of the occipital lobes are at least partially shiny (completely granulose in *Ph. obtusospinosa*), and the scapes are not flattened near the bases (always at least weakly flattened in *Ph. obtusospinosa*).

Distribution. USA: NV, UT, AZ, west OK, west TX; NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, Glenwood, 20 k N Glenwood, Mogollon Mts., **Chaves Co.**, Bottomless Lakes, **De Baca Co.**, Lake Sumner, **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Grant Co.**, Leopold Vista, 60 k E Silver City, San Lanuto [Jacinto?], **Hidalgo Co.**, Clanton Draw, **Los Alamos Co.**, Los Alamos, **Luna Co.**, 18 k NW Deming (1380m), **Otero Co.**, 8 mi NE Tularosa, **Sandoval Co.**, 1 mi S Jémez Springs, **Sierra Co.**, Caballo, **Socorro Co.**, Magdalena Mts. (23 k S Magdalena), 33°48'32.2"N 107°22'57.2", Water Canyon; MEXICO: Durango.

Habitat. Sagebrush, desert scrub, arid grasslands, black grama grassland, fluff grass habitat, to oaks, pinyon-juniper, and ponderosa pine forests, up to 1600 meters in elevation.

Biology. Nests are found under stones in areas of rocky loam and coarse sand, as well as gravel. These ants are very alert, fast and aggressive when the a large nest is disturbed. Brood was found in nests in March, April, August, and September, reproductives in August. This species may be polygynous, as multiple, dealate females are found in nests. This is a very common species in New Mexico, especially in arid ecosystems.

Rojas and Fragoso, 2000

***Pheidole diversipilosa* Wheeler**

Discussion. The majors of this species are easily recognized by the short (less than 0.05 mm), erect hairs on the dorsum of the gaster (Fig.). The scape of the major is flattened near the base, but the width is less than the width of the scape near the apex. The scape extends slightly more than ½ the length to the occipital corner. The anterior half of the head has coarse, reticulated rugae, the posterior half of the head, and the tops of the occipital lobes, are smooth and glossy. The posterior half of the mesonotum is enlarged and swollen (Fig.), the propodeal spines are well developed, but thick. The lateral connules on the postpetiole are absent.

The minor worker has most surfaces punctate, with shining areas in the middle of the head, dorsum and side of the pronotum, and the gaster.

The major worker can be separated from that of *Ph. crassicornis tetra* in being smaller (about 2.6 mm total length, compared with nearly 4 mm in *Ph. crassicornis tetra*), having shorter scapes, and having less well-developed propodeal spines. The erect hairs on the dorsum of the gaster of

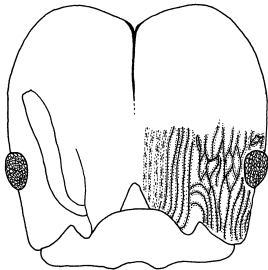


Fig. 238. Head of a major of *Ph. diversipilosa*.

Ph. crassicornis tetra are at least 0.2 mm in length, much longer than the hairs in *Ph. diversipilosa* (see Fig.). The minor workers of the 2 species are nearly identical, except those of *Ph. diversipilosa* are about 2 mm in total length, whereas those of *Ph. crassicornis tetra* are greater than 2 mm in total length.

Distribution. USA: AZ. We have not collected this species in the state, but it occurs in Arizona (SE corner, Cochise Co.) and Chihuahua, and would be expected to occur in the southern part of the state.

Habitat. Oak forests, alligator juniper, Chihuahua pine forests.

Biology. These ants form populous nests under large stones. Brood is found in nests in April, sexuals in June. Nests appear to be monogynous, even though the nests are very large. Foragers are attracted to tuna baits.

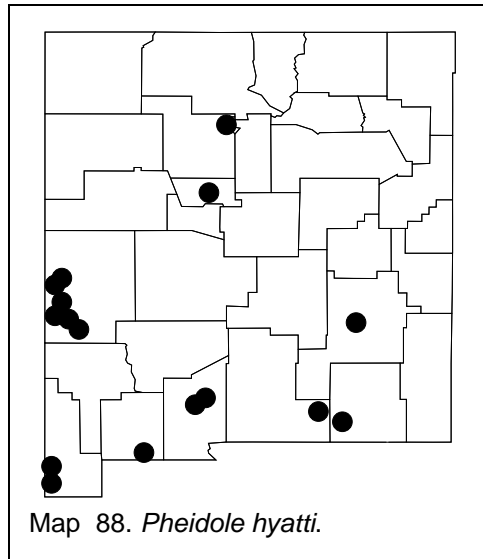
***Pheidole hyatti* Emery**

Discussion. This species can be recognized by the relatively long scapes, which are flattened near the base. The occipital lobes are finely granulate, and at least moderately shining. It could be confused with intermediate sized majors of *Ph. obtusospinosa*. It can be separated as the fronts of the occipital lobes are at least partially smooth and shiny, whereas they are completely granulate and dull in *Ph. obtusospinosa*.

Distribution. USA: southwestern states; NM: **Bernalillo Co.**, NE Albuquerque, **Catron Co.**, Frisco Hot Springs, 2 mi N Frisco Hot Springs, 20 k N Glenwood, 35 k N Glenwood, Mogollon, 8 k N Reserve, **Chaves Co.**, Bottomless Lakes State Park, **Doña Ana Co.**, 18 k E Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, 5 k SE Sitting Bull Falls, **Grant Co.**, 60 k E Silver City, **Hidalgo Co.**, Clanton

Draw, Guadalupe Canyon, **Los Alamos Co.**, Rio Grande, **Luna Co.**, Columbus, **Otero Co.**, Guadalupe Mts. (41k NW Sitting Bull Falls); MEXICO: northwestern states.

Habitat. Creosotebush scrub, grasslands, riparian vegetation in arid ecosystems, with oaks and hackberry, pinyon-juniper woodlands and ponderosa pine forests, up to 1920 meters in elevation, and is common in urban habitats.



Map 88. *Pheidole hyatti*.

Biology. *Pheidole hyatti* nests under stones, or simply in the soil, in areas with rocky loam, gravelly soils, or sandy areas with abundant rocks. Brood is found in nests in March. They are usually not aggressive, and simply escape with the brood when the nest is disturbed. Workers are omnivorous or predaceous, and are attracted to

subterranean Vienna sausage baits. Nests are raided by the army ant *Neivamyrmex nigrescens*.

Rojas-Fernández and Fragoso, 1994, 2000, Ward, 2000 or 1999?

***Pheidole macclendoni* Wheeler**

Discussion. The majors of this species can be recognized by having a flattened, rugose area located between the frontal lobe and the eye, with large, intrarugal foveolae, and the petiole has a large, prominent lateral spiracle. The head of the major is large, at least 2 millimeters in total length, excluding the mandibles. The pronotum of the major has transverse striae. This species is weakly polymorphic.

Distribution. USA: AZ east to southern TX. This species should occur in New Mexico, but we are not aware of any records.

Habitat. Sandy-gravelly desert (Cole, 1957).

Biology. This species nests in the soil, with the nest marked by a small entrance.

Cole, 1957, Gregg, 1958

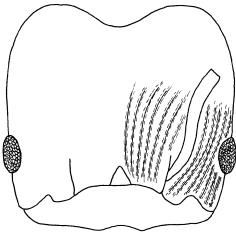
***Pheidole marcidula* Wheeler**

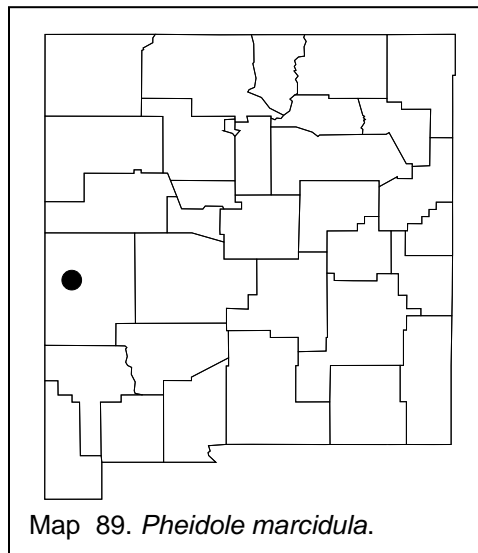
Fig. 239. Head of a major of *Ph. marcidula*.

Discussion. The minor worker of this species is easily recognized by the clavate or spatulate hairs on the dorsum of the mesosoma (Fig.). The scapes of the minor extend about 1 funicular segment past the occipital corner, the dorsum of the head is nearly completely smooth and glossy, the

dorsum and sides of the pronotum are smooth and glossy, the remainder of the mesosoma is punctate, the propodeal spines are well-developed and somewhat curved upwards.

The major is small, about 2.5-mm total length. The anterior $\frac{1}{2} - \frac{2}{3}$ of the head is striated, the posterior part is smooth and glossy (Fig.). The dorsum of the pronotum is smooth and glossy, the side of the pronotum is punctate and weakly shining, and the remainder of the mesosoma is punctate, except for parts of the mesopleuron, which are smooth and shiny. The propodeal spines are well developed, but thickened. The lateral connules on the postpetiole are not developed. Most hairs on the mesosoma are blunt-tipped, a few more weakly spatulate, but not noticeably so.

This species could be confused with *Pheidole ceres*, but a greater proportion of the posterior part of the head is smooth and glossy, and posterior part the mesonotum is not as strongly raised (compare Figs.). The minor workers are very similar, but can usually be separated by the clavate hairs, which are blunt-tipped or only slightly enlarged at the tips in *Pheidole ceres*. The majors of this species could be confused with those of *Ph. bicarinata*. They are usually darker and brown in color (*Ph. bicarinata* is often pale brown



Map 89. *Pheidole marcidula*.

in color), and greater proportion of the head is striated (usually less than $\frac{1}{2}$ in *Ph. bicarinata*). The propodeal spines are more developed, and directed upwards.

Distribution. USA: TX (eastern); NM: **Catron Co.**, 37.1 k N Apache Creek (straight-line distance). This is the first record from New Mexico.

Habitat. Ponderosa pine forests.

Biology. Two nests were found under stones in rocky loam. Brood and females were present in the nests in March.

Wheeler, 1908

***Pheidole metallescens* Emery**

Discussion. The minors of this species can be easily recognized, as they have abundant bluish or purple reflections, which are especially obvious on the head. The majors rarely have bluish reflections, and are relatively small (about 2 mm total length), with short scapes (extend about $\frac{1}{2}$ the length of the head), and the entire dorsum of the head is covered with rugae, granulose between the rugae. Only the tops of the occipital lobes are smooth and shining. The lateral connules on the postpetiole are well developed, but blunt and rounded. *Pheidole metallescens metallescens* differs in that most of the dorsum of the head of the minor is sculptured. There is a considerable amount of variation in the amount of sculpturing on the head of the minor worker, and the two subspecies are probably not distinct.

Distribution. USA: TX; NM: This species may occur in southern New Mexico.

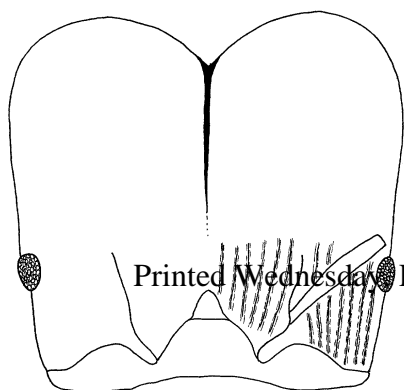
Habitat. Oak forests.

Biology. This species makes small crater nests in the soil. Nest populations are small.

Wheeler, 1908

***Pheidole militica* Wheeler**

Discussion. The majors of this species are large (head length, excluding mandibles, > 2 mm totaling, total length of ant more than 5 mm). The anterior $\frac{1}{3}$ of the head is sculptured with rugae, the



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Fig. 240. Head of a major worker of *Ph. militica*.

intrarugal spaces are mostly shining, and the posterior 2/3 of the length of the head is smooth and glossy. The dorsum of the pronotum is smooth and glossy, the promesonotum form a single, convex unit, and the dorsum of the propodeum is nearly flat. The propodeal spines are well developed, but thick and blunt. The apex of the petiole is sharp in profile, concave as seen from behind; the postpetiole is wide with well-developed connules, as seen from above. The structure of the mesosoma of the major makes this species easily recognized and easy to separate from all others in the genus. needs editing????

The structure of the promesonotum is similar to that of *Pheidole clydei*, but the 3-segmented club and the predominantly glossy and shiny head easily separates this species from the latter mentioned species. The

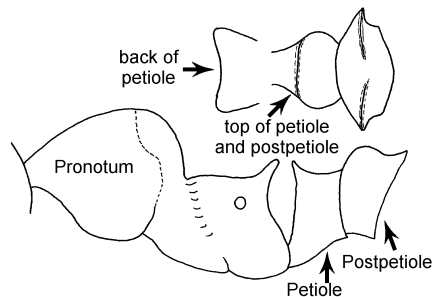
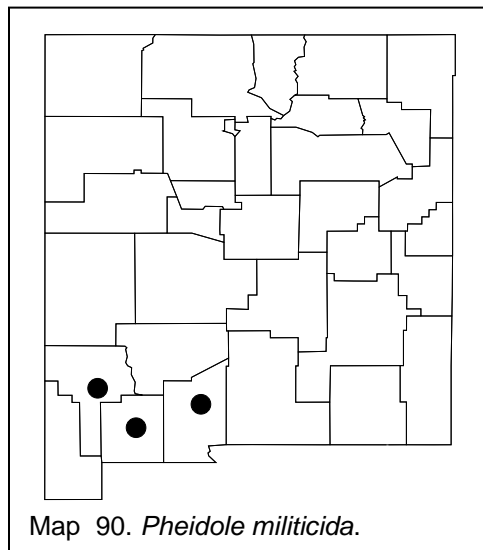


Fig. 241. Mesosoma of a major of *Ph militica*. the insets show the apex of the petiole from the back, and the petiole and postpetiole as seen from the top.



smooth and glossy pronotum, as well as the moderately glossy remainder of the mesosoma, separates the minor workers of this species from many of the others, but it may be difficult to recognize his species on the basis of the minor workers only.

The minor workers are remarkably small, most slightly longer than 2 mm, the head is smooth and glossy, the pronotum is smooth and glossy, and the remainder of the mesosoma is sculptured but at least moderately smooth and glossy.

Distribution. USA: AZ; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Grant Co., Bayard, Luna Co., Deming.

Habitat. Creosotebush scrub, areas of open annuals.

Biology. This species nests in the soil, with the entrance (7 - 13 cms diameter) surrounded by a low mound and chaff of seed hulls.

They also feed on dead insects. Majors are difficult to find and rarely collected.

It is interesting to note the derivation of the name of this species. Wheeler (1915) noted that there were majors in the nests in August, but were absent in November, when their remains were found in the chaff pile surrounding the nest. He hypothesized that the majors were killed on the approach of the winter, after they had broken all of the seeds in the nest and were no longer needed. Creighton and Gregg (1955) doubt that this occurs, but it needs to be carefully checked.

Creighton and Gregg, 1955, Cole, 1953

***Pheidole obtusospinosa* Pergande**

Discussion. This is a polymorphic species, which has the usual minors, intermediate sized workers (which look like major workers of other species) and very large major workers. The scape is flattened at the

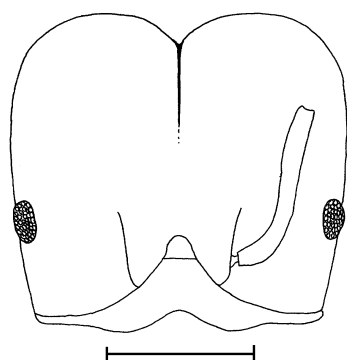


Fig. 242. Head of a large major of *Ph. obtusospinosa*. The sculpturing is not shown. The scale = 1 mm and is drawn to the same scale as Fig. 211.

base, but the flattened area is not as wide as the width of the scape near the apex (Fig.). It extends about $\frac{2}{3}$ the length of the head in the largest workers (Fig.), but may extend nearly to the occipital lobes in the smallest majors (Fig.). The entire dorsal surface of the head is sculptured, with granulose sculpture on the front faces of the occipital lobes. The entire dorsum of the head is dull. The mesonotum projects above the level of the pronotum and propodeum (Fig.). The dorsal surface of the gaster is finely punctate. This species was

previously referred to as *Pheidole subdentata* Pergande.

The intermediate sized workers of this species could be confused with the majors of *Ph. desertorum*. They differ in having the entire dorsal face of the head sculptured and dull (at least parts of the occipital lobes are shiny in *Ph. desertorum*), the scapes do not extend past the occipital lobes (they usually extend well past the lobes in *Ph. desertorum*) and the scapes are definitely flattened at the base (never flattened at the base in *Ph.*

desertorum). This species could also be confused with *Ph. cockerelli*. It can be separated as the faces of the occipital lobes are covered with granulose sculpture, those of *Ph. cockerelli* are covered with granulose sculpture, as well as reticulo-rugose sculpture.

This species is similar to *Ph. porcula*, but can be separated if a complete series is available, as the workers are trimorphic or polymorphic. The intermediate size worker of *Ph. obtusospinosa* is very easily confused with the largest major of *Ph. porcula*. The scape of *Ph. obtusospinosa* is widened at the base, and flattened, but the flattened portion is narrower than the width of the scape near the apex (Fig.). The scape of *Ph. porcula* is wider at the base as it is near the apex of the scape (Fig.). The propodeal processes are basically angles, not spine-like as in *Ph. porcula*.

Distribution. USA: AZ; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site), Hidalgo Co., Coronado National Forest (Clanton Draw), Union Co., Kiowa National Grasslands. These are the first records from New Mexico; MEXICO: Chihuahua, Nayarit, Sinaloa, Jalisco, Sonora, Durango.

Habitat. Creosotebush scrub, grasslands, oak-pinyon-pine forests, pinyon-juniper communities, Chihuahua pine, up to 2100 m elevation. This species is very common in Clanton Draw in the Coronado National Forest of Hidalgo Co.

Biology. This species nests under stones, often the largest stones in an area, or nest in soil with several separate entrances. It is common in sandy soils, including dunes, but also occurs in areas of rocky loam. Brood is found in nests in March. They are preyed on by *Neivamyrmex leonardi*, and make no attempt to defend the nest and only attempt to escape and rescue brood.

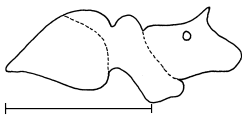
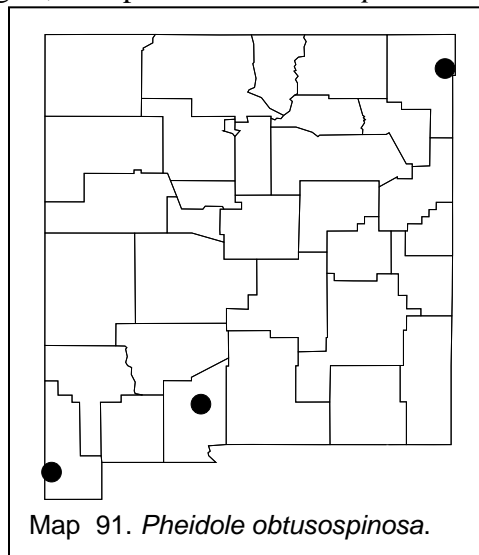


Fig. 243. Mesosoma of an intermediate major worker of *Ph. obtusospinosa*. The scale = 1 mm and is drawn to the same scale as Figs. 211 & 229.



Map 91. *Pheidole obtusospinosa*.

Foragers are found both diurnally and nocturnally, and visit extrafloral nectaries.

Rojas-Fernández and Fragoso, 1994, 2000, Ward, 2000

***Pheidole porcula* Wheeler**

Discussion. The form of the scape easily separates this species from most of the others. It is wide near the base, and flattened or even concave on the upper surface. The scape progressively narrows towards the apex (Fig.). The scapes of the major extend about two-thirds the length of the head. The occipital lobes are usually moderately smooth and shining, but they are occasionally punctate. The propodeal spines are small, but well formed. This species could be easily confused with the intermediate sized workers of *Ph. obtusospinosa*. It can be distinguished, as the background sculpture of the head of *Ph. obtusospinosa* is obviously punctate and only weakly shining. The propodeal spines of *Ph. obtusospinosa* are in the form of an angle, and not a spine as in *Ph. porcula*. The scape of the intermediate sized worker of *Ph. obtusospinosa*

strongly angulate, and flattened near the base, where it is narrower than it is near the apex (Fig.).

Distribution. USA: west Texas (Jeff Davis Co., Real Co.), possibly CO. We have no records from New Mexico, but this species may be found in the southeastern part of the state.

Habitat. Cypress and oak forests, grasslands, up to 1450 meters in elevation. They are apparently most common in semi-arid habitats.

Biology. These ants nest under stones, in very rocky loam. They can be aggressive when the nest is disturbed, and the minors, and especially the majors, can bite.

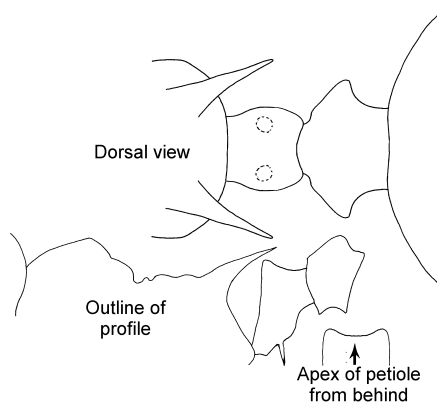


Fig. 244. Mesosoma, petiole and postpetiole of a major worker of *Ph. rhea*. The upper inset shows the propodeum, petiole, postpetiole and anterior edge of the gaster as seen from above, the bottom inset shows the apex of the petiole as seen from behind.

***Pheidole rhea* Wheeler**

Discussion. This is a large, polymorphic species, in which the propodeal spines are unusually long and sharp (Fig.). The gaster is rounded anteriorly, where it connects to the postpetiole (Fig.). The entire dorsum of the head is covered with striae, which diverge towards the occipital lobes. These striae may form concentric whorls on the occipital lobes of the largest workers. The apex of the petiole is relatively sharp, and may be bidentate in the largest workers (Fig.). The lateral connules are well developed. The minor worker is similar, and could be mistaken for a member of the genus *Aphaenogaster*, based on its relatively large size and well developed propodeal spines (Fig.). The three-segmented club easily separates it from *Aphaenogaster*. The

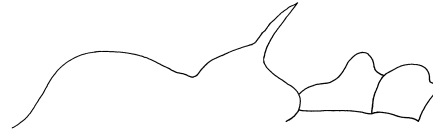
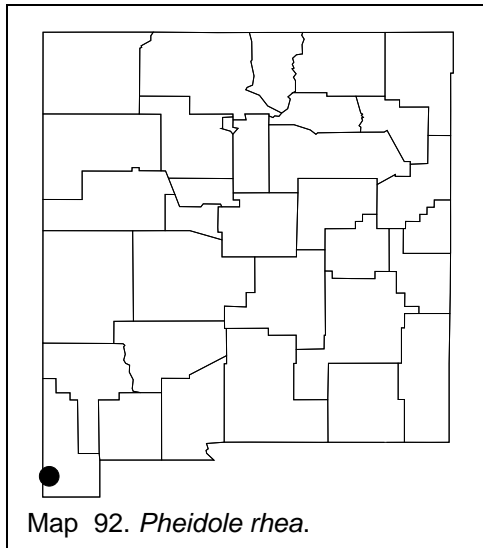


Fig. 245. Mesosoma, petiole and postpetiole of a minor worker of *Ph. rhea*.



Map 92. *Pheidole rhea*.

dorsum of the head is predominantly smooth and shining, the scapes extend about $\frac{1}{3}$ of their length past the occipital corners, the propodeal spines are very long, and curved slightly downward, the node of the petiole is rounded, the lateral connules are not developed and the gaster is rounded anteriorly (as in the major).

Distribution. USA: AZ; NM: Hidalgo Co., Peloncillo Mts.; MEXICO south to Nayarit. This is the first record from New Mexico.

Habitat. Upland open and grassy slopes in mountain foothills.

Nests are found on plateaus or in foothills at the bases of mountains, from 1100 - 2200 meters.

Biology. This species nests in the soil, and nests can be very large. They are not commonly collected in the United States, and are much more common in México. The majors have such heavy heads, that they become “stuck” in a position with the heads down and the remainder of the body and legs kicking in the air!

***Pheidole rufescens* Wheeler**

Discussion. The majors of this species are small (total length about 2.5 mm), the anterior half of the head is longitudinally striate, the posterior half is coarsely sculptured, with a combination of punctae and striae, the tops of the occipital lobes are transversely striate, with the striate extending onto the dorsal surface of the head and posteriorly and longitudinally on the posterior surfaces of the occipital lobes. The humeral angles of the pronotum are weakly developed. The head of the minor is predominantly punctate, except for a central region, which is partially shining. The mesosoma is mostly punctate, although the top and side of the pronotum is partially smooth in shining. The erect hairs of the mesosoma (of the minor and to a lesser extent the major) are clavate or spatulate (Fig.).

The sculpture on the tops of the occipital lobes would separate this taxon from most of the others in the genus *Pheidole*. The poorly developed humeral angles would separate it from many of the similar species, finally, the clavate hairs on the dorsum of the mesosoma of the minor (and to a lesser extent the major) would separate this subspecies from the other subspecies of *Ph. sitarches*. *Pheidole sitarches campestris* Creighton is considered a synonym.

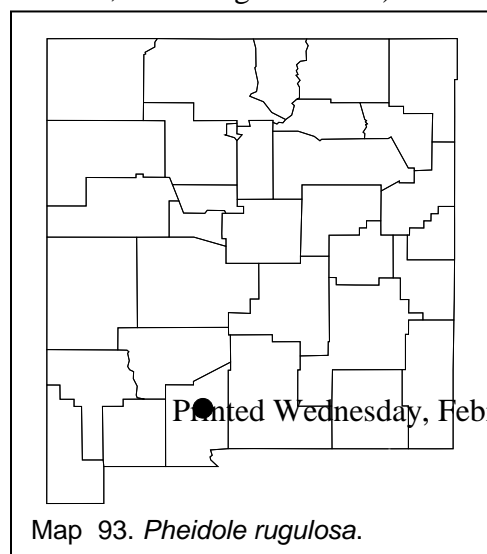
Distribution. USA: MO south to MI, west to CO, south to central TX; NM: we know of no records from the state, but it undoubtedly will be found within the borders.

Habitat. This species occurs in a variety of habitats.

Biology. Nests are found in the soil.

***Pheidole rugulosa* Gregg**

Discussion. The majors of this species are small (total length about 2.5 mm, head length 1.2 mm). The anterior ½ of the head is longitudinally striate, the posterior half of the head is predominantly smooth and shining, the tops of the lobes have transverse striate, which extend onto the fronts of the lobes, as well as extend longitudinally on the posterior surfaces of lobes. The humeral angles are present, but are not notably developed; the



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connules are poorly developed. The minors are small, dark brown specimens, with a shiny head, shiny pronotum, the remainder of the mesosoma is punctate.

Distribution. USA: AZ, TX; **NM: Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site).

Habitat. Creosotebush scrub, weedy bajada, fluff grass habitat, black grama grass, mesquite zone at edge of playa,

Biology. These ants make small nests in the soil, with the nest entrance usually surrounded by a small mound. This species is very common near Las Cruces, but was not found in other sites in New Mexico. The nests and the specimens are small, making them easily overlooked.

***Pheidole sciara* Cole**

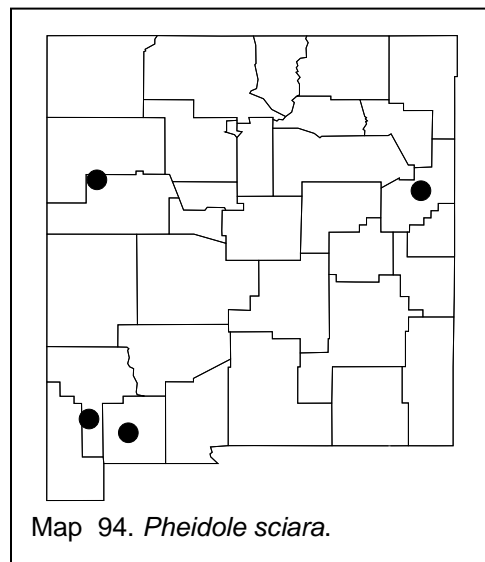
Discussion. The major of this species can be recognized by the flattened area at the base of the scape, the long scape, the rough sculpture over the entire dorsal surface of the head, and, the coarse, transverse pronotal rugae, with the intrarugal spaces shining. The petiolar notch is shallow, but broad, the hairs on the gaster are long, nearly of equal length,

blunt, and widely spaced. The head of the minor is smooth and shining, the postpetiole is globular and less than twice the width of the node of the petiole.

Distribution. USA: TX, **NM: Cibola Co.**, Zuni Mts (southeast of Gallup, 35°10.3'N 108°19.5'W), **Hidalgo Co.**, Lordsburg (Cole, 1955), **Luna Co.**, 6 mi NW Deming, **Quay Co.**, Glenrio,

Habitat. Open, sandy, semi-desert areas.

Biology. This species nests in the soil, with the entrance



Map 94. *Pheidole sciara*.

surrounded by a small mound.

Cole, 1955

***Pheidole sciophila* Wheeler**

Discussion. The major of

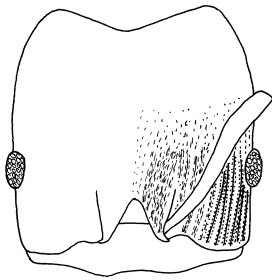


Fig. 246. Head of a major of *Ph. sciophila*.

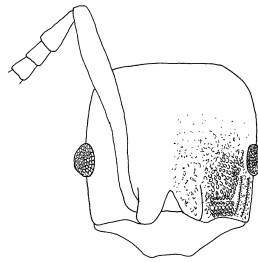


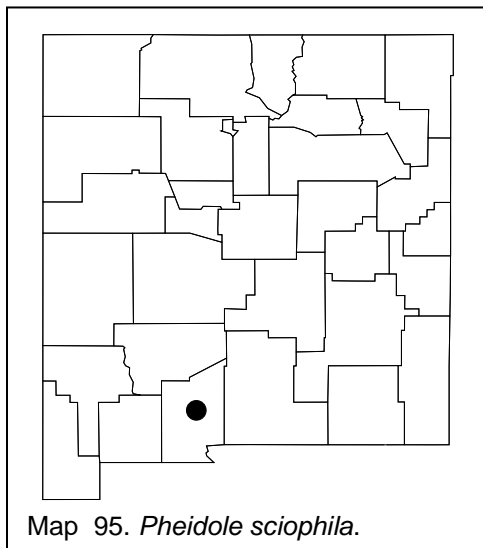
Fig. 247. Head of a minor of *Ph. sciophila*.

this species is tiny (total length slightly more than 2 mm, head length 1.2 mm), with the anterior half of the head longitudinally striate, the posterior half of the head and the tops of the occipital lobes smoothing shining, much of the dorsum of the pronotum is smooth and glossy, the sides of the mesosoma are finely punctate, the humeral angles are poorly developed, the lateral connules are not developed. The scapes of the minor workers extend more than one funicular segment past the occipital corners (Fig.), the head is glossy and shining, the mesosoma is completely and densely punctate, the dorsum of the pronotum may shine in the central region, but is still punctate.

Distribution. USA: AZ, TX; NM: Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site). MEXICO: Chihuahua, Sonora, Durango.

Habitat. Weedy zone of annuals, black grama grasslands, creosotebush scrub, mesquite communities, Chihuahua pine forests.

Biology. This species nest under stones. Colonies are small. Foragers were attracted to peanut butter baits. Wheeler (1908) suggested that this species was entomophagous (eat insects).



Map 95. *Pheidole sciophila*.

Pheidole senex Gregg

Discussion. The major of this species can be recognized by the very elongate, sharp lateral connules on the sides of the

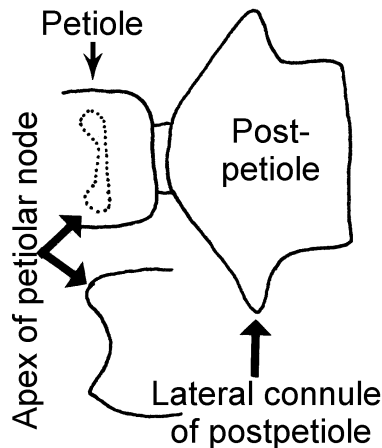


Fig. 248. Petiole and postpetiole of a major of *Ph. senex*, as seen from above, showing the lateral connules on the postpetiole, and the petiole as seen from behind.

postpetiole (Fig.). The anterior half of the head is covered with parallel rugae, the tops of the occipital lobes are covered with fine rugae, the region between the sculptured areas is predominantly smooth and shining (Fig.). Most surfaces of the minor worker are sculptured: the head has a mixture of parallel striae and punctures, the entire mesosoma is punctate (usually part of the dorsum of the pronotum, and side of the pronotum is partially smooth and glossy).

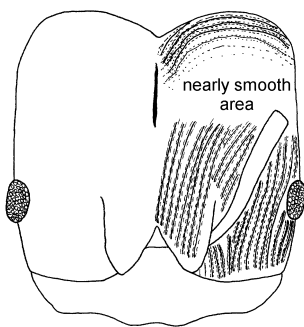
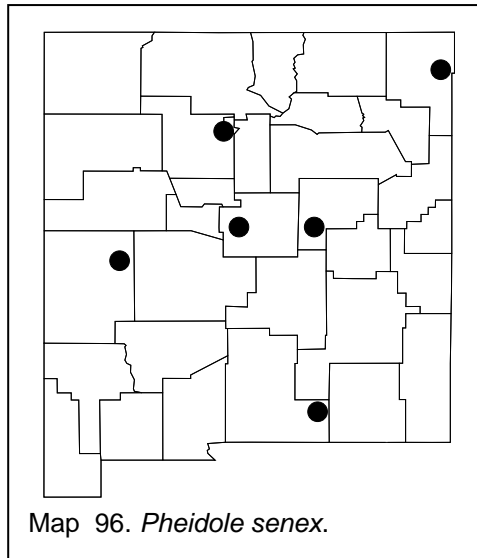


Fig. 249. Head of a major of *Ph. senex*.



Distribution. USA: CO, TX; NM: **Catron Co.**, Sawtooth Mts., **Guadalupe Co.**, 25 mi SE Vaughn, **Otero Co.**, 41 k NW Sitting Bull Falls, **Sandoval Co.**, Bandelier National Monument, **Torrance Co.**, 13 k NW Mountainair, **Union Co.**, Kiowa National Grasslands; MEXICO: Chihuahua.

Habitat. Grasslands,

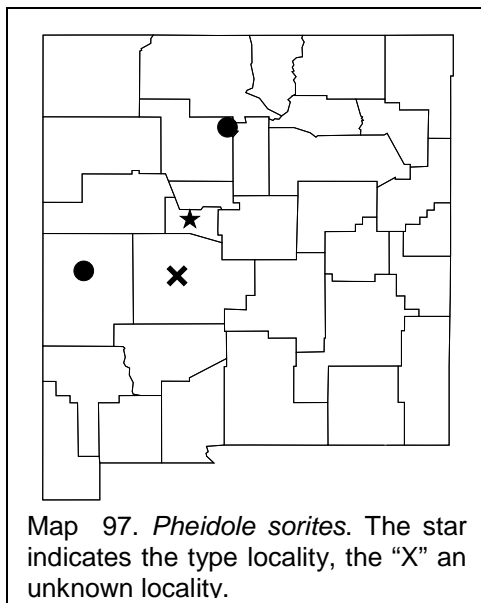
pinyon-juniper, pine forests.

Biology. This species nests under stones or cow manure. Brood was found in nests in April.

Wheeler, 1908

***Pheidole soritis* Wheeler**

Discussion. The major of this species is small (total length about 2½ mm), the scapes expand about ½ way to the occipital corners, the anterior ½ of the head is covered with fine, longitudinal rugae, the posterior half is roughly sculptured with longitudinal and transverse striae, the tops of the occipital lobes have transverse striae. The humeral angles and lateral connules are poorly developed. The anterior part of pronotum is predominant glossy, the posterior part covered with transverse, but fine striae. The minor worker is a small black ant, in which most of the dorsum of the head is smooth and glossy, the side and top of the pronotum are smooth and glossy, the remainder of the mesosoma punctate. The hairs on the dorsum of the mesosoma are blunt tipped, but not clavate.



Cole (1953f) proposed that *P. sitarches rufescens* (as *campestris* Wheeler) be synonymized with *P. sitarches soritis* Wheeler, but later (Cole, 1956) reversed his position. *Pheidole sitarches sitarches* Wheeler and *P. sitarches rufescens*

also hybridize at the area of overlap of their distributions near Austin, TX (Creighton, 1950). The minors in our samples show considerable variation in the sculpturing of the head, and in the pronotal rugae, and some of them would key to *P. sitarches sitarches*. We suggest that at least *P. sitarches sitarches* and *P. sitarches soritis* are conspecific. A revision of the species complex would probably reveal two species: *P. sitarches* Wheeler and *P. littoralis* Cole. We consider that Naves (1985) was justified in treating *P. littoralis* as a separate species.

Distribution. USA: UT, AZ, western TX; NM: **Bernalillo Co.**, NW Albuquerque (type locality), **Catron Co.**, 35 k E Old Horse Springs, **Los Alamos Co.**, Los Alamos, **Socorro Co.**, without locality.

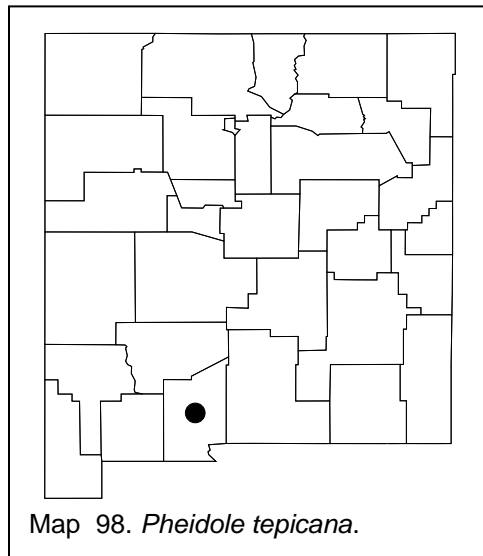
Habitat. Sagebrush communities and disturbed areas.

Biology. This is a common ant in disturbed areas. Nests are usually located beneath stones.

Wheeler, 1908

***Pheidole tepicana* Pergande**

Discussion. The deep, semicircular emargination along the anterior border of the clypeus of the major (Fig.), separates this species from all the others in NM. The anterior $\frac{1}{3}$



Map 98. *Pheidole tepicana*.

of the head is finely rugose, the occipital lobes have fine, transverse striae, and the remainder of the head is smooth and glossy. The humeral angles are poorly developed, as are the lateral connules. The dorsum of the pronotum is smooth and glossy, much of the side of the mesosoma is glossy, and the propodeal spines are small and somewhat upturned. The minor worker is a small, brown specimen, with pale brown legs. The dorsum of the head is smooth and glossy, as is much of

the mesosoma, especially the pronotum. The propodeal spines are small, consisting of tiny angles. This is a polymorphic species, which may also help in separating it from other species of *Pheidole*.

Distribution. USA: AZ, TX; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site) (Map 97); MEXICO: throughout northern Mexico.

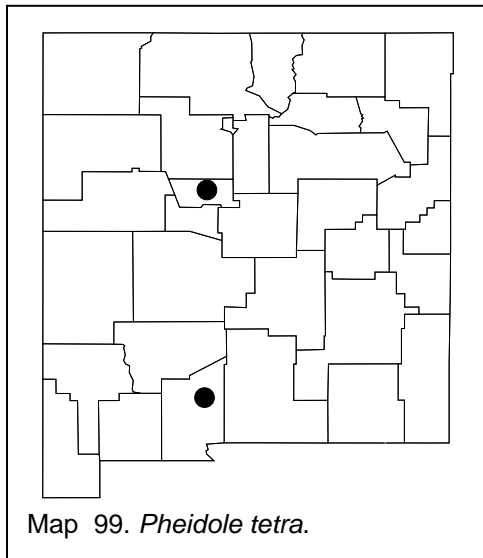
Habitat. Fluff grass habitat, weedy desert bajada, black grama grassland.

Biology. This species nests in the soil.

***Pheidole tetra* Creighton**

Discussion. This species can be recognized as the base of the scape is flattened, with the dorsal surface slightly concave; and the scapes extend about $\frac{2}{3}$ of the distance to the occipital corners. The flattened area of the scape is about equal in width to the diameter near the apex of the scape. The anterior or $\frac{2}{3}$ of the head is roughly sculptured, with coarse, reticulated rugae, with the intrarugal spaces punctate. The posterior $\frac{1}{3}$ of the head is finely sculptured and moderately to strongly shining the tops of the occipital lobes have only the piligerous punctures and are glossy and shiny. The dorsum of the pronotum is finely sculptured, and mostly smooth and glossy. The posterior $\frac{1}{2}$ of the mesonotum is swollen into a protuberance, the propodeal spines are moderately slender, and well developed. The lateral connules on the post petiole are poorly developed.

Most surfaces of the minor worker are densely and evenly punctate, only the central portion of the head and the side and dorsum of the pronotum are smooth and glossy. The gaster is smooth and glossy.



Map 99. *Pheidole tetra*.

This species could be confused with *Pheidole porcula* and differs in that the flattened area of the scape is about the same width as the scape near the apex (Fig.). It commonly occurs in the same habitat as *Pheidole hyatti*, but the majors can be easily separated by the shorter scapes, and the minor workers can be separated as most surfaces are densely punctate, not primarily smooth and shining as are the minor workers of *Ph. hyatti*. If you collect smaller majors, which appear to be this taxon (less than 3 mm total length),

in which the hairs on the dorsum of the gaster are all short (less than 0.02 mm), they are probably *Ph. diversipilosa*. See the discussion of *Ph. diversipilosa* for more details.

Pheidole crassicornis occurs in eastern United States, as far west as Texas. It differs in that erect hairs on the gaster are sparse, longer, and the pubescence is mostly oppressed. The erect hairs on the gaster of *Ph. tetra* are more numerous, shorter and finer, and merge with the

pubescence, most of which is semierect. These differences appear to be variable, and of little importance.

Distribution. USA: AZ, TX; NM: Bernalillo Co., NW Albuquerque, Doña Ana Co., 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: Durango.

Habitat. Creosotebush scrub, weedy bajada, black grama grassland, and urban areas.

Biology. This ant nests in soil, with entrance surrounded by a small mound. Workers are group foragers.

Rojas-Fernández and Fragoso, 1994

***Pheidole titanis* Wheeler**

Discussion. As the name suggests, the majors of this species are very large, with the head length of the major exceeding 2-mm. The longitudinal rugae on the dorsum of the head extend onto the anterior portions of the occipital lobes, the tops of the occipital lobes of the major are shiny. The pronotum of the major has several transverse striae.

Distribution. USA: southern AZ, western TX; NM: We have not collected this species in New Mexico, but expect it to occur in the southwestern corner of the state, as it is found in southeastern Arizona.

Habitat. Riparian areas in desert canyons, creosotebush scrub.

Biology. This species nests under large stones in rocky soils. It is a carnivore, and feeds on termites.

Creighton and Gregg, 1955

***Pheidole tucsonica* Wheeler**

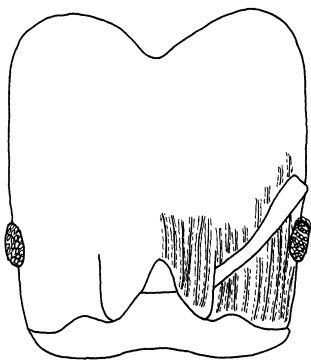


Fig. 250. Head of a major of *Ph. tucsonica*.

Discussion. The major of this species can be recognized by viewing the head in profile. The head is obviously narrowed towards the apex, and the eyes relatively large, with more than 70 ommatidia. The anterior $\frac{1}{3}$ of the head is covered with rugae, with the intrarugal spaces smooth and shiny, the posterior $\frac{2}{3}$ of the head and the tops of the occipital lobes are smooth and glossy. The scape

is gradually bent at the base and extends about $\frac{1}{3}$ the length of the head. The dorsum of the pronotum is coarsely sculptured, with transverse rugae or coarse striae, with the intrarugal spaces punctate. The humeral angles are developed as swellings, the lateral connules are developed, but blunt (Fig.). The minor worker has a glossy dorsal surface of the head, the sides of the pronotum are smooth and glossy, the top is finely sculptured and at least the center of the dorsal surfaces is smooth in glossy. The shape of the head of the major, and the coarse sculpture of the pronotum would separate this species from most of the others. It could be confused with *Pheidole xerophila*, but can be separated because *Pheidole xerophila* has few or no rugae on the dorsum of the pronotum and the intrarugal surfaces are smooth to slightly coriaceous, moderately to strongly shining. This species can be separated from *Pheidole yaqui* by the shape of the head, the head of *Pheidole yaqui* is not narrowed towards the occipital lobes when seen in profile.

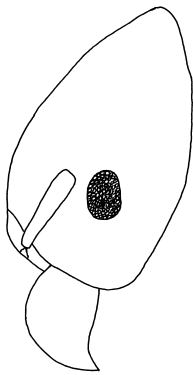
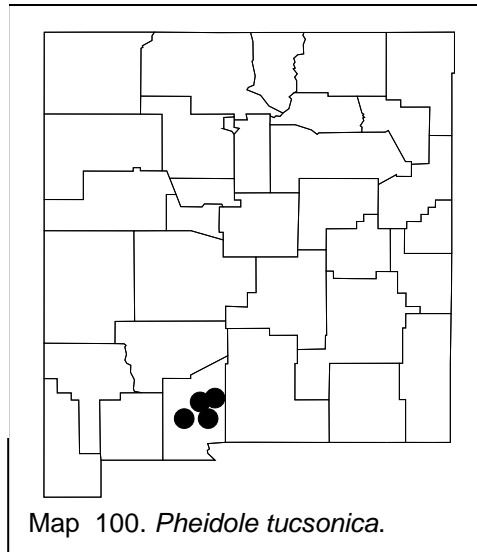


Fig. 251. Side view of the head of a major worker of *Ph. tucsonica*.

Distribution. USA: CA, AZ, nTX; NM: Doña Ana Co., Aguirre Springs, Las Cruces, 40 k NNE Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site); MEXICO: Sonora.

Habitat. Creosotebush scrub, grasslands, mixed basin bajada.

Biology. This species nest in the soil, where mounds may be small or crater-like, it is occasionally found nesting under stones. Brood is found in nests in April and September, sexuals in September. Foragers work in

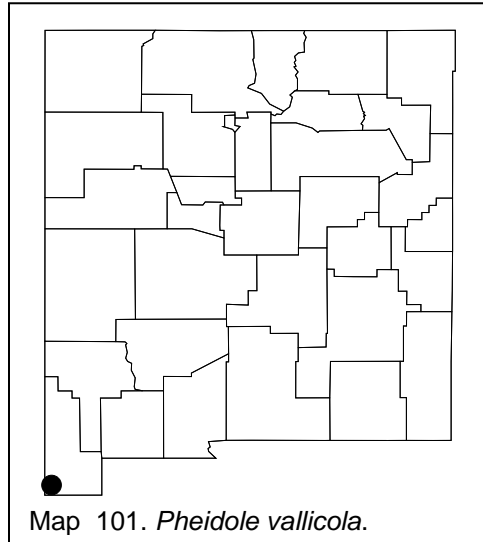


Map 100. *Pheidole tucsonica*.

columns. This species is very common in southern New Mexico, but was not collected anywhere else in New Mexico.

Creighton and Gregg, 1955

***Pheidole vallicola* Wheeler**



Discussion. The major of this species can be recognized by flattened region at the base of the scape, as well as by the elongate scape, which reaches at least $\frac{3}{4}$ of the distance between its insertion and the posterior margin of the occipital lobe. The posterior half of the occipital lobe is moderately to strongly shining. The dorsum of the head of the minor worker is densely punctate and opaque, erect hairs on the gaster of the major are sparse and widely spaced. This species would most likely be confused with *Pheidole hyatti*. It

can easily be separated by the opaque dorsum of the head of the minor worker, which is smooth and shining in *Pheidole hyatti*.

Distribution. USA: AZ; NM: **Hidalgo Co.**, Guadalupe Canyon. This is the first record from New Mexico.

Habitat. Riparian habitats in bottoms of desert canyons with sycamore, cottonwood trees and meadows.

Biology. This species nests under stones in rocky loam soils. Brood was found in nests in July. Seeds are stored in nests.

***Pheidole virago* Wheeler**

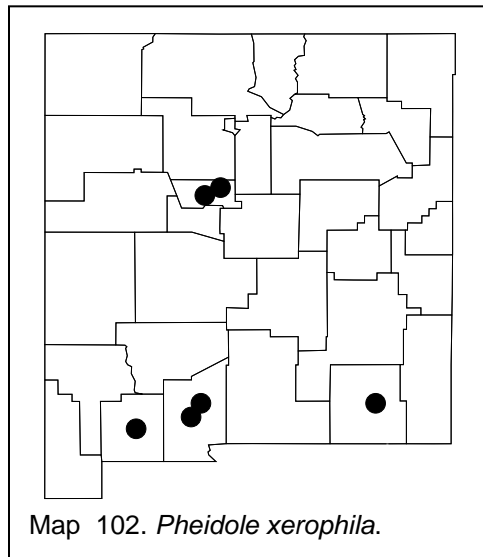
Discussion. The majors of this species are large, with a head length (excluding mandibles) at least 2 mm in length, usually more. The pronotum of the major is covered with transverse striae, the posterior half of the head is without sculpture. This species would be most likely confused with *Pheidole macclendoni*, but can be separated as the head of the major is without a flattened, rugose area between the frontal lobe and the eye, and petiole is without the prominent lateral spiracle.

Distribution. USA: AZ, TX. We have no records of this species from the state, but it would be expected to occur within the border.

Habitat. Riparian areas in the Sonoran Desert.

Biology. The nests of this species are in the soil, with a small mound (7 - 13 cms diameter). The nest entrance is large (1.2 cms), suggesting they are preyed upon by army ants (*Neivamyrmex*). Colonies are small and contain only a few workers.

***Pheidole xerophila* Wheeler**



Discussion. The major of this species is similar to that of *Pheidole tucsonica*, which is obviously narrowed toward the apex, when seen in profile. The eyes are relatively large, with about 70 ommatidia. The posterior part of the head, and top of the occipital lobes, are smooth and glossy. This species could be confused with *Pheidole tucsonica*, but can be separated as the dorsum of the pronotum of the major has few or no rugae, which are mostly restricted to the anterior face and neck of the pronotum, and not

noticeably reticulate, and the intrarugal spaces are smooth to slightly coriaceous or even moderately to strongly shining.

Distribution. USA: TX; NM: **Bernalillo Co.**, Albuquerque, Sandia Mts., **Doña Ana Co.**, 11 mi N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Carlsbad, **Grant Co.**, 7 mi W Deming.

Habitat. Black grama grassland, weedy bajada.

Biology. This species nests in the soil with the hole surrounded by a mound or crater. Nests are attacked by the army ant *Neivamyrmex harrisii*.

Wheeler, 1908, Creighton and Gregg, 1955,

Genus *Pogonomyrmex*

(Keys: Cole, 1968; Mackay et al., 1985)

This is a common and obvious group of seed harvesting ants, found throughout the state. Most species are seed harvesters, others feed on a variety of items, especially dead or dying insects. Large quantities of seeds are stored in nests (Mackay and Mackay, 1984).

Most species in the genus have a large psammophore or beard of coarse hairs on the ventral surface of the head, which are used to carry fine sand during the excavation of the nest. Large mating flights occur in late summer, usually after a rain on the previous day (Mackay, 1981). Some species, especially *P. occidentalis*, build large conspicuous mounds. These ants clear the vegetation from around the nest. The function may be to reduce the impact of prairie fires, increase the amount of solar insolation, or may reduce web sites of spiders, which are found around the nest entrance (Mackay, 1982). Some species construct enormous nests, with diameters over 5 meters and heights of a meter. Most species in this genus can deliver very painful stings.

Important characteristics of this genus include the pectinate mid and hind tibial spurs; sutures and constrictions on the dorsum of mesosoma rudimentary or absent; propodeum usually with a pair of spines; psammophore usually present, if absent, the propodeal spines are connected by a carina. The pectinate tibial spurs and the form of the dorsum of the mesosoma separate this genus from all others in the state. Latke (1990) has shown that the subgenus *Ephebomyrmex* is a synonym of *Pogonomyrmex*.

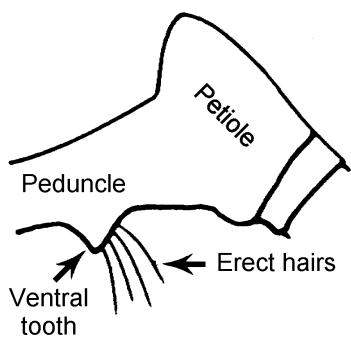


Fig. 252. Petiole of a worker of *P. apache*.

Cole (1934, 1954b) discusses the genus in New Mexico. See also Spangler and Rettenmeyer (1966), and Wheeler and Wheeler (1963, 1973).

Key to the workers of the genus *Pogonomyrmex* (See Mackay et al., 1985)

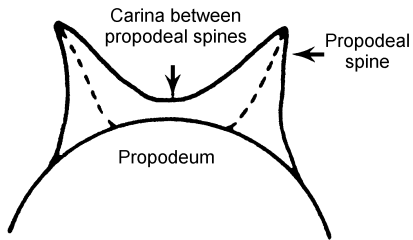


Fig. 254. Propodeum of a worker of *P. imberbiculus* as seen from the front (From Mackay, 1985).

Note *P. anergismus* Cole, known only from sexuals, is not included in the key. also cole

1. Propodeal spines connected by ridge (Fig.); psammophore (long, curved hairs on ventral surface of head) poorly developed (Fig.); clypeus (seen from above) forms projections anterior to the

antennal fossae (Fig.) ***imberbiculus* Wheeler**

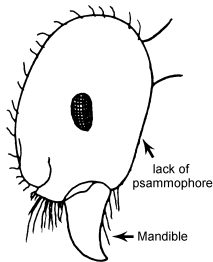


Fig. 253. Side of the head of a worker of *P. huachucanus* (From Mackay, 1985).

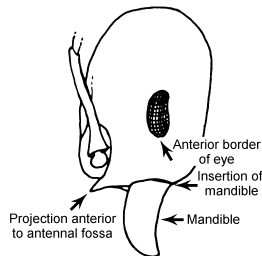


Fig. 255. Side of the head of a worker of *P. imberbiculus* (From Mackay, 1985).

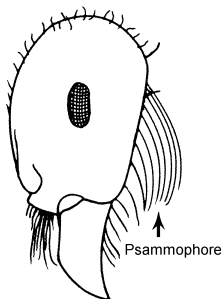


Fig. 256. Side view of a head of a worker of *P. rugosus* (From Mackay, 1985).

- Propodeal spines (not always present) not connected by ridge (may be connected by a low carina); psammophore moderately to well developed (Fig.); clypeus without projections anterior to antennal fossae **2**

2(1). Propodeal spines absent, or if present in some workers in a nest, they are bumps or tiny spines irregular in size **3**

- Propodeal spines well developed **6**

3(2). Longitudinal rugae of head widely diverging towards the

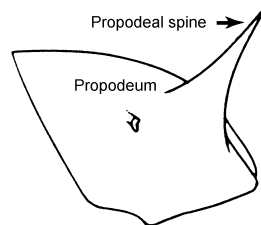


Fig. 257. Propodeum of a worker of *P. apache* (From Mackay, 1985).

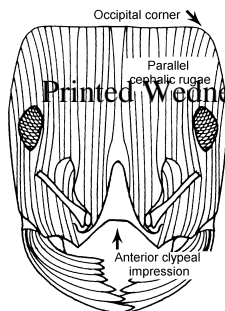


Fig. 258. Head of a worker of *P. apache*, showing the parallel rugae and the impression along the anterior border of the clypeus (From Mackay, 1985).

posterior lobes of the head, usually forming concentric curves above the eyes; commonly collected 4

- Longitudinal rugae (ridges) of head almost parallel, rarely forming concentric curves posterior to eyes; rarely collected 5

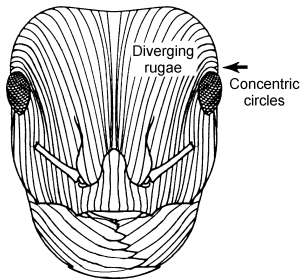


Fig. 259. Head of a worker of *P. californicus* (From Mackay, 1985).

tiny spines on their propodia
***maricopa* Wheeler**

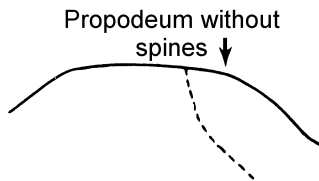


Fig. 260. Mesosoma of a worker of *P. californica* (From Mackay, 1985).

4(3). Regions between the rugae on the head, side of the pronotum and mesopleuron punctate, dull; usually some of the workers have

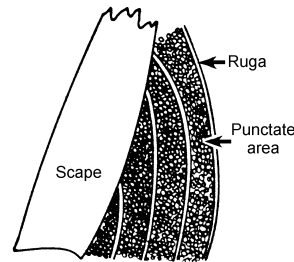


Fig. 261. Side view of a portion of the head of a worker of *P. maricopa* (From Mackay, 1985).

- Region between the rugae on these surfaces mostly smooth and shining; propodeum never has spines or teeth ***californicus* (Buckley)**

5(3). Anterior margin of clypeus with wide, deep impression that often extends to frontal lobes (Fig.); rugae on head very coarse ***apache* Wheeler**

- Anterior margin of clypeus weakly concave (nearly straight); rugae on dorsum of head very fine, parts of surface smooth and glossy ..
***bigbendensis* Francke and Merikel**

6(2). Basal tooth (closest to head) abruptly bent upward and backward; common ant at higher elevations, which builds large mounds.....***occidentalis* (Cresson)**

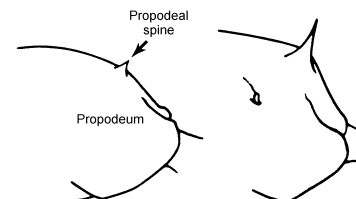


Fig. 262. Propodia of workers of *P. maricopa*, showing 2 extremes of the propodeal spines (From Mackay, 1985).

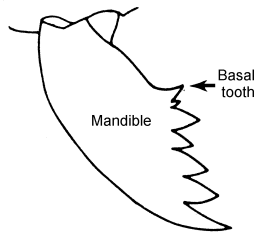


Fig. 263. Mandible of a worker of *P. occidentalis*, showing the offset basal tooth (From Mackay, 1985).

diverging posteriorly; sculpture on mesopleuron very rough, with poorly defined rugae, and size relatively small (total length up to 6 mm); mesic habitats **huachucanus Wheeler**

- Rugae on dorsum of head nearly straight (may be less than 6 mm total length), or slightly diverging posteriorly and relatively large (over 8 mm total length); primarily desert habitats **8**

8(7). Occipital corners smooth and glossy; striae on dorsum of head fine and silky; usually less than 6 mm total length **desertorum Wheeler**

- Occipital corners with sculpture; striae or rugae on head coarser, not silky; usually greater than 8 mm in total length **9**

9(8). Color deep red or reddish orange, gaster same color as mesosoma **barbatus (Smith)**

- Color dark or black, often the gaster is lighter in color than mesosoma **rugosus Emery**

- Basal tooth similar to other teeth of mandible; ants do not build gravel mounds, although they often surround nest entrance with gravel

..... **7**
7(6). Rugae on dorsum of head

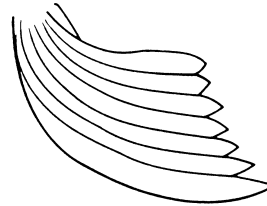


Fig. 264. Mandible of a worker of *P. rugosus* (From Mackay, 1985).

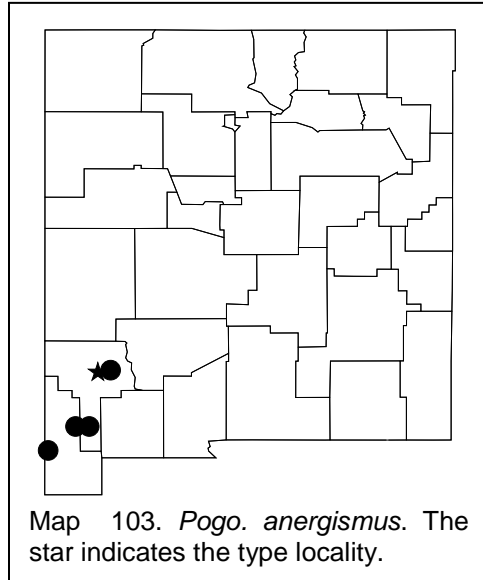
include data from cole68

***Pogonomyrmex anergismus* Cole**

Discussion. Only the females and males are known, presumably there is no worker caste. These ants can be found in nests of either *P. barbatus* or *P. rugosus*. They can be recognized as they are smaller than the sexuals of the hosts (females about 8 mm, males about 7 mm total length, compared to the hosts in which the females are about 12 - 15 mm and the males about 12 mm total length). The males and females are very

similar in color, both being pale brown to ferrugineous brown. The hosts are dark brown (*P. rugosus*) or dark ferrugineous brown to dark brown (*P. barbatus*).

Distribution. USA: AZ, TX; NM: **Grant Co.**, 25 mi E Lordsburg, 6.1 and 7.6 K E Separ (300 to 1000 m south of Interstate 10, 32°10'30"N, 108°21'30"W), 15 mi E Silver City (type locality), 24 K E Silver City, **Hidalgo Co.**, 0.5 K W junction of Highways 9 and 80 (31°55'30"N, 109°2'30"W).



Habitat. Chihuahuan Desert grasslands.

Biology. These ants are social parasite in nests of *P. barbatus* and *P. rugosus*. This species occurs at very low densities, infecting only a few nests out of a population of several hundred. This species can be collected most efficiently by digging into the nests of the host (to a depth of a few cms), and rapidly spreading the soil on the

surface. After a quick examination, you should move on the next nest. When these ants are present, they can usually be seen within a few seconds. The most efficient searching strategy is to rapidly check nests in late summer or fall, spending only a few seconds at any one nest. They are easily distinguished from the darker *P. rugosus* by their light yellowish red color. They are essentially the same color as the alates of *P. barbatus*, making them difficult to distinguish, but can be separated on the basis of their smaller size.

Flights occur during the afternoon after late summer and fall rains. Pouring about 8 liters of water on a parasitized colony can sometimes stimulate flights. Workers of the host are highly aggressive during the flights, as would happen during flights of their own species.

Females mate with colony mates, usually within the nest. The females fly from the nests, males remain in the nest. The spermathecae contain about 8000 sperm, about 1/20 that of other species of *Pogonomyrmex* (i. e. the other social parasite *P. colei*). Apparently

females must replenish the sperm in the spermatheca during later mating flights.

Apparently the females encounter aggression when they enter a nest of the host. When the female makes contact with the host queen or brood of the host, hostile behavior is replaced by intensive grooming by the host workers. Thereafter she is completely accepted by the nest and does not kill the host queen. Nests may contain more than one parasitic queen.

Mackay and Van Vactor (1985), Johnson 1994

***Pogonomyrmex apache* Wheeler**

Discussion. This species is easily recognized due to the deeply emarginate clypeal border. It could be confused with *P. texanus*, but the latter species does not have the excised clypeal border (at least not nearly to the extent of *P. apache*). The lack of spines on the propodeum would separate this species from most of the others in the genus. The lack of propodeal spines could result in this species being confused with *Pogonomyrmex californicus*, or *P. maricopa*. It can be separated from both of the species by the excised clypeal border.

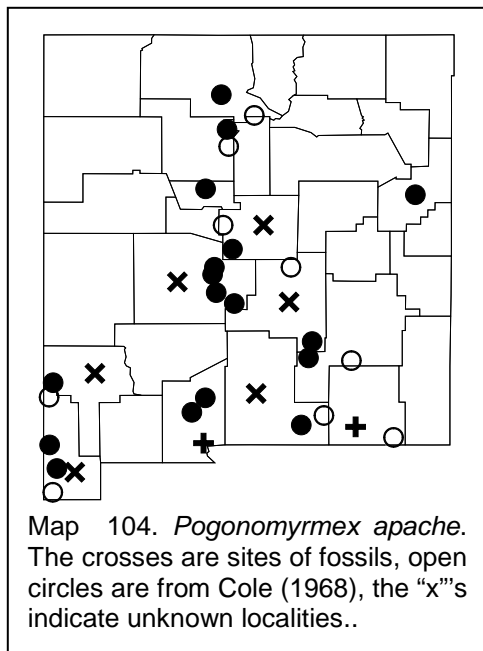
Distribution.

USA:

Throughout the southwest; NM: **Bernalillo Co.**, Sandia Mountains near Albuquerque, **Doña Ana Co.**, Bishops Cap (fossils), 11 mi N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Rocky Arroyo (fossils), **Grant Co.**, without locality, **Hidalgo Co.**, Rodeo, Granite Pass, **Lincoln Co.**, without locality, **Los Alamos Co.**, Los Alamos, **Otero Co.**, without locality, **Rio Arriba Co.**, Abiquiu Dam, **Quay Co.**, 7 mi S Quay, **Socorro Co.**, without locality, **Torrance Co.**, without locality; MEXICO: Sonora, Chihuahua, and Durango.

Habitat.

Creosotebush



scrub, desert grasslands, sagebrush.

Biology. Nests are small and difficult to locate. They occur in the soil, sometimes evident simply by a hole, or otherwise by a small hole with a small (10cm diameter) mound of soil. Nests are small, with perhaps 80 workers. A founding female was collected in July. Nests are apparently small (few hundred workers?) and although they are large individuals, they are not as aggressive as others in the genus.

Gregg, 1963, Rojas-Fernández and Fragoso, 1994, 2000, Cole, 1954, 1968

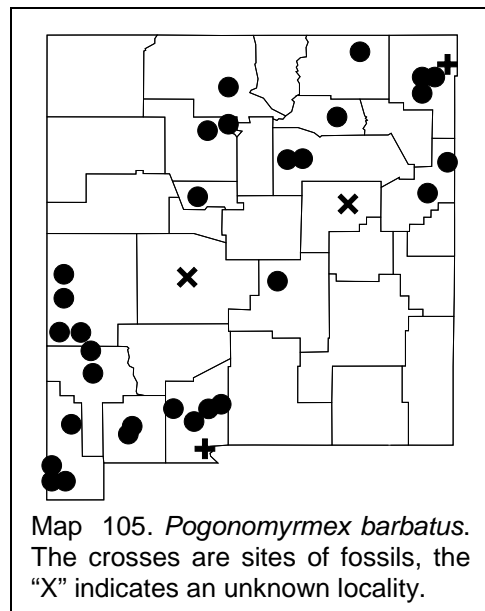
***Pogonomyrmex barbatus* (Smith)**

Discussion. This is usually an easily recognized species as it is large, red and aggressive. Occasionally it is difficult to distinguish specimens from those of *P. rugosus*. The color usually works to distinguish this species (*P. rugosus* is dark with a contrasting lighter gaster), but it may be necessary to examine the cephalic rugae to determine if they are fine or coarse as in *P. rugosus*. It can be separated from the other species, as it is much larger (total length over 8 mm, usually about 10 mm in total length). Workers from newly founded nests are small, and could be confused with *P. desertorum*. The cephalic rugae

are fine, but are not as fine as those of *P. desertorum*, which also has a shiny area at the occipital corner, an area which is covered with rugae in *P. barbatus*.

Distribution.

USA:
Southwestern United States; NM:
Bernalillo Co., Albuquerque,
Catron Co., Frisco Hot Springs, 2
mi N Frisco Hot Springs,
Glenwood, Mogollon Mts., **Colfax**
Co., 10 mi S Raton, **Doña Ana**
Co., Aguirre Springs, Bishop's
Cap (fossil), Las Cruces, 45 k NE
Las Cruces (Long Term Ecological
Research site), **Grant Co.**, 14 mi N
Silver City, 100k N Silver City,



Guadalupe Co., without locality, **Hidalgo Co.**, Guadalupe Canyon,

Lordsburg, Peloncillo Mts., 3 mi N Rodeo, **Lincoln Co.**, 33°57'08.45N 105°42'44.95"W, **Los Alamos Co.**, Rio Grande, **Luna Co.**, Deming, 16 mi WSW Deming, **Mora Co.**, 2 k E Wagon Mound, **Otero Co.**, White Sands National Monument, **Quay Co.**, 6 m SW Nara Visa, 7 mi S Quay, **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, 1 mi S Jémez Springs, **San Miguel Co.**, Infield, Villanueva State Park, **Socorro Co.**, without locality, **Union Co.**, Clayton, 6 mi NW Clayton, 10 mi SE Clayton; MEXICO: Widely distributed and common in the northern half of the country.

Habitat. Found in a variety of habitats in the state, ranging from the edges of the desert and grasslands up to lower elevation pine forests (up to 1850 meters), pinyon-juniper and oak forests, sagebrush, riparian habitats. It occurs in more mesic sites than *P. rugosus* and they are sympatric in only a few areas (i.e. Aguirre Springs in Doña Ana Co.)

Biology. This species has large crater-like mounds with a diameter of about 1-meter. They are cleared of vegetation and covered with gravel, if it is available. Brood and reproductives were found in the nests in July. They are extremely pugnacious and their sting is very painful. It is not as common in the state as *P. rugosus*.

Gregg, 1963

***Pogonomyrmex bigbendensis* Franke and Merikel**

Discussion. This is a very rare species that shows some similarities to *P. desertorum*. It can be distinguished as the cephalic rugae are almost absent and the head is mostly smooth and shining. There are no other North American *Pogonomyrmex* with a smooth and shiny head.

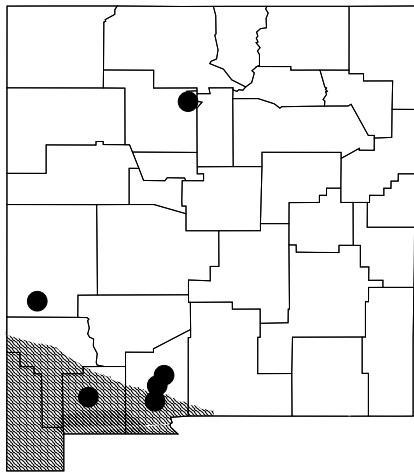
Distribution. USA: TX, Big Bend Park; MEXICO: Chihuahua, may occur in NM.

Habitat. Creosotebush scrub.

Biology. This species nests in the soil.

***Pogonomyrmex californicus* (Buckley)**

Discussion. This species can be distinguished from most of the other species, as the propodeal spines are completely absent. It is difficult to separate from *P. maricopa*, but can be distinguished as the interrugal spaces are smooth and shining. This species never has spines of the propodeum, at least some of the workers in a nest of *P. maricopa* usually have tiny spines.



Map 106. *Pogo. californicus*. The hatched area is from Cole (1968).

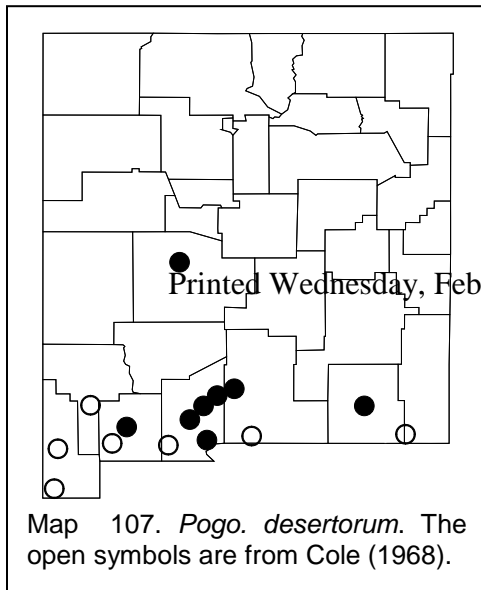
Distribution. USA: Common throughout southwestern United States; NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, Las Cruces, 15 mi N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Luna Co.**, 5 mi W Deming, **Sandoval Co.**, 1 mi S Indian Pueblo; MEXICO: Common throughout northern Mexico.

Habitat. Nearly all arid environments ranging from weedy bajadas to grasslands on to creosotebush scrub.

Biology. This species usually nests in sandy soils where it has small mounds (20-cm diameter). This species does not clear vegetation surrounding the nest. Nest populations are about 2000 individuals, with a nest depth of 2 meters. It is primarily a seed harvester. Foragers are often active during relatively hot times of the day. During these times the ants run stiff-legged with the gaster elevated, apparently in an attempt to distance themselves from the hot surface. They can often be seen mounting small pebbles and stones and wave their legs, apparently attempting to lower their body temperatures. It is very pugnacious and is one of the two ants in New Mexico with the most painful sting (the other species is *P. maricopa*). The sting is barbed and becomes detached to remain in the flesh, as occurs in the honeybee. It is possible to watch the sting apparatus apparently pump venom into one's tissues, especially through a microscope. Reproductives are found in nests from May to July. Flights occur from May to July and a single nest may participate in several nuptial flights. Horned lizards (*Phrynosoma* spp.) are major predators.

Wheeler, 1910a, Michener, 1942, Cole, 1966, Erickson, 1972, Wheeler and Wheeler, 1973

***Pogonomyrmex desertorum* Wheeler**



Map 107. *Pogo. desertorum*. The open symbols are from Cole (1968).

Discussion. This species can usually be recognized by the well-developed propodeal spines and the fine, silky cephalic rugae, with shiny posterior-lateral corners

of the occipital lobes. The propodeal spines separate this species from others that lack the spines. It could be confused with *P. barbatus*, but is smaller and the sculpture is much finer. *Pogonomyrmex barbatus* also lacks the smooth and shiny area on the occipital corners. It is unlikely to be confused with any other members of the genus.

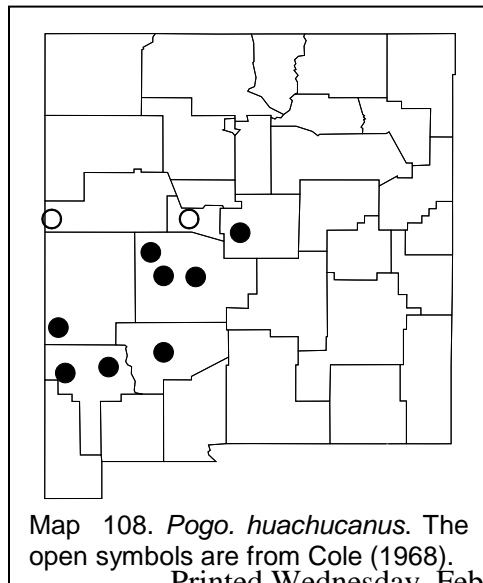
Distribution. USA: Throughout southwestern United States; NM: **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 2 mi SW Haldeman Air Force Base, 2.9 m N Mesquite, **Eddy Co.**, Carlsbad Caverns, **Luna Co.**, 5 mi W Deming, **Otero Co.**, White Sands National Monument, **Sierra Co.**, Elephant Butte; MEXICO: Common in northern Mexico (Sonora, Chihuahua, Coahuila, Durango, Tamaulipas, and San Luís Potosí).

Habitat. Chihuahuan Desert in rocky or sandy soils, including dunes.

Biology. This is a species of seed harvesters (individual and group forager) with small nest populations (few hundreds?). They are very docile ants. They nest in sandy areas, or even gravel soils, with a small mound surrounding the nest entrance. Flights occur in June and July. During the mating flights, sexuals search for the highest object in an area, which in its typical habitat is usually the myrmecologist! It can be a very interesting experience, and additionally the females can deliver a painful sting.

Cole, 1968, Whitford and Bryant, 1979, Rojas-Fernández and Fragoso, 1994, 2000

***Pogonomyrmex huachucanus* Wheeler**



Discussion. This is a member of the “Ephebomyrmex” group of species, although it serves as a ideal link between this group (“Ephebomyrmex”) and the other species in the genus. The propodeal spines are somewhat united by a carina, but the psammophore is reasonably well developed. It is a very coarsely sculptured species. The propodeal spines separate this species from others that lack spines. The rough

sculpture (the area between the rugae on the head is punctate, the area between the rugae on the mesosoma is shiny, but the rugae are reticulated) separates it from many of the species which have propodeal spines. It could be confused with *Pogonomyrmex occidentalis*, but lacks the offset basal tooth.

Distribution. USA: AZ; NM: Found in the southeastern part of the state, **Catron Co.**, Glenwood, **Grant Co.**, Mimbres, 60 k E Silver City, **Sierra Co.**, Elephant Butte Reservoir, **Socorro Co.**, Magdalena Mts. (17 k S Magdalena, Socorro (Cole, 1968), Water Canyon, 33°48'32.2"N 107°22'57.2"W), **Torrance Co.**, Mountainair (Cole, 1968); MEXICO: Chihuahua, Durango.

Habitat. Mesic or riparian areas along the edges of the Chihuahuan Desert, often in grasslands, thorn scrub, oak forests or pinyon-juniper forests, up to the edges of pine forests.

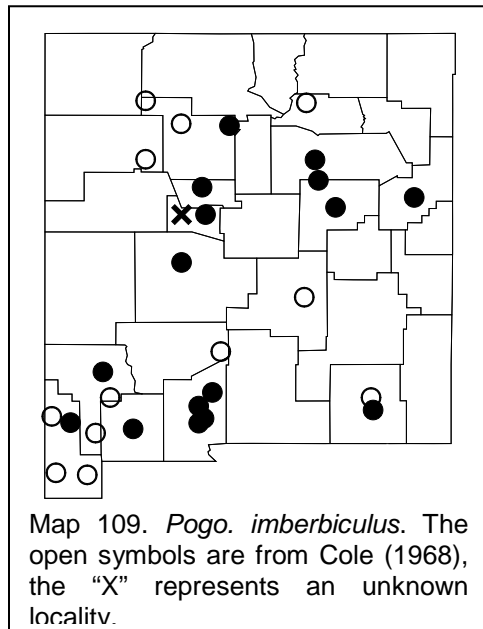
Biology. This species nests in the soil, with the entrance hole often surround by a small, soil mound (up to 10-cm diameter), in fine sand soils or loam with scattered stones, or rocky soils. This species also nests under stones. Nests are usually difficult to find and may be simply small entrance holes. They are occasionally surrounded by seed hulls, which makes them easier to locate. Rarely there are a few pebbles around the entrance. Nests contain about 125 - 150 workers, although large nests may contain 400 - 500 workers. Brood is found in nests from June to July, reproductives in July and August. It forages diurnally, and uses a mixture of seed, excrement, and dead insects as the food source and stores seeds in the nests. It is the only North American species that has multiple wingless female reproductives in the nest, although it is not clear whether more than one is involved in reproduction. Mating may occur in the nests, and at least some of the females are brachypterous (have small wings). Workers are preyed upon by *Dorymyrmex smithi*. It is very docile and a pleasure to work with, and this fascinating species should be studied in detail.

Cole, 1968, Rojas and Fragoso, 2000

***Pogonomyrmex imberbiculus* Wheeler**

Discussion. This is a common member of the "Epehebomyrmex" group, which is very easily recognized as the clypeus is bent as a flange anterior to the insertions of the antennae. This is very easy to see by looking from the top of the head towards the mandibles. This is the only North American species of *Pogonomyrmex* with this characteristic. Thus,

this species would not be confused with any other North American species.



Distribution. USA: southwestern states; **NM:** **Bernalillo Co.**, Taylor Ranch, **Doña Ana Co.**, Aguirre Springs, 40 k NNE Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi E Las Cruces, **Eddy Co.**, Carlsbad, **Guadalupe Co.**, Santa Rosa Lake, **Grant Co.**, 100 k N Silver City, **Hidalgo Co.**, Lordsburg, **Los Alamos Co.**, Rio Grande, **Luna Co.**, Deming (Cole, 1968), **Quay Co.** 7 mi S Quay, **Socorro Co.**, Water Canyon, **Valencia Co.**; MEXICO: Sonora, Chihuahua, Durango, Coahuila.

Habitat. Chihuahuan Desert in grasslands, open weedy

areas, creosotebush scrub, up into juniper forests and oak forests.

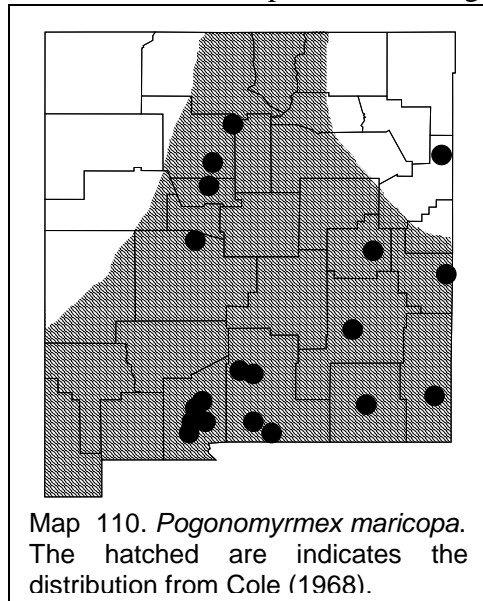
Biology. This species nests under stones or in nests in the soil, sometimes surrounded by a small mound (approximately 4 cms in diameter). Rarely they will nest under stones. Nests are located in sandy soils, to coarse rocky gravel. Nests appear to be small, perhaps 50 to a few hundred workers. Brood is found in nests in August. This is primarily a single foraging, seed harvester, dead insect collector, apparently specializing on grass seeds. Workers forage individually. It is very docile and easy to study. Flights occur in mid July.

Creighton, 1956 (from Cole), Cole, 1968

***Pogonomyrmex maricopa* Wheeler**

Discussion. This species is very similar to *P. californicus* and it is usually difficult to separate the two. If a large series is available, usually at least a few will have poorly developed propodeal spines, which are always lacking in *Pogonomyrmex californicus*. It is slightly larger than *P. californicus* and the interrugal areas (head and mesonotum especially) are more strongly punctured. The anterior edge of the clypeus is straight or

weakly convex, which would separate this species from *P. apache* and *P. texanus*, which have a concave margin. It can be separated from the remainder of the species in the genus, by the lack of spines on the propodeum.



Distribution. USA:

Southwestern United States; NM: **Bernalillo Co.**, Albuquerque, **Chavez Co.**, Bottomless Lakes State Park, **De Baca Co.** Sumner Lake, **Doña Ana Co.**, 1.5 mi W Mesilla, Las Cruces, 5 mi W Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 1.5 mi W Mesilla, **Eddy Co.**, Carlsbad Caverns, **Lea Co.**, 20 mi WSW Hobbs, **Los Alamos Co.**, Los Alamos, Rio Grande, **Otero Co.**, Fort Bliss, Lake Lucero, North MacGregor Range, White Sands National Monument, **Quay**

Co., 6 m SW Nara Visa, **Roosevelt Co.** 1 k E Oasis State Park, **Sandoval Co.**, Santa Ana Pueblo, **Socorro Co.**, Sevilleta National Wildlife Refuge (Map 109); MEXICO: northern states (Baja California, Sonora, Sinaloa, Chihuahua, Durango).

Habitat. This species is found in all communities of the Chihuahuan Desert, especially areas with sandy soils. This is one of the few species which can nest in loose sands, such as at White Sands National Monument.

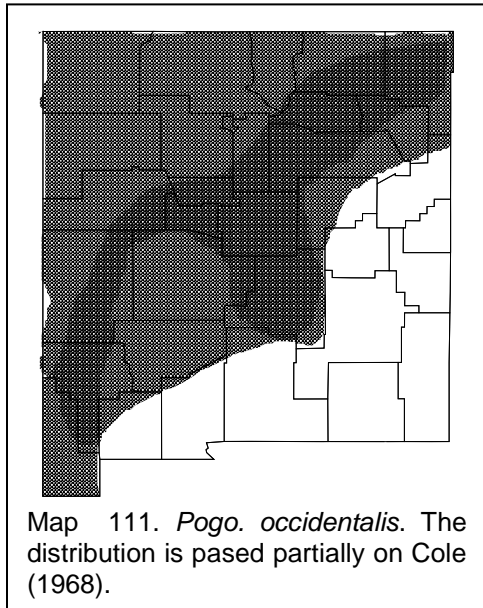
Biology. This species usually has nests very similar to those of *P. californicus*, and usually occur in sandy soils. In some areas, for example the sandy soils east of El Paso, TX, the nests are immense, with clearing up to 7 meters in diameter with the mounds approaching 2 meters in height. Typical nests are found in the same area. Unfortunately most of these nests have been eliminated by construction, and will probably be completely eliminated in the future. These ants are extremely pugnacious and have a very painful sting. Flights occur from June to August, new colonies are formed in July - October. They are individual foragers collecting seeds, excrement and dead insects. The myrmecophilous scarabaeid beetle genus *Cremastocheilus* occurs in the nests.

Gregg, 1963, Cole, 1968, Wheeler and Wheeler, 1973, Rojas-Fernández and Fragoso, 1994, 2000

***Pogonomyrmex occidentalis* (Cresson)**

Discussion. The course interrugal spaces usually distinguish this species from others in the genus. In addition, the basalmost tooth is offset (Fig.), which would separate to species from all others in the genus. They also have a very typical mound that is rarely seen in other species, a

mound covered with gravel with a diameter of about a meter and a height of about 50 cms. It is the only species of *Pogonomyrmex* that is common at higher elevations in New Mexico.



Distribution.

USA: Throughout western United States; **NM:** Very common in the mountains of New Mexico, throughout the state (Map); **MEXICO,** Common in the state of Chihuahua.

Habitat.

Never found in completely arid habitats, most common in higher elevation grasslands, sagebrush sites, oak forests, pinyon juniper forests into

pine forests, but always in clearings.

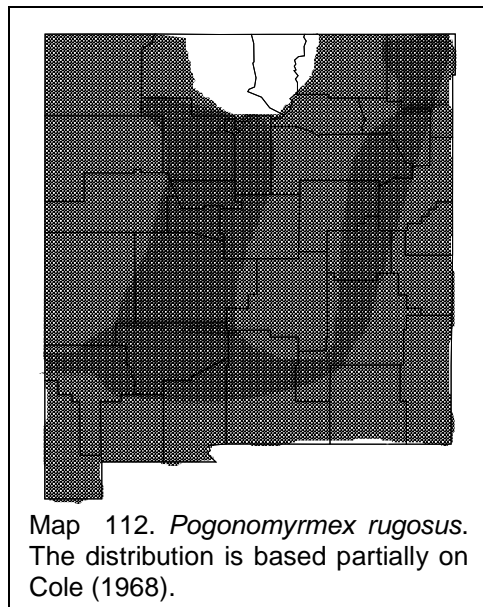
Biology. This is one of the most common and obvious ants in the state. It is especially conspicuous due to the large gravel mounds. Foragers are active during the day, retreating into the nest or in protected sites during the hot part of the day. During the night the ants often block the nest entrance. It feeds on seeds and dead insects. It colonizes a disturbed area rapidly, as it is present on a waste site (Los Alamos) on plots 5 years old. Brood and reproductives are found in the nests throughout the summer. It is a very aggressive species and can inflict numerous painful stings in a surprisingly short period of time. Mounds play a role in thermoregulation of the nest. Surfaces exposed to the sun are warmer. The nests are usually covered with pebbles, snail shells or even

Indian beads and fossil mammal teeth. The function of the gravel is unknown, but may protect the mound from erosion or may mark the entrance hole (in species with no mound or smaller mounds) to make it easier to find. *Monomorium minimum* is found in the nests. The scarabaeid beetle *Cremastocheilus saucius* is found in nests.

Gregg, 1963, Wheeler and Wheeler, 1963, Usnick, 2000

***Pogonomyrmex rugosus* Emery**

Discussion. This is a very common ant in southern New Mexico and is easily recognized. Its color (and large size, over 8-mm) usually separates it from all others in the genus: dark brown, almost black head and mesosoma with a somewhat lighter colored gaster. The cephalic rugae are very coarse, which separates it from dark colored *P. barbatus* specimens.



Distribution. USA:

southwestern United States; **NM:** **Bernalillo Co.**, Albuquerque, West Mesa, **Curry Co.**, near Clovis, **DeBaca Co.**, Summerlake, **Doña Ana Co.**, Anthony (2 mi E Cemetery), Dripping Springs, Las Cruces, 15 mi N Las Cruces, 3 mi E Las Cruces, 5 mi W Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), San Agustin Pass, **Eddy Co.**, Carlsbad, 1 mi E Loco Hills, 5.3 k SE Sitting Bull Falls, **Grant Co.**, Whitewater, 15 mi SSE Silver City, 60 k E Silver City, 14 k E White Signal, **Guadalupe Co.**, Lake Santa Rosa,

Pearch Lake (1.5 mi SE Santa Rosa), **Hidalgo Co.**, 3 mi N Rodeo, **Lea Co.**, 20 mi E Tatum, **Lincoln Co.**, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, Rio Grande, **Otero Co.**, 8 mi NE Tularosa, White Sands National Monument, **Quay Co.**, Logan/Ute Lake 6 mi SW Nara Visa, **Rio Arriba Co.**, 2 k N Dixon, Española, 10 k SW Española, 4 k NW Navajo City, **Roosevelt Co.**, **Sandoval Co.**, Bandelier National Monument, Coronado State Park, 1 mi S Indian Pueblo, **San Juan Co.**, 4k E Aztec,

Ghaco Canyon, **San Miguel Co.**, Infield, **Santa Fe Co.**, Galisteo, **Sierra Co.**, Caballo Lake, Truth or Consequences, **Socorro Co.**, 11 k NW Magdalena, 19 k S Magdalena, **Torrance Co.**, Corona, 5 m NE Corona, 13 m NE Corona, 10.7 k SW Corona, **Union Co.**, 15 m SW Clayton, **Valencia Co.**, 66 k E Albuquerque, 13.8 mi W Los Lunas (Map); MEXICO: Common throughout the northern part of the country, especially in the state of Chihuahua.

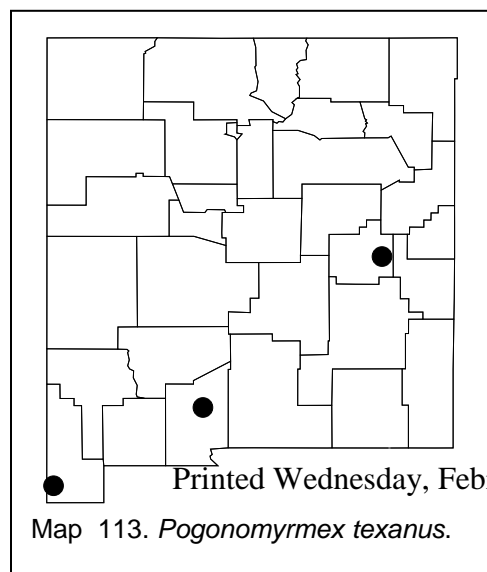
Habitat. Found primarily in Chihuahuan Desert communities, including grasslands, creosotebush scrub and riparian habitats

Biology. This species forms large crater-like mounds similar to those of *P. barbatus*. Rarely it forms a small mound a few cm higher than the surface of the ground. Nests are large, containing several thousand workers. Workers are individual or group foragers, depending on the conditions. Food sources are primarily seeds (especially those of *Erodium cicutarium* sp?), but also includes dead insects. The soil surface temperature limits foraging activity. The myrmecophilous scarabaeid beetle genus *Cremastocheilus* occurs in the nests. These ants deposit seed hulls and other debris around the edge of the mound, where it is eaten by tenebrionid beetles of the Genus *Eleodes*. The black widow spider is one of the main predators of this species.

Gregg, 1963, Wheeler and Wheeler, 1973, Mackay, 1981, 1982, Mackay and Mackay, 1989 Foraging Slobdchiov?? Rojas-Fernández and Frago, 1994, 2000

***Pogonomyrmex texanus* Francke & Merickel**

not in key



Discussion. Workers of this species can be recognized as being large ants (total length greater than 9 mm), which lack propodeal spines. The anterior border of the clypeus is concave (Fig.), but not to the extent of the clypeus of *P. apache* (Fig.). The rugae on the dorsum of the head are fine, nearly parallel, directed straight back to the vertex, the occipital corner is

smooth and shining. It can be separated from most of this species in the genus by the lack of propodeal spines. It is much larger than *Pogonomyrmex californicus* and most workers of *P. maricopa*. It can also be separated from these two species, as the anterior border of the clypeus is nearly straight.

Distribution. USA: TX: NM: **De Baca Co.**, 4 mi N Taiban, **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site), **Hidalgo Co.**, Peloncillo Mts. (N Highway 9) (Map 112). fossil BVD

Habitat. Rocky areas within the Chihuahuan Desert.

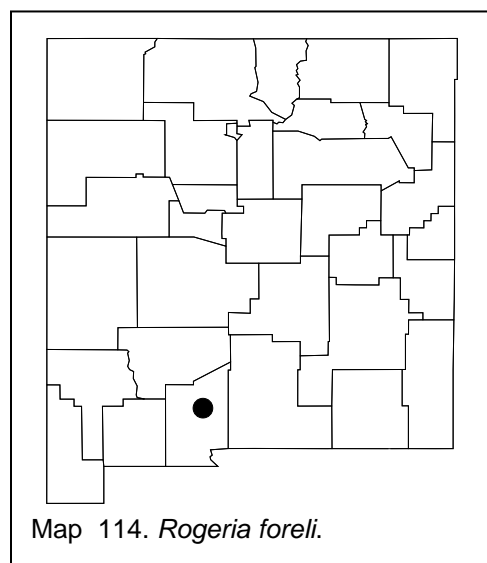
Biology. This ant nests in the soil, with the entrance hole surrounded by a small (10 - 15 cm diameter) mound.

Genus *Rogeria*

(Key: Kugler, 1994)

This is a Latin American genus (24 species) and one of the rarest of the genera in the United States. Only 1 species, *R. foreli* is found in New Mexico. The eyes are usually small and the clypeus has 3 prominent carinae, which diverge anteriorly, but never form clypeal teeth. They are very roughly sculptured.

Rogeria foreli Emery



Discussion. This is easily recognized as a small (about 2 mm total length), light brown species. The three-segmented antennal club is much longer than the remainder than the remainder of the funiculus (Fig.). The eyes are very small (about 8 ommatidia). The anteroinferior pronotal angle is well developed (Fig.), which is nearly as large as the angle on the propodeum. *Rogeria huachucana* Snelling is a synonym.

Distribution. USA: Southeast AZ, and south central New Mexico south to northern

South America, NM: **Doña Ana Co.**, 45 K NE Las Cruces, Jornada Long Term Ecological Research Site.

Habitat. Rocky areas within the Chihuahuan Desert, extending into juniper woodland at 1800m.

Biology. The habits of this ant are little known, they apparently nest under stones, as that is where stray workers have been found.

Snelling, 1973, Kugler, 1994

Genus *Solenopsis*

(Key: Creighton, 1950)

This genus can easily be distinguished from all others in New Mexico by the 10-segmented antenna with a two-jointed club. Most common species are polymorphic and could only be confused with *Pheidole*. The antenna, lack of spines on the propodeum, the extension of the clypeal carinae as tooth-like projections past the antennal border of the clypeus (except in the majors of the rarely collected *S. amblychila*), and the mandibles with more than 2 well developed teeth in most species easily separate this genus from *Pheidole*. Most of the species in this genus are small, monomorphic ants with tiny eyes. These species are rarely collected, although they are common, but subterranean ants. They are not likely to be confused with other genera as they also have the 10-segmented antenna with the 2-jointed club (it is very difficult to count the segments due to their small size). Most species in New Mexico are yellow or pale yellow in color, which allows them to be easily separated from the tiny black workers of *Monomorium*. There are no spines on the propodeum, which separates them easily from small, pale *Pheidole* workers. The eyes are very small, consisting of only a few ommatidia, whereas in the other genera the eyes are large. Thus, even though the workers of these ants are tiny and difficult to examine, they are not likely to be confused with workers of other genera.

The larger, polymorphic species are most commonly collected. They commonly build large nests in lawns and place the soil on top of the grass, making the yard unsightly. They have a moderately painful sting, which is usually not serious unless a large number of workers stings a gardener. These larger species are usually found in dry areas nesting in the soil or under stones. They feed primarily on seeds, but may feed on dead

insects. These are common urban and house pests and include the imported fire ant, which is a notorious pest.

Most colonies of the smaller species are found in the soil without an entrance hole, unless nuptial flights are occurring. Occasionally nests are discovered under stones. Nests are usually found while one is excavating the nest of another species. They are considered thief ants, which pilfer the nests of other ants. As they are so small, other ants may not even notice them.

This is a relatively common group in New Mexico, and is found in a number of habitats. *Solenopsis molesta* is the most common species in the area. We recognize a second small species as *S. krockowi*, although it could be *S. salina*, as there is considerable variation in the ventral tooth of the anterior peduncle of the petiole. Cole (1953c) discusses the distribution of the genus in New Mexico. The smaller species in this genus are in desperate need of revision; identification is nearly impossible.

Key to the workers of the genus *Solenopsis* (all of the thief ants known from the United States are included in the key)

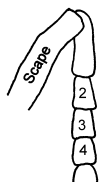


Fig. 265. Scape and first part of the funiculus of a worker of *S. invicta*.

1. Workers dimorphic or polymorphic; eye of minor with total of more than 20 ommatidia; second and third funicular segments longer than broad (Fig. 264) 2

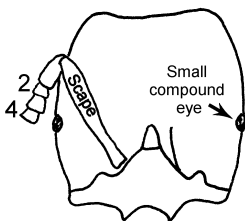


Fig. 266. Head and scape with first 4 funicular segments of a worker of *S. krockowi*.

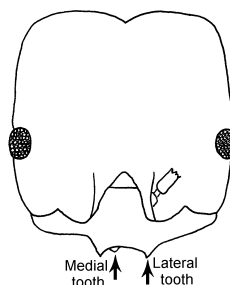


Fig. 267. Head of a major worker of *S. invicta*. The medial tooth is indicated.

- Workers monomorphic; or

if dimorphic, eye of minor with total of less than 15 ommatidia (Fig.); second and third funicular segments at least as broad as long

5

2(1). Workers with two lateral teeth on anterior border of clypeus, with at least 1 tooth between them (Fig. 265); mesopleuron striated (Fig. 267); subpeduncular tooth small (Fig. 267)

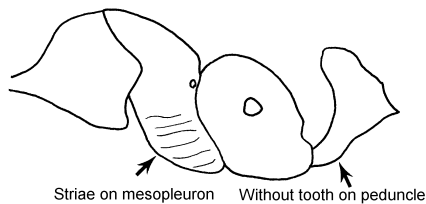


Fig. 268. Mesosoma and petiole of a major worker of *S. invicta*, showing the striated mesopleuron and the lack of a developed subpeduncular process.

..... ***invicta* Buren**

- Workers with either two lateral teeth on anterior border of clypeus, or none, medial tooth absent; mesopleuron usually smooth and shining; subpeduncular tooth usually well developed

3

3(2). Major worker with 2 well developed, lateral teeth on anterior border of clypeus

4

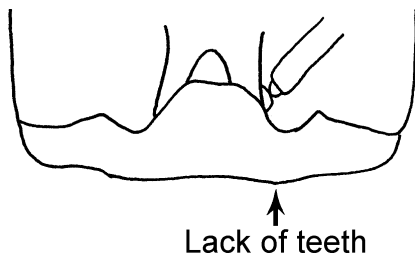


Fig. 269. Anterior border of clypeus of a major worker of *S. amblychila*.

- Largest major worker without lateral teeth on anterior border of clypeus (caution: smaller majors and minor workers usually have 2 lateral teeth)

..... ***amblychila* Wheeler**

4(3). Eye of major worker with about 70 - 80 ommatidia, eye of minor worker with more than 40 ommatidia; gaster often black, remainder red or yellow

***xyloni* McCook**

- Eye of major worker with about 50 - 60 ommatidia, minor with up to 35; gaster usually light brown ***aurea* Wheeler**

USA: **salina, truncorum, texana, carolinensis, tennesseensis, subterranea, tonsa, nickersoni, pergandei, punetaeipes, pulleni, AZ1, MA1, pilosula, kroekowi, molesta, , impolitqa, abdita,**

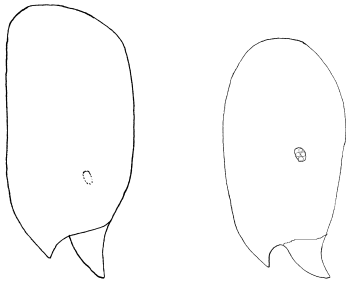


Fig. 270. Side of the head of workers of *S. subterranea*, showing the small, poorly defined eye (left) and of *S. molesta* (right) showing the moderately well developed eye.

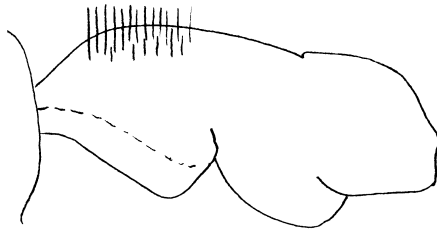


Fig. 271. Mesosoma of a worker of *S. subterranea*.

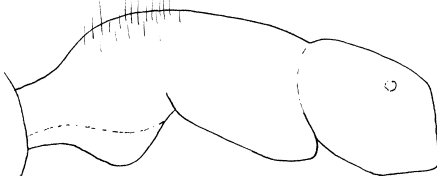


Fig. 272. Mesosoma of a worker of *S. tennesseensis*.

5(1). Eyes tiny, nearly absent (Fig. 271 left); head elongate, with coarse punctures **6**

- Eyes small, but visible, black, with several ommatidia (Fig. 271 right); head not greatly elongate, punctures on head may be coarse **12**

6(5). , az1, mai, pulleni, impolita, Pronotum with more than 20 erect hairs (Fig. 272) **7**

- Pronotum with fewer than 10 erect hairs (undescribed species) **9**

7(6). Most hairs on pronotum short, about same length; not known from New Mexico **8**

- Most hairs on pronotum longer, of various lengths; common in New Mexico **tennesseensis bb**

8(7). Head slender when viewed in profile (Fig. 271), dorsal and ventral surfaces nearly parallel, nearly straight; smaller segments of funiculus about 0.06 mm in length; Texas south to northern South America **subterranea Mackay and Vinson**

- Head thickened when viewed in profile, ventral surface convex, not parallel to dorsal face; smaller segments of funiculus about 0.08 mm in total length; Florida and Texas **tonsa Thompson**

9(6). Eyes poorly developed or absent **10**

- Eyes obvious and consisting of at least 1 ommatidium **11**

10(9). Pronotum without erect hairs; head not extremely elongated; western Texas new species **1**

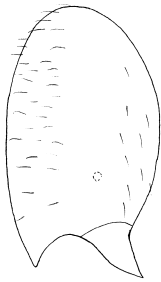


Fig. 273. Side view of the head of a worker of *S. tonsa*.

- Pronotum with few erect hairs; head extremely elongate; southern New Mexico

..... new species 2

11(9). Head thick in profile (0.18 mm dorsal to ventral surface); clypeus with 2 teeth along anterior surface (2 additional, poorly

defined bumps may be present); southern New Mexico
..... new species 3

- Head slender in profile (0.15 mm); clypeus with 4 teeth along anterior border; SE Arizona new species 4

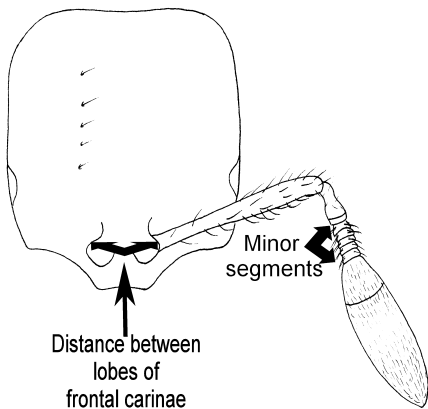


Fig. 274. Head of a worker of *S. abdita*, showing the minor segments of the funiculus.

12(5). Minor segments (Fig. 274) of funiculus (antennal segments between pedicel and club, or antennal segments 3 - 8) longer than the greatest distance between the lobes of the frontal carinae (more than 0.12 mm in length) . **13**

- Minor segments of funiculus about equal to, or shorter than greatest distance between frontal lobes (less than 0.10 mm in length, rarely up to 0.12 mm, see Fig. 275) **18**

13(12). Punctures on head small, not much greater in diameter than hairs arising from them; funicular segments 3 - 8 usually only slightly longer than 0.10 mm; common in New Mexico *molesta* (Say)

- Punctures on head coarse, much larger than diameter of hairs arising from them; funicular segments 3 - 8 usually much longer than 0.10 mm in length; not

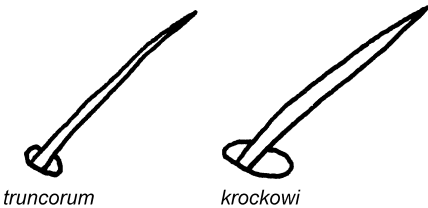


Fig. 275. Cephalic hairs and punctures on the dorsum of the heads of workers of *S. truncorum* and *S. krockowi*. change truncorum to carolinensis

common in New Mexico **14**

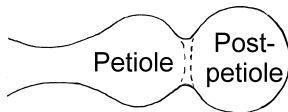


Fig. 278. Petiole and postpetiole of a worker of *S. pergandei*.

14(13). Postpetiole nearly circular as seen from above (Fig. 276); not recorded from New Mexico

..... ***pergandei* xx**

- Postpetiole oval-shaped (Fig.

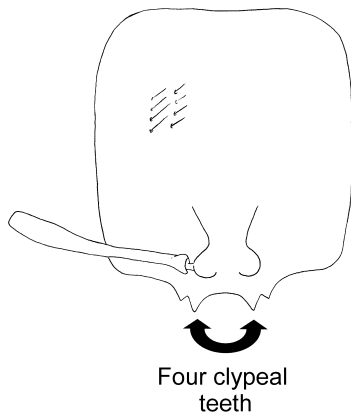


Fig. 276. Head of a worker of *S. krockowi*.

- Posterior tibia with few erect and suberect hairs

16

16(15). Larger ant (total length over mm); 4 well developed teeth along anterior clypeal border ***krockowi* bb**

- Smaller ant (TL under mm); 2 teeth along anterior border of clypeus

bb

18(12). Brown (head, mesosoma and gaster), appendages, especially legs, pale yellow; Florida ***castor* xx**

- Usually concolorous yellow, gaster may be darker, if brown, legs not pale yellow; widely distributed **19**

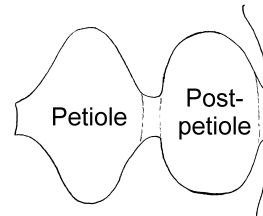


Fig. 277. Petiole and postpetiole of workers of) and *S. pilosula*.

277); occurs in New Mexico

..... **15**

15(14). Posterior tibia with abundant erect and suberect hairs on all surfaces; eastern and central Texas

..... ***pilosula* bb**

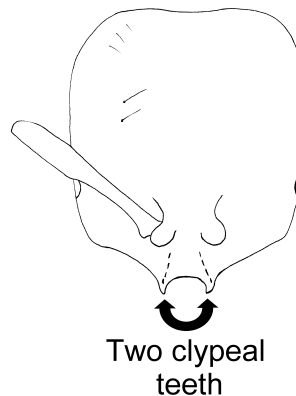


Fig. 279. Head of a worker of *S. salina*.

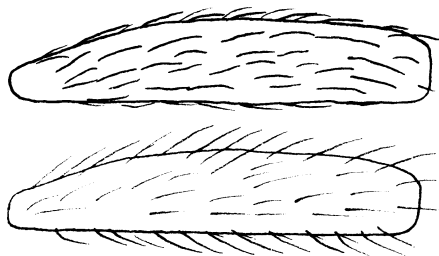


Fig. 280. Posterior tibiae of workers of *S. texana* (top) and *S. carolinensis*.

19(18). Most hairs on posterior tibia appressed; occasionally brown; female with small eye (diameter ~ 0.18 mm)

..... **20**

- Most hairs on posterior tibia suberect or erect (Fig.); usually yellow; female with large eye (diameter ~ 0.25 mm)

..... ***carolinensis* Forel**

20(19). Female yellow; scape of worker relatively long (Scape index [scape length/ head length X 100] ranges from 63 - 66); worker petiole relatively narrow (petiole index [petiole width/postpetiole width X 100] ranges from 76 - 82) widely distributed from Ontario south along New England, west to central Texas, not known from Florida

..... ***texana* Forel**

- Female dark brown; scape of worker relatively short (SI 58); worker petiole relatively broad (PI 88 - 89); Florida

***abdita* Thompson**

, on head small, often visible only under high magnification, and not much larger than the hairs which arise from them (Fig. 269, left); most commonly collected in northern part of state

- Punctures on head small, but distinct, and are clearly greater in diameter than the hairs which arise from them (Fig. 269, right); most commonly collected in southern part of state

6(5). Color clear golden yellow or light brownish yellow

..... ***molesta* (Say)**

- Color medium brown to deep castaneous brown . ***truncorum* Forel**

7(5). Postpetiole oval shaped as seen from above, slightly wider than long; usually medium yellow ants

..... **8**

- Postpetiole nearly circular as

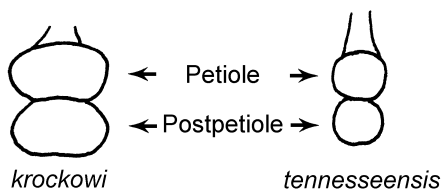


Fig. 281. Petioles and postpetioles of workers of *S. krockowi* and *S. tennesseensis* as seen from above.

seen from above, about as wide as

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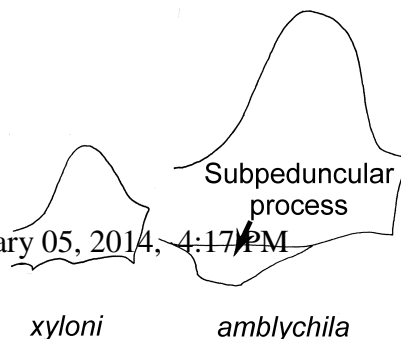


Fig. 282. Petioles of a minor of *S. xyloni* showing a poorly developed subpeduncular process and of a major of *S. amblychila* with a well developed subpeduncular process.

long; usually pale yellow ants (yellow to milky-white) 9

8(7) Smaller ants, total length about 1.8 - 2.0 mm total length; anterior peduncle of petiole occasionally with prominent, sharp ventral tooth;

rarely collected

..... **salina** Wheeler

- Larger ants, total length about 2.2 - 2.5 mm total length;

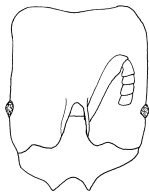


Fig. 284. Head of a worker of *S. tennesseensis*.

anterior peduncle of petiole often with a blunt ventral tooth; commonly collected

..... **krockowi** Wheeler

9(7). Head elongate (Fig. 272), scape failing to reach occipital corners by about 3 lengths of first funicular segment

..... **tennesseensis** M. Smith

- Head nearly square in shape, scape failing to reach occipital corner by about length of first funicular segment (Fig.)

..... **pergandei** Forel

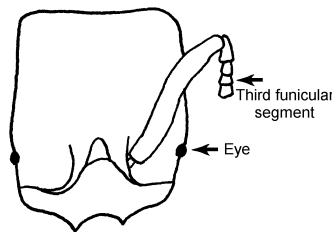
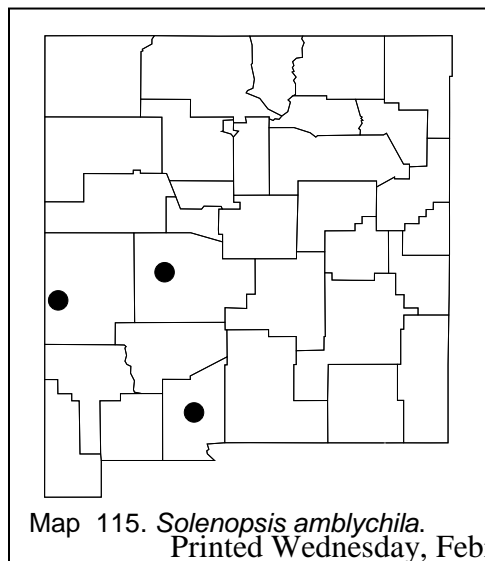


Fig. 283. Head of a worker of *S. pergandei*.

***Solenopsis amblychila* Wheeler**



Map 115. *Solenopsis amblychila*.

Discussion. This species is not common in New Mexico. The largest workers are easily recognized due to the lack of teeth on the anterior border of the clypeus. Intermediate sized and minor workers are difficult to separate from other species, especially from the common *S. xyloni*. They are usually lighter in color and the gaster is mostly light brown, whereas the gaster of *S. xyloni* is usually partially or

completely black. The majors of *S. aurea* have lateral teeth on the clypeus, which separates them from this species. The smaller workers appear to be indistinguishable from *S. aurea*.

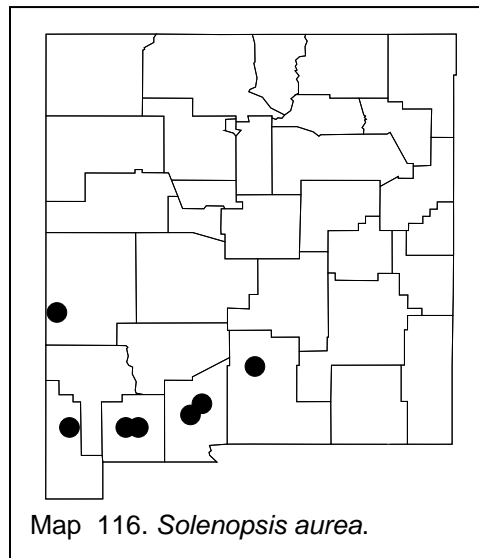
Distribution. USA: southern AZ (Cochise Co.), western TX, NM: **Catron Co.**, 21 k N Glenwood, **Socorro Co.**, 17 k S Magdalena, Trager (1991) lists the Doña Ana Mts.; MEXICO: northern States.

Habitat. These ants are usually found in well-watered lawns in urban habitats, or in riparian areas in arid regions, although they may be found in dry habitats. They are found at higher elevations (1,500 - 2,500 m) than *S. aurea*.

Biology. This species nests in the soil, often under stones or wood. Reproductives were collected in a nest in April. This species nests together with *Camponotus festinatus*.

***Solenopsis aurea* Wheeler**

Discussion. This species is not as common as is *S. xyloni*, and is usually lighter in color with a light colored gaster, often with brown patches. The eyes are smaller (about 50 ommatidia in the major, 20 in the minor), being separated from the insertion of the mandibles by about twice the maximum diameter of the eyes. The majors have lateral teeth on the clypeus, which separates this species from *S. amblychila*. The minors are impossible to separate reliably from minors of *S. amblychila*.



Map 116. *Solenopsis aurea*.

Distribution. USA: CA east to TX; NM: **Catron Co.**, 21 k N Glenwood, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi E Las Cruces, **Hidalgo Co.**, Lordsburg, **Luna Co.**, Deming, 5 mi W Deming, **Otero Co.**, Alamogordo; MEXICO: Chihuahua, Durango, Jalisco, Nuevo León, Zacatecas.

Habitat. Chihuahuan Desert in a variety of habitats (black grama grassland, creosote bush scrub, mesquite and thorn scrub), as well as in urban habitats.

Biology. Colonies are often found under stones (or other objects, such as pieces of wood or cow manure) in loam or coarse gravelly soils. Nests may be in the soil, surrounded by a small mound. Dealate females were collected in July and August.

Wheeler, 1908, Rojas-Fernández and Fragoso, 1994, 2000

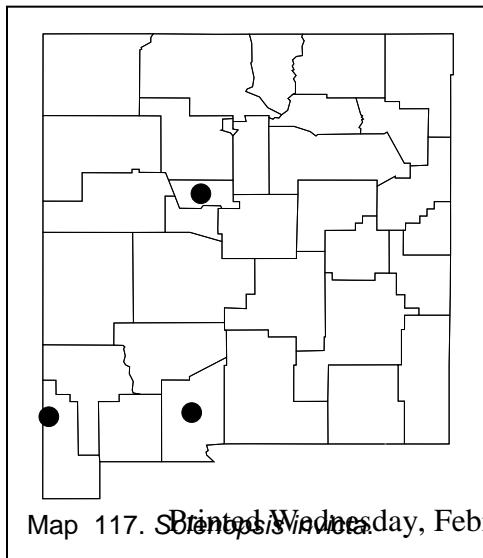
***Solenopsis invicta* Buren**

Discussion. This species, the introduced (from South America) red imported fire ant, is found only in watered lawns in cities at the present time, but may be able to exist in mesic habitats throughout the state. The distribution of this species is rapidly expanding, and is being found in areas where its presence was not predicted. It can nearly always be recognized by the presence of a third tooth (usually on right side of middle of clypeus) between the 2 lateral clypeal teeth (Fig.). Occasionally there are a total of 4 teeth along the anterior border of the clypeus. This character allows the recognition of workers of all sizes, as well as the females, as the workers and females of all of the other species in the state have a maximum of 2 teeth. The striated mesopleuron and the small subpetiolar process will serve to confirm the identification. It is difficult to separate this species from *S. xyloni* in the field, but it is notably more aggressive, attacking in large numbers. Small, white, pustules form at the site of the sting, after about 1 day. These pustules do not form after stings of the other species of fire ants in New Mexico.

Distribution. USA:

Throughout southeastern United States as far north as VA, west to NM; southern CA; NM: **Bernalillo Co.**, Albuquerque, **Doña Ana Co.**, Las Cruces, **Hidalgo Co.**, Steins (eradicated).

Habitat. Restricted to more mesic areas, when in forested area, in clearings. Presently only be found in urban habitats in New Mexico.



Map 117. *Solenopsis invicta*. Printed Wednesday, February 05, 2014, 4:17 PM

Biology. This is probably the most aggressive ant species in the United States. It has a very painful sting and easily eliminates most other ant species as well as other insects, birds and small mammals. Although it is well established in New Mexico, it will probably never be an outstanding pest and its distribution will be limited to urban environments. It undoubtedly occurs in other areas in New Mexico. The colony at Steins was the result of the dumping of soil and the species would not have been able to establish there.

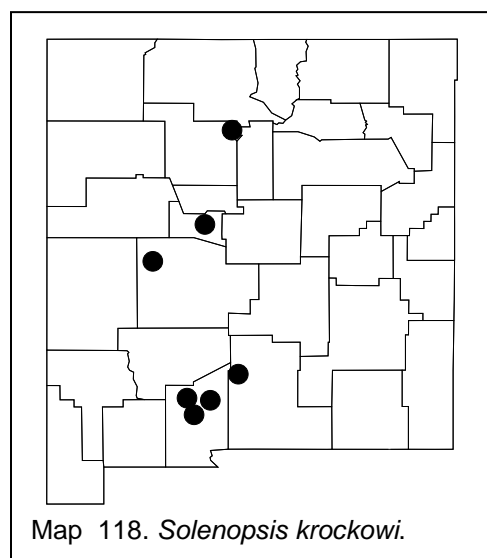
***Solenopsis krockowi* Wheeler**

Discussion. This is a member of the thief ant group, and due to their small size, they are difficult to identify. This seems to be the most common species in arid habitats in New Mexico. The punctures on the dorsum of the head are much larger in diameter than the hairs arising from them. The postpetiole is oval in shape, wider than long (Fig.). It is

difficult to separate from *S. salina*, but is slightly larger (2.25 - 2.5 mm total length).

Distribution. USA: TX, NM: **Doña Ana Co.**, Las Cruces, 15 mi N Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Los Alamos Co.**, Rio Grande, **Otero Co.**, Sacramento Mts. (Box Canyon, type locality), White Sands National Monument, **Socorro Co.**, Magdalena Mts. (17 k S Magdalena, **Valencia Co.**, Belém.

Habitat. Chihuahuan Desert scrub, Riparian, juniper,



Map 118. *Solenopsis krockowi*.

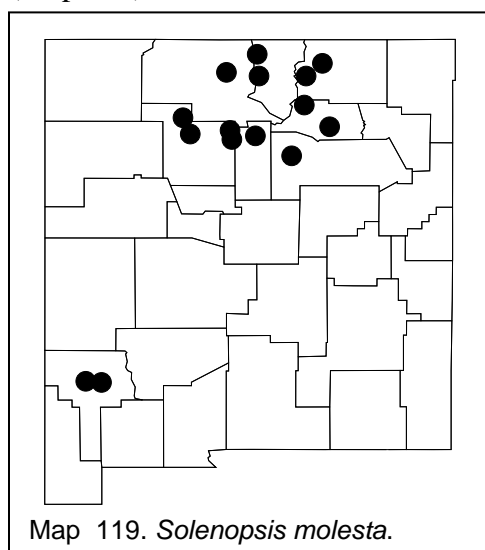
sagebrush, urban habitats.

Biology. *Solenopsis krockowi* nests under stones, or simply in the soil with no external evidence of the nest. This species is predominantly subterranean. Sexuials were found in nests in July and August. Foragers can be captured with subterranean traps in southern NM.

***Solenopsis molesta* (Say)**

Discussion. This is another member of the “thief ant” group. Due to their small size, they are very difficult to distinguish from other species in the group. This is the most common small species in the genus, at least in northern New Mexico. It is usually a clear yellow ant that can be separated from the similar, brown *S. truncorum*. The punctures on the dorsum of the head are small, only slightly larger in diameter than the hairs that arise from them (see Fig).

Distribution. CANADA: Ontario; USA: most of continental United States; NM: **Colfax Co.**, 41 k E Eagle Nest, 16 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.** Los Alamos, 4 k N Los Alamos, 8 k N Los Alamos, Rio Grande, Mortandad Canyon, **Mora Co.**, Coyote Creek State Park, 2 k E Wagon Mound, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 4 k W Cuba, **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Santa Fe, **Taos Co.**, 14 k SE Tres Piedras, 6 k SW Tres Piedras (Map 118).



Map 119. *Solenopsis molesta*.

Habitat. Found in a number of habitats, except for dryer sites, riparian; pinyon-juniper; pinyon pine-riparian; ponderosa pine, oak woodlands, meadows, sagebrush; disturbed areas, and even into semi dry habitats.

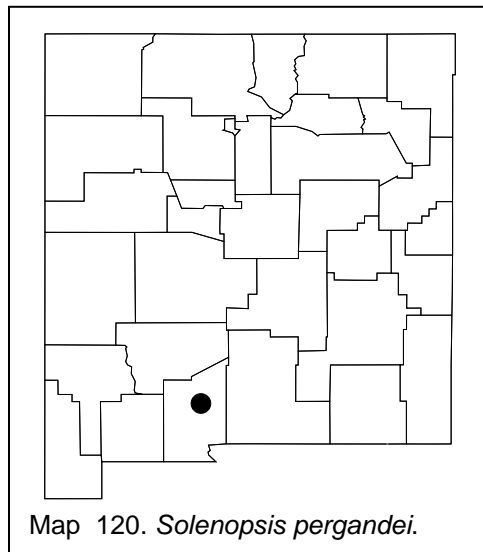
Biology. This is a common, widely distributed species. Nests are in the soil (often under stones) and often adjacent to the nests of other species. Reproductives and brood are present throughout the summer. This is also a house-infesting ant. Nests in soil and

under stones, often live in nests of other ant species, where it steals food or brood from its host. This is also a household pest, although it may not be noticed due to its small size. It hollows out seeds, thus destroying seed in beds. Colonies contain up to a few thousand workers. Sexualls are found in nests from July to October. Nuptial flights occur from late July to early fall, individuals mate in the air. These ants are predaceous, but are also omnivorous (feeding on seeds) and eat dead insects. They also tend

Homoptera. It has been collected in the nests of *Myrmica americana*, *Manica invidia*, *Pogonomyrmex occidentalis*, *P. montanus*, *Messor lobognathus*, *Monomorium minimum*, *Pheidole bicarinata*, *P. pilifera*, *Dorymyrmex insanus*, *Camponotus vicinus*, *Lasius crypticus*, *L. neoniger*, *L. sitiens*, *L. umbratus*, *Acanthomyops claviger*, *A. interjectus*, *A. murphyi*, *Formica argentea*, *F. neogagates*, *F. limata*, *F. rubicunda*, *F. bradleyi*, *F. altipetens*, and *F. fusca*.

Wheeler and Wheeler, 1963, 1973, Gregg, 1963, Ayre, 1963, Mallis, 1941, Grundmann and Peterson, 1953, Smith 1965

***Solenopsis pergandei* Forel**



Discussion. This species is rarely collected in New Mexico. It is a small, pale yellow species, in which the scape nearly reaches the occipital corner. The punctures on the dorsum of the head are especially large and coarse. The postpetiole is nearly circular in shape. These 3 characteristics should separate this species from the others in the genus.

Distribution. USA: eastern United States; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site).

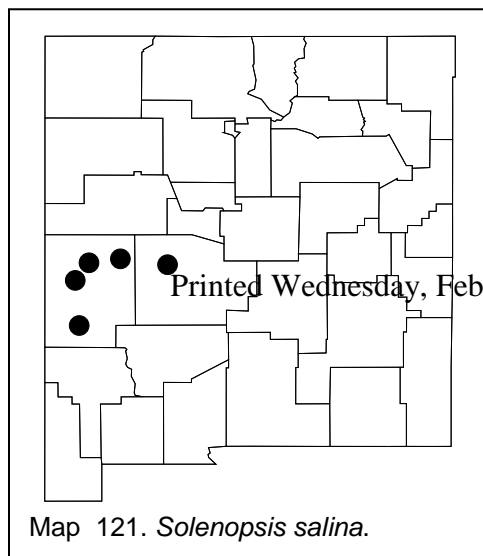
Habitat. Chihuahuan

Desert (in New Mexico).

Biology. This species nests in soil.

Smith, 1931, 1944

***Solenopsis salina* Wheeler**



Discussion. This species is difficult to distinguish from *S. krockowi*, which the most abundant of the small species found in arid regions. It is slightly smaller than *S. krockowi* (1.8 - 2.0 mm total

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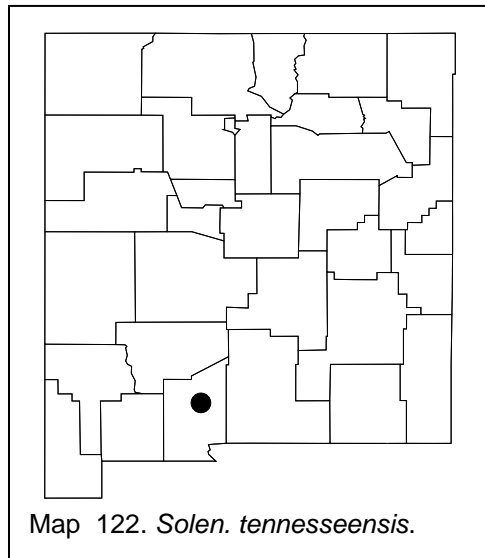
length), the form of the subpeduncular process is not a reliable character. This species is apparently rare in New Mexico and occurs predominately in more mesic sites than does *S. krockowi*.

Distribution. USA: CA east to TX; NM: **Catron Co.**, 37 k N Apache Creek, 15 k NW Datil, Mogollon Mts (near Snow Lake), Ox Spring Canyon, **Socorro Co.**, Magdalena Mts. (17 k S Magdalena); MEXICO: Chihuahua.

Habitat. Number of habitats, but usually in more mesic sites. Gregg (1963) records this species from several communities in Colorado, but at least some of these could be *S. krockowi*.

Biology. This species nests under stones and logs, often near other ant species. Reproductives were found in nests in July and August.

***Solenopsis tennesseensis* M. Smith**



Map 122. *Solen. tennesseensis*.

Discussion. This species is rarely collected in New Mexico. It can be recognized by the elongate head, in which the scape falls far short of reaching the occipital corner (Fig.). The punctures on the head are coarse, and the postpetiole is circular in shape. This species was previously known as *Solenopsis longiceps* Smith.

Distribution. USA: CA east to MS, north to KS; NM: **Doña Ana Co.**, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site).

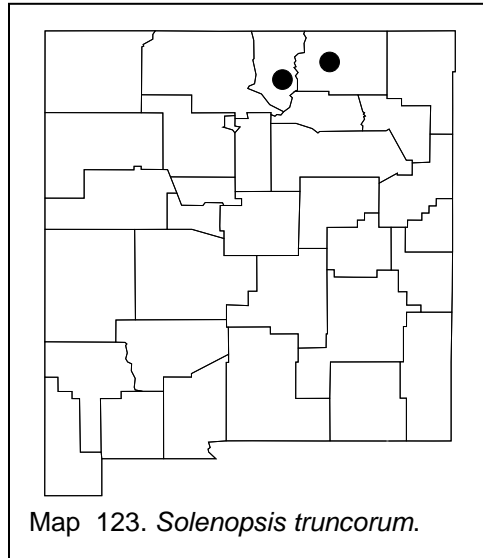
Habitat. Found in a variety of habitats, including creosote bush scrub in New Mexico.

Biology. These ants are almost entirely subterranean, and can usually be collected only with subterranean baits. Occasionally they are found in extractions of leaf litter.

***Solenopsis truncorum* Forel**

Discussion. This is the only monomorphic, small, brown (caution: may be pale brown with darker brown gaster) *Solenopsis* in the state. The

punctures on the head are fine, like those of *S. molesta*, but *S. molesta* are always yellow with a predominantly yellow gaster. It tends to be a little larger than most of the other species of "thief ants" (usually over 2 mm total length).



Map 123. *Solenopsis truncorum*.

Distribution. USA: AZ east to FL, north to NC; NM: Colfax Co., 16 k E Eagle Nest, Taos Co., 20 k S Taos.

Habitat. Most common in mesic forests (ponderosa pine, spruce), although may occur in semi arid habitats. Gregg (1963) lists a number of habitats, including mixed montane forests, aspen, ponderosa pine, pine-oak woodland, and even greasewood desert.

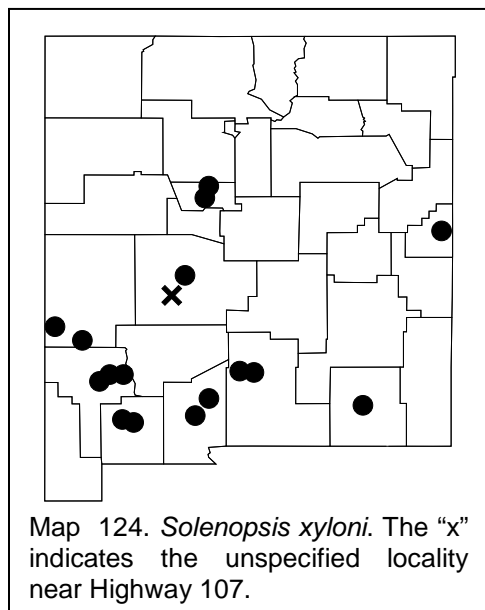
Biology. This ant nests under stones near other ant species (*Camponotus*, *Lasius*).

Reproductives and brood were found in nests in August and September.

Gregg 1963

***Solenopsis xyloni* McCook**

Discussion. These ants are often concolorous dark in color, although they are also bicolored with a red head and mesosoma, black gaster. The gaster rarely has any light brown areas. This is the most commonly collected species in New Mexico. The lighter colored ants may come from polygynous nests, the darker ants from monogynous nests, as occurs in *Solenopsis invicta* and *S. geminata*. This species can be usually separated from the lighter *S. amblychila* and *S. aurea* on the basis of the darker color. It is difficult to separate this species from *S. invicta* in the field. They are aggressive, but notably less aggressive than *S. invicta*, attacking in lower numbers. Pustules do not appear at the site of the sting, as occurs with *S. invicta*. It is necessary to carefully examine the clypeus with a microscope to separate this species from *S. invicta*. *Solenopsis geminata maniosa* Wheeler is considered to be a synonym.



Distribution. USA: CA east to FL north to NC; **NM:** **Bernalillo Co.**, Albuquerque, Taylor Ranch, **Catron Co.**, 21 k N Glenwood, Mogollon Mts., **Doña Ana Co.**, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), **Eddy Co.**, Carlsbad Caverns, **Grant Co.**, Leopold Vista, 60 k E Silver City, Whitewater, **Luna Co.**, Deming, 18 k NW Deming, **Otero Co.**, Lake Lucero, White Sands National Monument, **Socorro Co.**, 8 mi from Highway 107, Highway 1 near I10 [near Socorro]; **MEXICO:** Chihuahua, Sinaloa,

Coahuila, Nuevo León.

Habitat. Chihuahuan Desert, from grasslands and cottonwood forests.

Biology. This species nests in open areas in soil or under stones, it may build unsightly nests of loose soil on lawns. Reproductives are found in the nest throughout the year, nuptial flights occur from May through September. Flights occur in the afternoon and are usually announced by large numbers of very aggressive ants milling around the nest entrance. These ants are aggressive with a painful sting, although not nearly as aggressive as the introduced red fire ant, *S. invicta*. They derive the name "native fire ant" from their sting. It causes considerable damage to seed banks, kills newly hatched birds, girdles agricultural plants, attacks agricultural products, attacks electrical equipment, and is a serious, stinging kitchen pest.

Mallis, 1938, Gregg, 1963, Wheeler and Wheeler, 1973, Mackay and Vinson,

Genus *Stenamma*

(Key: Smith, 1957)

This genus is a rarely collected in the southwest, and nests under stones or logs. Little is known of the genus, but it is usually considered to be carnivorous.

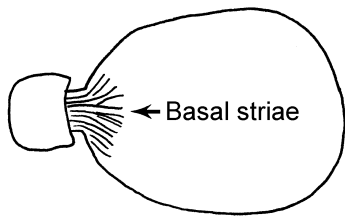


Fig. 285. Postpetiole and first gastral tergum of a worker of *S. occidentale*, showing the basal striae.

These ants are difficult to separate from the other genera. Important morphological characteristics would include: antenna 12 segmented, not reaching posterior corner of head; eyes usually small or vestigial; clypeus with a pair of longitudinal carinae; promesonotum somewhat convex, without distinct suture between the two; mesopropodeal region constricted and lower that

the promesonotum. This genus may be confused with *Aphaenogaster*, but the mesosoma is more robust (Fig.), the eyes are smaller (compare Figures) and the scapes extend past the occipital corner in *Aphaenogaster*. It is more likely to be confused with *Leptothorax*, from which it can be distinguished by the 12-segmented antenna (11 segments in some of the *Leptothorax* spp.), and by the relatively smaller eye (larger eye in most *Leptothorax* species). The species are difficult to identify, see Smith (1957) and Snelling (1973) for keys. The following key is greatly simplified, but will hopefully allow the identification of the species that will occur in New Mexico.

Key to the workers of the genus *Stenamma*

1. Lower mesopleuron predominantly rugose (Fig.) *diecki*
Emery
- Lower mesopleuron predominantly punctate (Fig.)
..... **2**

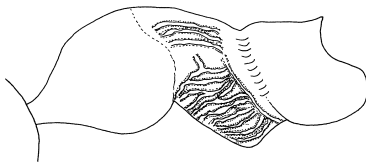


Fig. 286. Mesosoma of a worker of *S. diecki*, showing the rugose lower mesopleuron. The sculpture is shown only on the middle of the mesosoma.

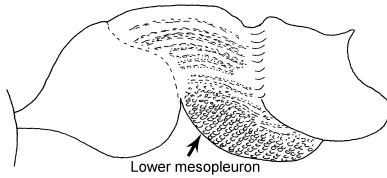


Fig. 287. Mesosoma of a worker of *S. chiricahua*, showing the predominantly punctate lower mesopleuron. The sculpture is shown only on the middle of the mesosoma.

2(1). Anterior border of clypeus notched or indented (Fig. caution: difficult to see if mandibles are closed); mesopleuron punctate or rugulose; pronotal sides either conspicuously punctate or rugulose or both; first gastral tergite conspicuously striate at base (Fig.) or not; larger species (total length 2.5 - 4 mm) ***snellingi* Bolton**

- Anterior border of clypeus without notch, possibly somewhat concave (Fig.); mesopleuron densely punctate and sides of pronotum smooth and with reduced sculpture on lower half at least; smaller species (usually less than 2.6 mm) **3**

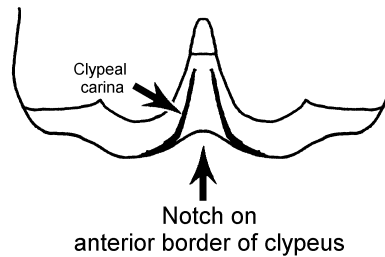


Fig. 288. Anterior border of the clypeus of a worker of *S. occidentale* showing the indented or notched clypeus.

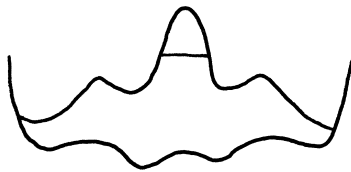


Fig. 289. Clypeus of a worker of *S. huachucanum*.

3(2). Clypeal carinae absent or poorly developed (Fig.); first tergite without basal striae

***huachucanum* Smith**

- Clypeal carinae well developed (Fig.); first tergite with basal striae (Fig.)

..... ***chiricahua* Snelling**

***Stenamma chiricahua* Snelling**

Discussion. Workers of this species have well developed carinae on the clypeus, but the region between the carinae on the anterior border

of the clypeus is at most only weakly concave, thus separating it from *S. occidentale*, in which the clypeal carinae are similar. The predominantly punctate lower mesopleuron will separate it from *S. diecki*, in which the clypeal carinae are similar. Finally, it is easily separated from *S. huachucanum*, in which the carinae are poorly developed.

Distribution. USA: Southern AZ (Chiricahua Mts.), may occur in southwestern NM.

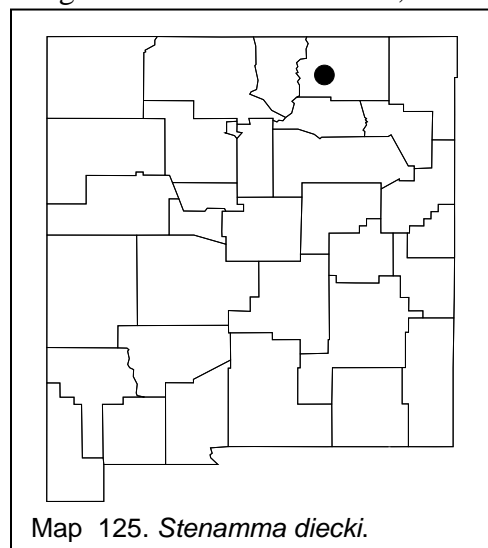
Habitat. Riparian, found in a shaded creek bed, also found in pine-Douglas fir-oak forest in shady areas.

Biology. This species nests in the soil under stones.

***Stenamma diecki* Emery**

Discussion. The predominantly rugose lower mesopleuron will separate this species from all of the others in New Mexico. Snelling (1973) lists several differences between this species and the closely related *S. occidentale*. Most of the mesosoma is covered with rugae, with the intrarugal spaces mostly smooth and shining. The propodeal spines are poorly developed.

Distribution. USA: This is the most widely distributed species of the genus in the United States, known to occur in all western states except AZ (Snelling, 1973), south into Mexico (Baja California); NM: **Colfax Co.**, near Eagle Nest.



Map 125. *Stenamma diecki*.

Habitat. This species is highly adaptable to various ecological habitats ranging from open areas to dense forests or swamps to semiarid habitats. It is found from low to moderate elevations up to about 2500 meters.

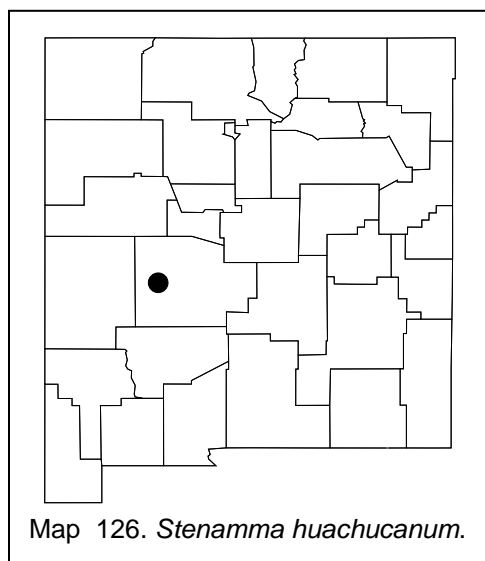
Biology. This species nests in the soil and in rotting wood, usually under stones or other objects, and have a depth of about 30 cms, with few chambers. Nests

are apparently monogynous with less than 200 individuals. Sexu- als are found in nests from midsummer to early fall, with flights occurring in from spring to fall. Sexu- als may overwinter in the nests. Workers are timid

and feign death when the nest is disturbed. They eat collembolans, thysanurans and fly larvae.

Smith, 1957

***Stenamma huachucanum* M. Smith**



Discussion. This species is easily separated from all of the other species in New Mexico by the poorly developed clypeal carinae. Much of the mesosoma is punctate, the remainder mostly covered with poorly developed to moderately developed rugae. Part of the side of the pronotum is smooth and shiny (usually the lower $\frac{1}{3}$).

Distribution. USA: AZ (Huachuca Mts. [head of Carr Canyon, summit of Montezuma Pass] and Santa Catalina Mts., Springerville, Chiricahua Mts.),

CO, Blue Creek Canyon (Gunnison Co.); NM: Socorro Co., Grassy Lookout (33°47'13.3"N 107°28'18.6") (first record from NM).

Habitat. Mixed canyon forest, open grassy areas in pine forests, 1200 - 3000 meters in elevation.

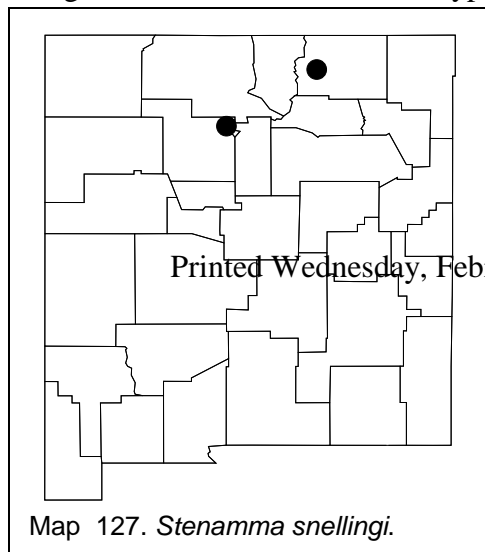
Biology. This species nests under stones in harsh, stony soil. Nests contain fewer than 200 workers.

Gregg, 1963, Creighton, 1952

***Stenamma snellingi* Bolton**

Discussion. This species is slightly larger than the other 3 species that occur in New Mexico. The indentation between the clypeal carinae along the anterior border of the clypeus easily separates this species from

the others. If the mandibles are closed, the indentation is difficult or impossible to see. It will be necessary to find a worker with the mandibles partially open, or pry



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the mandibles open to check the identification. This species was previously referred to as *S. occidentale*.

Distribution. USA: Western North America; NM: Colfax Co., 16 k E Eagle Nest, Los Alamos Co., Mortandad Canyon

Habitat. Ponderosa pine-riparian, oak woodland, birch forest at altitudes ranging from 200 - 2700 meters.

Biology. This species nests in soil under stones. We could find only 37 workers in 1 nest, and apparently captured the majority of the inhabitants. They are slow and docile. Sexuals are found in the nests in August to October and flights occur in September. Reproductives probably overwinter in nests.

Smith, 1957, Gregg, 1963

Genus *Strumigenys*

(Key: Brown,)

Ants of this genus are easily recognized due to the elongate mandibles each with three apical teeth. The antennae have 6 segments with a very long apical segment (Fig.). The propodeum has a pair of spines with a lamella beneath each. Postpetiole with spongiform processes on the ventral and posterior borders. These ants are superficially similar to *Odontomachus* as the mandibles of both are elongate with teeth at the apex, but can be easily distinguished as they are in different subfamilies and the antenna of *Strumigenys* has only 6 segments.

This is a large genus of ants that are very difficult to identify. They are also a special treat for myrmecologist as they are very unusual in habitus, especially in the greatly elongate mandibles and the strangely shaped hairs. The elongate mandibles distinguish them from all other genera in New Mexico, except for *Odontomachus*, which is in the subfamily Ponerinae, and does not have the postpetiole separated from the gaster.

***Strumigenys louisianae* Roger**

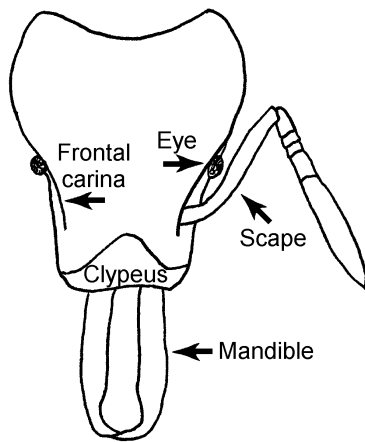


Fig. 290. Head of a worker of *S. louisianae*.

Discussion. This species could not be confused with most other genera, simply by the elongate form of the mandibles (Fig.). These mandibles are superficially similar to the mandibles of *Odontomachus*, which is in another subfamily (Ponerinae). The 2 genera are easily separated, as *Strumigenys* has a well-defined

postpetiole, *Odontomachus* does not. Additionally, the head of *Strumigenys* has several hairs, with the ends greatly thickened (Fig.), *Odontomachus* does not have these specialized hairs.

Distribution. USA: Eastern United States south to ARGENTINA, AZ; NM: This species has not been reported from New Mexico, but may occur within the state.

Habitat. Mesic sites, such as tropical forests.

Biology. The small colonies are found under stones. These ants are specialized to feed on collembolans.

Smith, 1931, Creighton, 1937, Dennis, 1938, Wilson 1950, 1953, Kempf 1958.

Genus *Tetramorium*

(Key:

Most New Mexican species of this genus have an 11-segmented antennae and the head is marked by a distinct carina, which is parallel to the scape. The posterior border of the clypeus forms a distinct ridge or welt in front of the insertions of the antennal scape. This character is difficult to describe, but once it is noted, it will serve to easily distinguish this genus from all others (except *Myrmica rugiventris*). The propodeum has well-developed spines. The petiole has a short peduncle and a high node (Fig.).

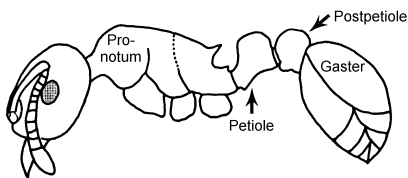


Fig. 291. Side view of a worker of *T. spinosum*.

This is a rarely collected genus, which is usually found in hot, dry habitats, especially foothills and areas of rough terrain. Nests are found in the soil or under

stones. They are probably predaceous.

Key to the workers of the genus *Tetramorium* **(modified from Bolton, 1979)**

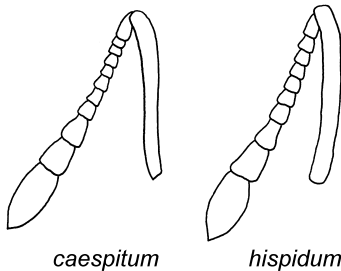


Fig. 292. Antennae of workers of *T. caespitum* and *T. hispidum*.

1. Antenna with 11 segments;
desert and urban habitats
..... **2**

- Antenna with 12 segments;
found only in cities (presently only
Albuquerque) ***caespitum***
(Linnaeus)

2(1). Erect hairs on pronotal
dorsum and upper frontal carina
short and straight, usually stubble
like, shorter than maximum

diameter of eye; eyes relatively large, maximum diameter at least 0.26 X
head width ***hispidum* (Wheeler)**

- Erect hairs on pronotal

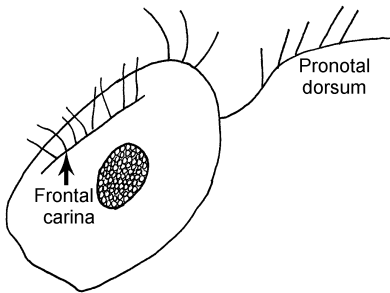


Fig. 294. Side of the head and
pronotum of a worker of *T. hispidum*.

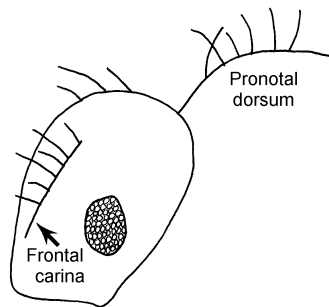


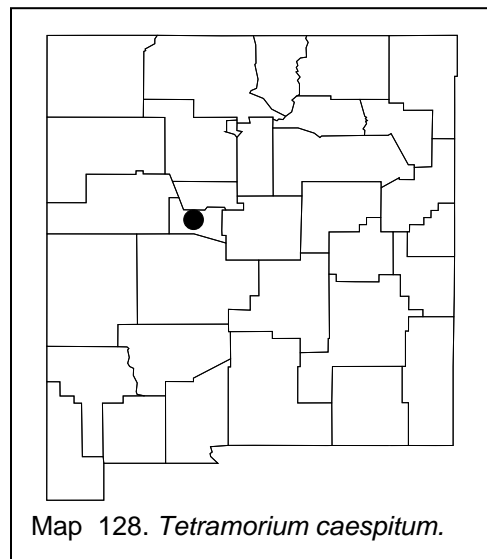
Fig. 293. Head and pronotum of a
worker of *T. spinosum*.

dorsum and upper frontal carina
long, fine, often curved, many longer than maximum diameter of eye; eye
relatively small, maximum diameter at most 0.25 X HW
***spinosum* (Pergande)**

***Tetramorium caespitum* (Linnaeus)**

Discussion. This species is easily separated from the other 2 species that may occur in New Mexico by the 12-segmented antenna. Additionally, the propodeal spines are poorly developed and the mesopleuron is covered with punctae. The spines are well developed in the other 2 species and the mesopleura are covered with rugae. This species would probably only be found in mesic sites within cities, whereas the other species occur primarily in arid habitats.

Distribution. USA: Throughout much of United States, Europe, sporadic records from Mexico, Belize and Chile; NM: **Bernalillo Co.**, Albuquerque.



Map 128. *Tetramorium caespitum*.

Habitat. In New Mexico, this species would probably only be found in houses and other well-protected sites.

Biology. This is a common house-infesting ant throughout much of the United States. It is especially abundant along the Atlantic coast, but occurs sporadically in other areas. They attack a number of foodstuffs and are an intermediate host of tapeworms (poultry). Nests are found under stones or logs in mesic habitats. This species is found throughout the world and was

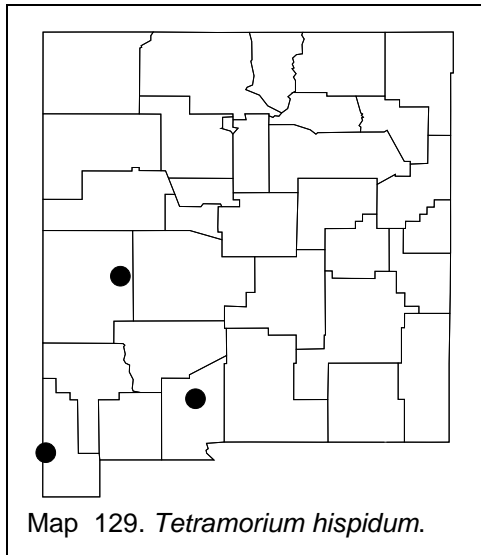
probably introduced into the New World.

Mallis, 1941, Brown, 1964, 1957, Smith, 1965, Lange, 1961, Weber 1965, Brian et al., 1967, Bruder and Gupta 1972, Gurney 1975

***Tetramorium hispidum* (Wheeler)**

Discussion. This species is difficult to separate from *T. spinosum*. The larger eye and the shorter, stubble-like hairs on the frontal carina and pronotum, appear to reliably separate this species from *T. spinosum*. It is easily separated from *T. caespitum* (see *T. caespitum* discussion).

Distribution. USA: Southern Arizona, western Texas; NM: **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site),



Hidalgo Co., Rodeo, Socorro Co.,
49 k SE Datil (first records from
NM check??).

Habitat. Desert scrub (fluff
grass communities, creosotebush
scrub).

Biology. This ant nests in
soil with small mounds
surrounding the nest entrance.

***Tetramorium spinosum* (Pergande)**

Discussion. Not commonly
collected, but more common than
T. hispidus. This species is difficult

to separate from *T. hispidum*. The smaller eye and the longer, curved hairs
on the frontal carina and pronotum, appear to reliably separate this species
from *T. hispidum*. It is easily separated from *T. caespitum* (see *T.*
caespitum discussion). There is considerable variation in the amount of
sculpturing on the dorsum of the gaster and the length of the propodeal
spines, as well as in other characters (Bolton, 1979).

Distribution. USA: southern AZ, TX; NM: We have no records
from NM; MEXICO: Throughout the northern half of the country.

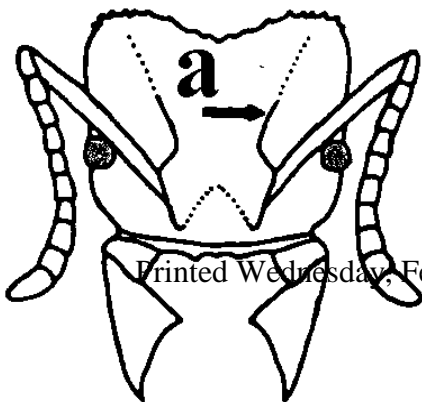
Habitat. Creosotebush scrub, arroyos, arid grassy sites.

Biology. This species nests in the soil, with the entrance
surrounded by a small mound, or under stones. It feeds on seeds and dead
insects.

Rojas-Fernández and Fragoso, 1994, 2000

Genus *Trachymyrmex*

Key: Creighton, 1950)



This is a large genus of
primarily South American ants,
which are nearly impossible to
identify due to the lack of keys. Dr.
Brandão of Brasil is working on a
revision at the present time.

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Fig. 295. Head of a worker of *T.*
smithi neomexicanus.

Fortunately only a few species occur in North America, which can be identified using Creighton (1950). Our species are in need of revision due to possible undescribed species and a few questionable subspecies.

It can be distinguished from all other genera in New Mexico due to the numerous spines on the head and mesosoma, and by the tubercles on the gaster. The antenna consists of 11 segments without a well-defined club, and with the insertion covered by a lobe of the frontal carina. The frontal carinae extend to the posterior border of the head (Fig.). A carina near the inner border of the eye extends either posteriorly (Fig.) or posteromesially (Fig.). The petiole, postpetiole and gaster are covered with tubercles, each with a short, stout curved hair. The body is often covered with a substance, which gives the ant a gray color. It can be distinguished from *Acromyrmex* as it is not polymorphic. Characteristics in the introduction of *Cyphomyrmex* will distinguish the latter genus from *Trachymyrmex*.

Key to the workers of the genus *Trachymyrmex*

1. Posterior corners of head each with cluster of rather slender tubercles with blunt tips and all about same length; largest may be bidentate, but not much larger than others; ferrugineous red, sometimes with grayish cast..... *arizonensis* (Wheeler)

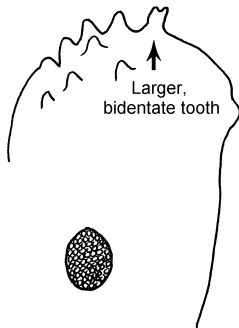


Fig. 297. Posterior corner of the head of a worker of *T. smithi neomexicanus*

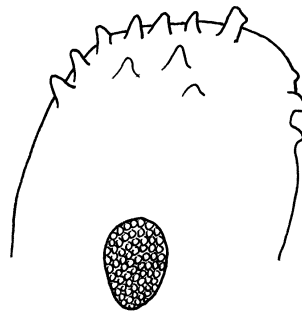


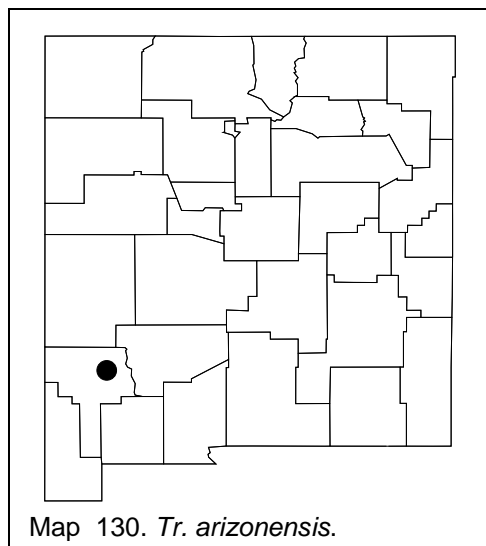
Fig. 296. Posterior corner of the head of a worker of *T. arizonensis*.

- Posterior corners of head each with 1 prominent, usually bidentate tubercle, and several shorter and smaller tubercles which are not bidentate, differences in size of smaller tubercles with larger tubercle notable; black with grayish cast *smithi neomexicanus* Cole

***Trachymyrmex arizonensis* (Wheeler)**

Discussion. This species is difficult to separate from *T. smithi*. The ferrugineous red color will nearly always separate this species from *T. smithi*, which is black. The tubercles on the posterior corners of the head are nearly all the same size, whereas there is 1 larger tubercle on the head of *T. smithi*.

Distribution. USA: AZ: Huachucana Mountains, Chiricahua Mts.; NM: Grant Co., 60 k E Silver City; MEXICO:



Chihuahua.

Habitat. Rocky desert canyons, pinyon-juniper, grasslands.

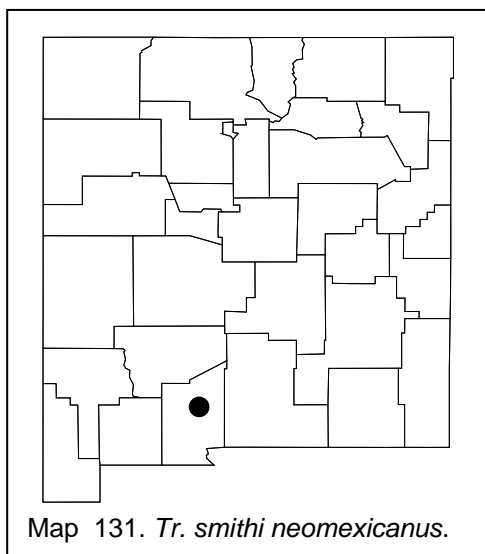
Biology. These ants nest under stones in sites with rocky loam. A dealate female was found under a stone in late July. One colony was nesting together with *Camponotus ocreatus*.

Wheeler, 1911, Essig, 1926, Weber, 1972

***Trachymyrmex smithi neomexicanus* Cole**

Discussion. The species from New Mexico is usually referred to as *T. smithi neomexicanus* Cole, and differs from the nominate species as it is covered with dusty, gray wax. This phenomenon commonly occurs in species of the genera *Trachymyrmex* and *Acromyrmex* and should be considered of no taxonomic importance. This is a moderately common species.

Distribution. USA: AZ, TX; NM: Doña Ana Co., 45 k



NE Las Cruces (Long Term Ecological Research site); MEXICO: Chihuahua.

Habitat. Creosotebush scrub, especially in temporarily riparian habitats such as edges of desert playas and bottoms of arroyos. It is often found in sandy soils.

Biology. This species cultivates fungi in their nests, using mesquite (*Prosopis glandulosa*) leaves as a substrate.

Genus *Tranopelta* (No key available)

Tranopelta sp.

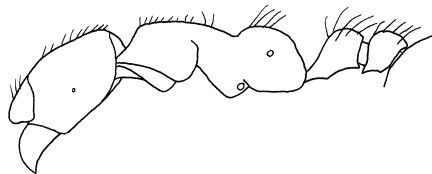


Fig. 298. Side view of the head, mesosoma, petiole and postpetiole of a worker of *Tranopelta* sp.

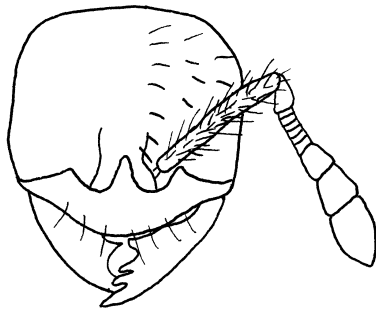


Fig. 299. Head, of a worker of *Tranopelta* sp.

This taxon is represented by an undescribed species (or possibly even an undescribed genus?), which occurs in southern California, southeastern Arizona and southern New Mexico as far north as the center of the state. They are undoubtedly widely distributed across the southwestern United States and into northern México. The worker is a small, pale colored ant, which is superficially similar to those of the thief ants in the genus *Solenopsis*, except that that the antenna has 11 segments (nearly impossible to count the tiny segments), with a 3-segmented club (Fig.). The eyes are tiny (nearly impossible to see, at least in frontal view of the head), and most of the erect hairs are very short (0.01 - 0.02

mm). These characters will separate this genus from *Solenopsis*. They can be separated from the similar sized *Monomorium* by the pale yellow color (*Monomorium* in New Mexico are black) and by the 11-segmented antenna (*Monomorium* has a 12-segmented antenna with a 3-segmented

club). The mandible has 4 teeth, the apical most 3 teeth are similar in size and position, the basal most tooth is offset from the rest and directed medially, not partially anteriorly as are the remainder of the teeth (Fig.). The node of the petiole is thick in profile, not slender as in most of the

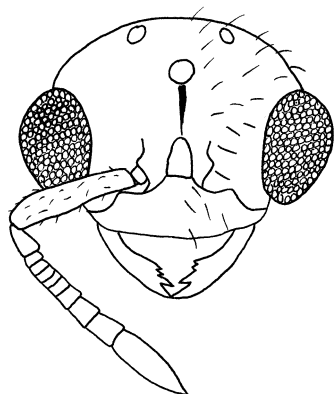


Fig. 300. Head of a male of *Tranopelta* sp. species of *Solenopsis*.

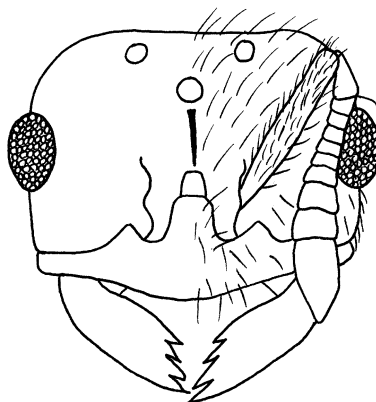


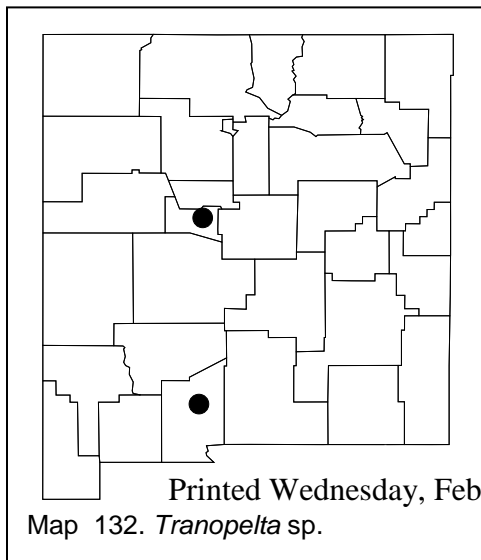
Fig. 301. Head of a female of *Tranopelta* sp.

The females are large and medium brown in color. The basal most tooth of the mandible is not offset to the same degree as it is in the worker. Rarely there is a fifth tooth near the basal margin of the mandible. The head (excluding the mandibles) is wider than long; the antenna is 11-segmented with a 3-segmented club. The club would separate it from members of *Solenopsis* (with a 2-segmented club); the 11-segmented antenna would separate it from *Monomorium* (with a 12-segmented club). The eyes and ocelli are well developed (Fig.).

The males are small, dark specimens, superficially appearing to be those of thief ants. The 11-segmented antenna with a 3-segmented club (not as well defined as in the worker), instantly separate these males from those of *Solenopsis* or *Monomorium*. The first segment of the funiculus is elongate, not rounded as in *Solenopsis* (Fig.).

The generic placement of these specimens presents numerous difficulties. They are not members of the South African genus *Diplomorium* (to which they would key with difficulty in Bolton, 1987), as they differ in several important characters: maxillary palp, labial palp??? the eyes are tiny, the 3-segmented antennal club is well differentiated from the remainder of the funiculus, the metanotal suture is

deeply impressed, and laterally compressed as seen from above, the petiole is bulbous in profile (not nodiform as in *Diplomorium*), the postpetiolar node is smaller than the petiolar node, and the postpetiole is not broadly attached to the gaster. They are likewise apparently not closely related to *Anillomyrma* (but see Hölldobler and Wilson, 1990:65). They are apparently not similar to any other genera, except *Tranopelta*, and by a process of elimination are provisionally placed here. Workers share many characteristics with *Tranopelta*: they lack a medial seta on the anterior border of the clypeus, but have 2 well defined lateral setae, in addition to a few others, the clypeus is convex without lateral carinae, and the 3-segmented antennal club is well defined. The petiole is not nodiform as in *Tranopelta*, and the attachment of the postpetiole to the gaster is more constricted. The eyes are smaller than in other species of *Tranopelta* (which normally have 6 - 18 ommatidia), but one (apparently undescribed) species from Panamá has tiny eyes with about 3 ommatidia. The females are similar to those of *Tranopelta*, in that the head is wide, and the scapes are short. The ocelli are well developed, but are smaller than in the species in *Tranopelta* (in which the diameters are greater than the distance between the ocelli). The petiole is bulbous as in the worker, not as nodiform as in *Tranopelta*. The postpetiole is broadly attached to the gaster, as in *Tranopelta*. The male is similar to those of *Tranopelta*, with slender, 3-toothed mandibles, relatively short scapes, pedicel is elongate, well developed ocelli (but again smaller than those of species in *Tranopelta*, in which the diameter is greater than the distance between the ocelli), 3-segmented antennal club is more developed than in *Tranopelta*, and postpetiole very broadly attached to the gaster. compare wing venation of the sexuals ??? look up Kempf, 1975 Studia Entomol 18:341
 ### NUMBER NOT IN REFMEUU



Distribution. USA: AZ, Cochise Co., Chiricahua Mts.; NM: Doña Ana Co., 45 K NE Las Cruces, Jornada Long Term Ecological Research Site, Socorro Co., Sevilleta National Wildlife Refuge.

Habitat. Creosotebush scrub and mesquite dominant zones, often near desert playas or arroyos, sometimes in open desert

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Map 132. *Tranopelta* sp.

or in bosque meadows. Occasionally they are found in saltflats or in saltbush communities.

Biology. This species nests in the soil, alates are attracted to black lights. Sexualls were found in a nest in August, flights occur in September and October.

SUBFAMILY DOLICHODERINAE

Ants of this subfamily can usually be recognized in the field by a characteristic disagreeable smell, which can be easily noted when holding an individual between the thumb and forefinger. Other characteristics would include a slit shaped terminal orifice at the tip of the gaster, sting absent, a pedicel which consists of a single segment (petiole), the antennal fossa touches the posterior of the clypeus, the antenna has 12 segments, without a club, the body sculpture is weak, the basal border of mandible is often with denticles or teeth and the workers are monomorphic.

Nests are usually in the soil or under stones, pupae are naked (not enclosed in cocoons). These ants feed on nectar, tend Homoptera and feed on dead insects. Nest populations of many species are small (few hundreds of workers), although some of the species have very large nests (*Liometopum*). Many of the species are major house pests.

Genus *Dorymyrmex*

(Key: Snelling, 1995)

Ants of this genus can be easily distinguished from all other genera in New Mexico on the basis of a single character: the propodeum has a pyramid-shaped structure on its dorsum (Fig.). Additional characters would include long hairs on the ventral surface of the head (Fig. , psammophore) apex of mandible with a long, well developed tooth, followed by several smaller teeth, maxillary palp with six segments, the third segment is long, about as long as the fourth, fifth and sixth combined. They also produce a strong aromatic odor when held between the thumb and index finger.

This is a relatively small genus that is greatly in need of revision, even though several have made attempts of the species in the United States (recent attempts include Johnson, 1989, Trager, 1988, Snelling, 1995). It is a minefield, in which the most recent reviewer ridicules the previous reviewers. Cuzzo is currently planning a revision of the South American

species, and may include all of the New World species. There are probably several undescribed species (DuBois and Danoff-Burg 1994). Species in this genus were previously referred to as *Conomyrma* in the United States. Shattuck (1993) has completed a generic revision of the subfamily. Species are very difficult to distinguish. It seems that color works about as well as anything else, interested readers may refer to Creighton (1950) or Johnson (1989) for other characters that may be useful. These ants are very abundant in many areas, especially the desert southwest.

need figures???

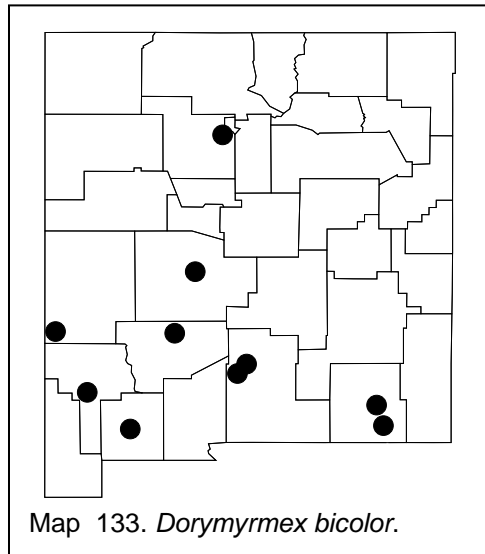
Key to workers of the genus *Dorymyrmex*

1. Color reddish-brown or yellowish brown with a strongly contrasting black gaster; eye relatively large, greatest diameter equal to or less than distance between anterior edge of eye and insertion of mandible (Fig.); margin of vertex usually concave (Fig.) ***bicolor* Wheeler**
 - Essentially concolorous dark brown or pale brown; gaster may be slightly darker; if bicolored, then eye relatively larger, greatest diameter equal to or more than distance to insertion of mandible (Fig.) and margin of vertex usually straight or even convex (Fig.) 2
- 2(1). Color primarily dark brown or black **3**
 - Color of entire ant pale brown or yellow ***flavus* McCook**
- 3(2). Margin of vertex distinctly concave; eye relatively small, distance between eyes at least 1.7 times greatest eye diameter; rare in eastern New Mexico ***smithi* Cole**
 - Margin of vertex straight, convex or only weakly concave; eye larger, distance between eyes less than 1.7 times greatest eye diameter; common throughout New Mexico **4**
- 4(3). Larger ants, total length greater than ?? ; propodeal cone well developed ***insanus* (Buckley)**
 - Smaller ants, total length less than ??; propodeal cone poorly developed ***species*** (minimums of insana?)

Dorymyrmex bicolor Wheeler

Discussion. Many specimens can usually be distinguished from others of the genus by the color pattern, a red head and mesosoma, and a black gaster. Specimens that are yellowish-brown with a black gaster are difficult to identify, and it will be necessary to make measurements, which do not always reliably separate the species. Occasionally specimens are

collected that cannot be separated into species. This species is most easily confused with *C. smithi*, and can apparently be separated only on the basis of color.



Map 133. *Dorymyrmex bicolor*.

Distribution. USA:

Throughout the southwestern United States and northern Mexico; NM: **Bernalillo Co.**, NE Albuquerque ATM, Petraglyph Park ATM, West Mesa ATM, **Catron Co.**, Frisco Hot Springs, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site) ATM, Mesilla Park ATM, **Eddy Co.**, 32°19.7'N 103°46.9'W, 32°22.2'N 103°47.4'W, **Grant Co.**, 14 k NW White Signal, **Luna Co.**, 18.5 k NE Deming, **Otero Co.**, 8 mi NE

Tularosa ATM, White Sands National Monument, Lake Lucero, **Sandoval Co.**, 1 mi S Indian Pueblo, **Sierra Co.**, Elephant Butte ATM, Truth or Consequences, **Socorro Co.**, 28 k N Socorro ATM, without locality ATM; MEXICO: Chihuahua.

Habitat. Occurs in a variety of communities ranging from creosotebush scrub, annual zones, grama grasslands, mesquite forests up to the edges of pine forests at 1900 meters elevation.

Biology. This species typically nests in the soil in open areas. The entrance is surrounded by a small mound (few cms in diameter). It often nests in loose, sandy soil, in sites where few other ants occur. Brood is found in nests in March. Flights occur at night in June and sexuals are attracted to blacklight traps. A loose female was collected at the end of August. This species is primarily carnivorous, feeding on dead insects. They also tend Homoptera.

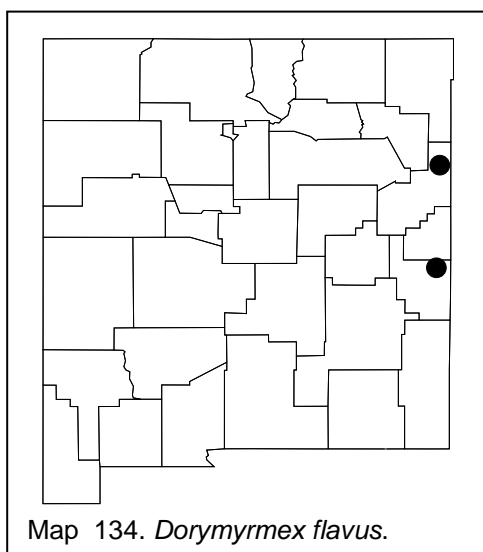
Mallis, 1941, Eckert and Mallis, 1937, Cole, 1966, Wheeler and Wheeler, 1973

***Dorymyrmex flavus* McCook**

Discussion. This species is not common in New Mexico. It is usually a concolorous yellow species; occasionally the gaster is darker

than the remainder of the ant. The head is relatively narrow (width/length > 0.88), and the eyes are large. The mesonotum is usually angulate (Fig.), but in some specimens it is evenly convex (Fig.). This species is difficult to separate from *D. flavopectus* (Smith) of Florida. It differs in minor color variation, being concolorous (one color) and lighter in color than *D. flavopectus* (Johnson, 1989). Snelling (1995) also separates it by having an angulate mesonotum. Color is a notoriously poor character in ants. It will probably be necessary to synonymize *D. flavopectus* or consider the specimens with an angulate mesonotum as being *D. flavus*, and those with an evenly convex mesonotum as being *D. flavopectus*, regardless of the color of the specimen. The former suggestion is probably the most sound, as there is considerable variability in the shape of the outline of the mesosoma, even in specimens from a single nest series. If the latter occurs, *D. flavopectus* will be found to occur at least as far west as central Texas, and may occur in New Mexico.

Distribution. USA: Colorado south to New Mexico, east to Kansas and western Louisiana; **NM: Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site)ATM, **Quay Co.**, 6 mi SW Nara Visa, **Roosevelt Co.**, 1 k E Oasis State Park.



Map 134. *Dorymyrmex flavus*.

Habitat. Although this species is not common in New Mexico, it can be found in a number of arid sites in the southwest, such as rocky creosote bush scrub, annual plant bajadas, grama grasslands, mesquite woodlands and sandy desert sites.

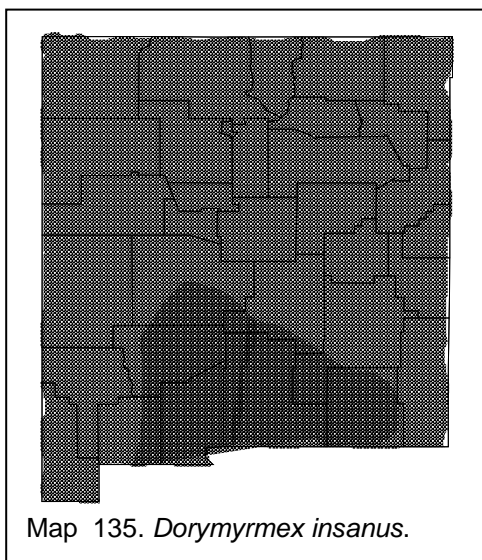
Biology. This species nests in the soil with small (5 cm diameter) mounds. Reproductives were found in nests in June and July.

DuBois and Danoff-Burg, 1994

***Dorymyrmex insanus* (Buckley)**

Discussion. These ants are usually nearly concolorous dark brown with a well-developed propodeal cone, characters which usually distinguishes the species from most of the other common species. Additionally, the eyes are very large (Fig.), the margin of the vertex is slightly concave, or straight, and the pronotum usually has a pair of obvious setae, one on each side (caution, both may be missing). These characters usually distinguish this common species from the others, although the other species may have 1 or more of these characters.

Distribution. USA: Most of the southwestern part of North America; NM: Entire state; MEXICO: Nayarit, Sinaloa, Chihuahua, Durango, Nuevo León, Veracruz.



Map 135. *Dorymyrmex insanus*.

Habitat. This ant occurs in a variety of habitats, ranging from deserts (fluff grass areas, creosote scrub, mesquite woodlands, and grasslands to pinyon-juniper and pine forests. This ant is especially common in disturbed areas, where it nests in open, sunny areas. It nests in extreme habitats where few other species can exist.

Biology. This ant has similar habits as *D. bicolor*. It nests in soil in open areas, with the entrance hole surrounded by a small mound (few cms diameter). Occasionally there are multiple entrances into the same nest. Nests are often found in fine, sandy areas, but they also nest in rocky soils. Brood and reproductives are found in the nest throughout the summer. Nest populations are apparently about 1000 workers. Workers are predaceous, but also feed on dead animals and honeydew. A nuptial flight occurred at 1600 on 27 July 1986, 66 k E Albuquerque. It is possible to obtain sexuals, by pouring water into the nest. Within ½ hour, the reproductives may be found at the nest entrance. It is easily recognized in the field due to the small (3-cm diameter), mound nests and its behavior. If one blows on the nest, the ants will race violently around the nest. It commonly nests in the disk of *Pogonomyrmex* spp. nests (especially *P. rugosus*, *P. occidentalis*), and seems to get along reasonably well with these larger

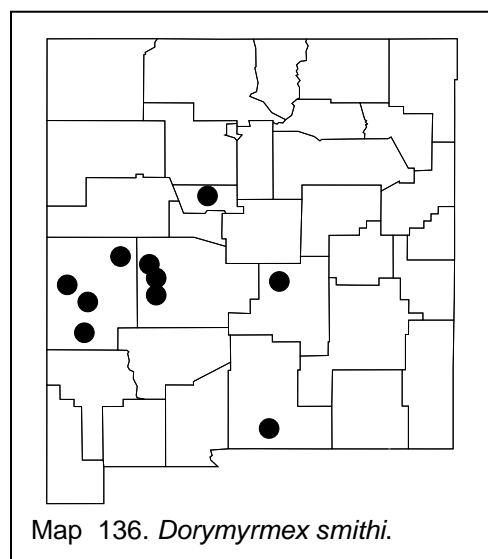
harvester ants. They are ignored for the most part by the larger harvester ants. The scarabaeid beetle *Cremastocheilus stathamae* occurs in the nests.

Wheeler and Wheeler, 1963, 1973, Gregg, 1963, Wilson, 1967, Smith, 1965, Cole, 1966, Rojas-Fernández and Fragoso, 1994, 2000

***Dorymyrmex smithi* Cole**

Discussion. This species can be recognized as being a relatively large species (?? mm), with a deeply impressed border of the vertex (Fig.). It is predominantly brown or black, although the gaster may be darker than the remainder of the body, making it appear weakly bicolored. The eyes are small. This species is most easily confused with *D. bicolor*, and the two species can apparently be separated only on the basis of color.

Distribution. USA: Eastern part of country, as far west as North Dakota south to Eastern New Mexico; **NM: Bernalillo Co.**, Albuquerque, **Catron Co.**, Mogollon Mts., Ox Spring Canyon, 7.6 k NNW Reserve, Snow Lake, **Lincoln Co.**, 33°57'08.45" 105°42'44.95", **Otero Co.**, north MacGregor Range, **Socorro Co.**, Magdalena Mts. (Water Canyon), Bear Mt. - 17.6 k NE Magdalena, 16.3 k S Magdalena.



Map 136. *Dorymyrmex smithi*.

Habitat. This species is most common at higher elevations, from 1000 - 2050 - meters. It occurs in communities ranging from grasslands and urban habitats to pinyon-juniper - oaks and ponderosa pine.

Biology. This species nests in the soil, and usually has the entrance hole surrounded by a small (3 cm diameter) mound, fine sand with stones, to rocky soils. Rarely it nests under stones. Brood and reproductives are found in nests in early August. Workers prey on *Camponotus* spp., *Pogonomyrmex imberbiculus* and *P. huachucanus*.

Genus *Forelius*

Key: Cuezco, 2000

This genus can best be recognized by characters, which are lacking in other genera in this subfamily.

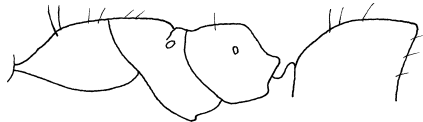


Fig. 302. Side view of the mesosoma, petiole and first gastral tergum of a worker of *F. pruinus*.

The petiole is relatively large, which distinguishes it from *Tapinoma*, although the petiole is usually angled anteriorly and partially covered by the gaster as in *Tapinoma*. There is no cone or pyramid on the propodeum as is

found in *Dorymyrmex*. The area between the mesonotum and propodeum is depressed, which distinguishes it from *Liometopum* (but not from *Linepithema*). The hairs on the clypeus are very long, extending nearly to the edge of the mandibles; these hairs are shorter in *Linepithema*. There is usually a pair of long, erect hairs on the pronotum, which are lacking in *Linepithema* (USA species), but this characteristic must be used with caution, as one or both may be missing.

They are the first ants to become active in the late afternoon during the summer in desert ecosystems. They collect nectar from the flowers of *Euphorbia* spp. They are very common in arid zones of New Mexico.

Iridomyrmex pruinus and its subspecies were transferred to *Forelius* by Snelling and George (1979) and Shattuck (1992). We are recognizing only two forms in New Mexico, although in some series the separation into only two forms appears to be somewhat arbitrary. We are including a key to all of the species north of Panamá, based on Cuezco (2000).

Key to the workers of the genus *Forelius*

1. Posterior occipital margin concave (sometimes concavity is weak, but always present) 2

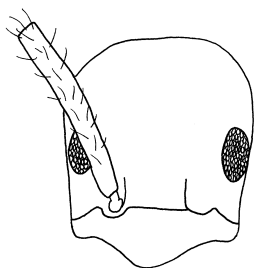


Fig. 303. Head of a worker of *F. mccoeki*, showing the erect hairs on the scapes. occiput concave. change

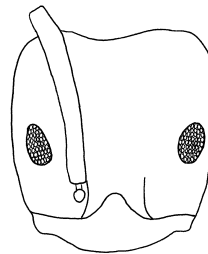


Fig. 304. Head of a worker of *F. pruinus*. this is analis

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Fig. 305. Head of a worker of *F. pruinosus*.

- Occipital margin straight **3***
- 2(1). Antennal scapes and tibia with several erect, short bristly hairs; pale orange to yellow, usually with tip of gaster darker; southwestern USA, Mexico, Jamaica ***mccooki* (McCook)**
- Scapes and tibia usually without short, erect, bristly hairs (a few hairs may be present); color varies from dark brown to orange on the head and mesosoma, gaster often dark brown or black; USA, México south to Colombia ***analís* (André)**
- 3(2). Head, mesosoma, and gaster concolorous dark brown, occasionally with iridescent reflections on dorsum of gaster; southern USA, México, Cuba ***pruinosus* (Roger)**
- Head and mesosoma orange-yellowish, with apex of gaster dark brown ; México (Socorro Island) ***keiferi* Wheeler**

***Forelius analis* (André)**

Discussion. ###

Distribution. USA: southwestern region; ATM NM: **DeBaca Co.**, 4 mi N Taiban, **Curry Co.**, near Clovis, **Doña Ana Co.**, Aguirre Springs, Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), 5 k E Las Cruces, **Eddy Co.**, Carlsbad Caverns, **Hidalgo Co.**, Guadalupe Canyon, 5.2 mi N Hachita, **Los Alamos Co.**, Los Alamos, Rio Grande, **Mora Co.**, 12 k N Wagon Mound, 2 k E Wagon Mound, **Otero Co.**, 8 mi NE Tularosa, **Quay Co.**, Logan/Ute Lake, 7 mi S Quay, **Rio Arriba Co.**, 57 k SW Dulce, 4 k NW Navajo City, **San Juan Co.**, 4 k E Aztec, **Santa Fe Co.**, 24 k NE Santa Fe, 34 mi S Santa Fe, **Sierra Co.**, Truth or Consequences, **Union Co.**, 15 mi SW Clayton, ; MEXICO, south to COLOMBIA.

Habitat. Desert scrub, including open weedy areas,

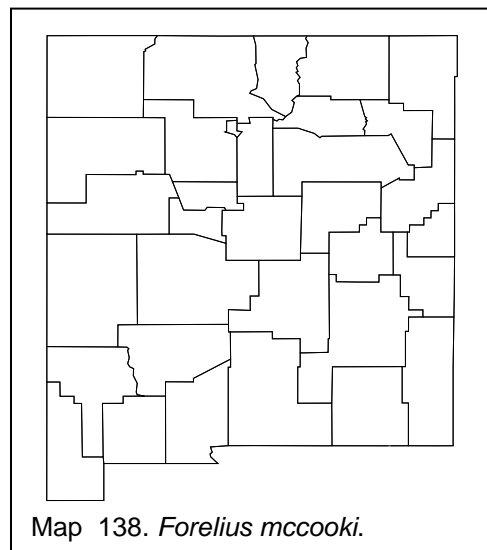
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Map 137. *Forelius analis*.

grama grasslands, fluff grass areas, creosote scrub, mesquite woodlands,

Biology. Alate female 7, 14-vii multiple females in nests,
6284, 6506, 6514, 6518, 7282, 7310, 7533, 7555, 7629, 7907,
8092, 8631, 34, 8638, 40, 41, 42, 8644, 8647, 8701, 02, 8719, 8721

foetidus from excel: Eddy Co: Carlsbad, Quay Co. Tucumcari



Map 138. *Forelius mccooki*.

***Forelius mccooki* (McCook)**

Discussion. This species is easily recognized as it has at least a few erect hairs on the antennal scape and on the tibiae.

Distribution. USA: Southern United States; NM: %%%; MEXICO: Chihuahua, Durango, Nuevo León, and Yucatán

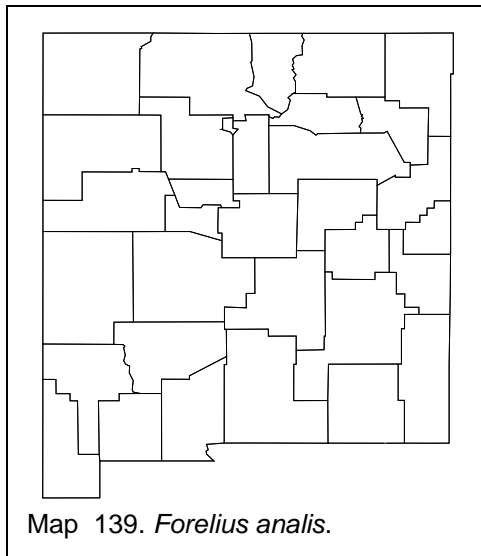
Habitat. Most common in arid habitats, but also occurs in mesic sites ranging from

grasslands to cottonwood forests.

Biology. This species nests in the soil, with the entrance surrounded by a small mound (few cms diameter); it also nests under stones. Nests may be found at the bases of desert plants. Reproductives were found in nests in June. Multiple queens ??These ants are group foragers, which can be found in rapidly moving groups early in the hot afternoon when no other ants are active. Foragers capture living insects, feed on dead insects and collect nectar from a variety of desert plants ranging from the small, prostrate *Euphorbia* spp. to foraging in the flowers of cholla (*Opuntia* spp). They nest at the edges of *Pogonomyrmex rugosus* nests.

Cole, 1937, Mallis, 1941, Lindquist, 1942, Wheeler and Wheeler, 1973, Rojas-Fernández and Fragoso, 1994, DuBois and Danoff-Burg, 1994

***Forelius pruinosus* (Roger)**



Discussion. Snelling and George (1979) transferred this ant from *Iridomyrmex* to *Forelius* based on the structure of the proventriculus. Shattuck (1992) supported this position with additional characters. The species *F. analis* André) is recognized, but is often difficult to separate and thus is not included in this work. ???

Distribution. USA: Most of North America; NM: **Los Alamos Co.** Rio Grande, Also reported from **Sandoval Co.**, Bandelier (Pippin and Pippin, 1984); MEXICO: Durango. see excel list.....

Habitat. Widely distributed in many habitats in New Mexico. Most common in arid habitats, although also occurs in Juniper, sagebrush, riparian and even into pine forests.

Biology. This ant usually nests in the soil, in open areas, but may be found nesting under stones. The nest usually consists of a small mound (diameter of few cms) with the entrance hole in the center. Reproductives were found in nests from May to July. Multiple queens?? The habits are very similar to those of *F. mccoeki*. Food consists of living and dead insects; this species also tends Homoptera and feeds on flower nectar. It can be a serious house pest.

Wheeler, 1905, 1911, Smith, 1930, Warter et al., 1962, Wheeler and Wheeler, 1963, 1973, Smith, 1965, Rojas-Fernández and Frago, 1994, DuBois and Danoff-Burg, 1994

Genus *Linepithema* **(Key: Creighton, 1950)**

These ants can be recognized by the numerous teeth and denticles on the mandibles (10 - 20) and the scarcity of erect hairs, with usually only a significant number of hairs on the clypeus. The hairs on the clypeus are relatively short (do not extend past the outer edge of the closed mandibles) and nearly straight. The pronotum is without erect hairs. The promesonotum is a continuously convex unit, the metanotal suture is

depressed below the level of the unit and the propodeum. The petiole is small and the scale is poorly developed and inclined anteriorly.

This genus could be confused with *Forelius*, but can be easily separated by the shorter hairs on the clypeus (extend to near the outer edge of the mandibles in *Forelius*), and lacking hairs on the pronotum (*Forelius* has at least 2 erect hairs on the pronotum).

***Linepithema humile* (Mayr)**

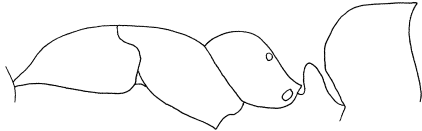


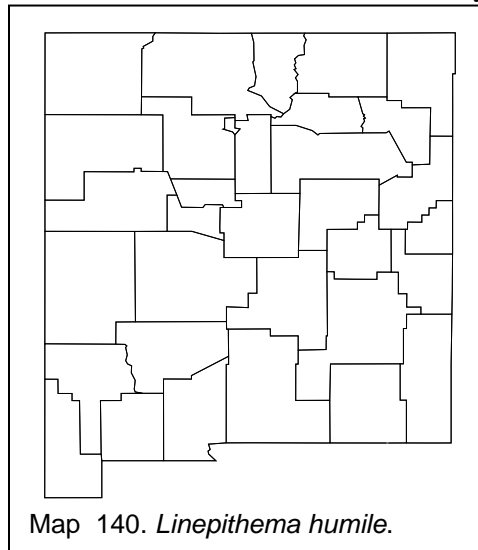
Fig. 306. Side view of the mesosoma, petiole and first gastral tergum of a worker of *L. humile*.

Discussion. The workers of this species can be recognized by the short, erect hairs on the clypeus, which fall far short of reaching the tips of the closed mandibles (Fig.), and by the lack of erect hairs on the dorsum of the mesosoma (Fig.), including the

lack of a pair of long, erect, hairs on the pronotum.. These characteristics would separate it from the similar and closely related genus *Forelius*. This species is most common in mesic and urban habitats, and is rarely found in arid regions where *Forelius* is especially common. This species was previously referred to as *Iridomyrmex humilis*.

Distribution. USA: Most of North America; NM: We are not aware of any records from New Mexico, but it would be expected to occur in cities in the state.

Habitat. This species occurs in a number of different habitats, but apparently does not occur in arid habitats. Nests are most common in urban habitats, where they are persistent house infesting ants. This species was introduced into the United States from South America.



Map 140. *Linepithema humile*.

Biology. This species usually nests in the soil, often under objects (stones, logs etc). Colonies are large, often separated into various nests with multiple queens.

Genus *Liometopum*

(Key: Creighton, 1950)

Majors of this genus may be recognized by the large heads with a concave posterior border, the numerous teeth on the mandibles (including the basal border), the convex mesosoma, forming an essentially uninterrupted arch, and the gaster with dense pubescence. This genus may be confused with *Camponotus*, but differs in a number of easily seen characters. *Camponotus* is a member of the subfamily Formicinae, and has a circular orifice at the end of the gaster, it usually has only seven or fewer teeth on the mandible with no teeth on the basal border and the posterior edge of the head is rarely strongly concave. They have a strong smell of the defensive secretions common in species of the subfamily Dolichoderinae, *Camponotus* have little odor, or smell like formic acid. The structure of the mesosoma should separate it from all other genera of ants.

Species of this genus are found in the Holarctic Region as far south as southern México. This genus is very common in New Mexico; nests are usually located under stones or in living trunks or dead logs. Colonies are very large, probably numbering in the thousands or tens of thousands. The ants are very aggressive, and although they do not sting, they can be very unpleasant.

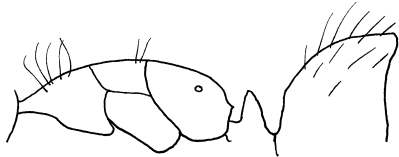


Fig. 307. Mesosoma, petiole and gaster of a worker of *L. apiculatum*. The fine pubescence which is abundant on the mesosoma is not

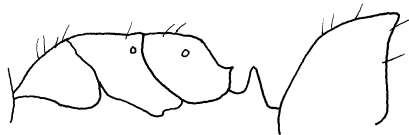


Fig. 308. Mesosoma, petiole and gaster of a worker of *L. luctuosum*.

Key to the workers of the genus *Liometopum*

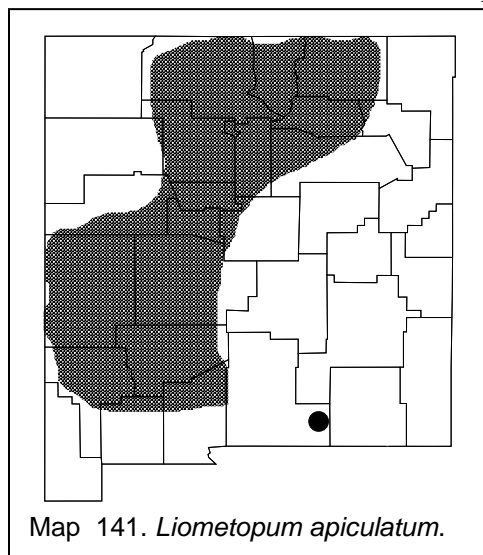
1. Long erect hairs present on dorsum of gaster mixed with shorter erect hairs, some of the hairs nearly as long as those on the pronotum; commonly collected ***apiculatum* Mayr**
 - Erect hairs on dorsum of gaster short (or absent) and of approximately equal length,

usually shorter than erect hairs on pronotum; rarely collected
luctuosum Wheeler

Liometopum apiculatum Mayr

Discussion. This is the most common species of the two, especially at lower elevations. It can usually be identified by the long hairs on the pronotum. The broadly convex mesosoma of the worker could cause this species to be confused with the genus *Camponotus*. The apex of the gaster is definitely slit-shaped, whereas that of *Camponotus* has an acidopore that has at least a few hairs.

Distribution. USA: AZ, CO, west TX; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, 4 k N Apache Creek, 13 k N Apache Creek,



Map 141. *Liometopum apiculatum*.

Catwalk, 15 k NNE Datil, 12 k W Datil, 15 k NW Datil, 1 mi W Mogollon, Mogollon Mts., 7.5 k NW Reserve, Snow Lake, **Cibola Co.**, without locality, **Colfax Co.**, 41 k E Eagle Nest, **Doña Ana Co.**, Aguirre Springs Recreational Area, Dripping Springs, 18k E Las Cruces, 45 k NE Las Cruces (Long Term Ecological Research site), San Agustín Pass, **Eddy Co.**, 5.3 k SE Sitting Bull Falls, **Grant Co.**, Black Range, Mimbres, 5 mi N Pinos Altos, 9 k ENE White Signal, **Lincoln Co.**, 2.5 mi NNE Fort Stanton, Valley of Fire State

Park, **Los Alamos Co.**, Los Alamos, 2 k NE Los Alamos, Rio Grande, **Mora Co.**, 2 k E Wagon Mound **Otero Co.**, Hidden Cave, Three Rivers Campground, **Rio Arriba Co.**, 37 k N Abiquiu, 4 k N Chama, 57 k SW Dulce, **Sandoval Co.**, 11 k E Cuba, Jémez Mts., **Santa Fe Co.**, Cedar Crest, Santa Fe, **Sierra Co.**, 21 k SW Hillsborough, 6 k W Kingston, **Socorro Co.**, 5 k N Camp Luna, 48 k SE Datil, Grassy Lookout, Magdalena Mts. (Water Canyon), Sevilleta, 8 mi from Highway 107, 33°48'32.2"N 107°22'57.2"W, **Taos Co.**, Peñasco, **Valencia Co.**, 22 k S

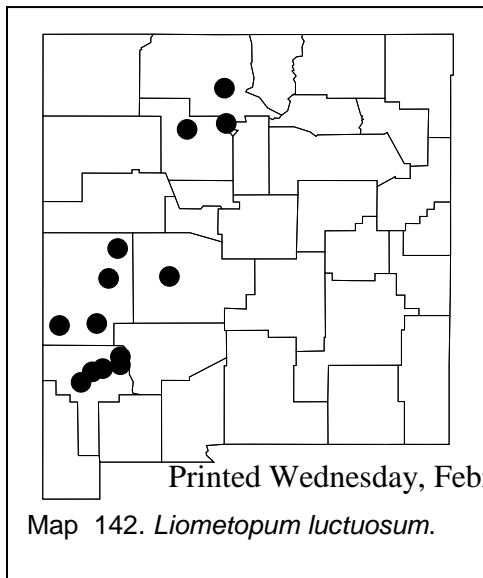
Fence Lake; MEXICO: Chihuahua, Coahuila, Guanajuato, Michoacán, Nuevo León, San Luis Potosí, Tamaulipas.

Habitat. Occurs sporadically in creosotebush scrub and grasslands, up to sagebrush zones and becomes much more common at higher elevations (1900m) in oak forests (most common habitat), piñón pine, up to ponderosa pine and riparian sites.

Biology. This species nests under stones and in trunks of living and dead trees (especially oaks) and dead *Yucca* spp. stalks. It is polydomous with segments of nests scattered over the landscape under stones and logs. It is the dominant ant in most of the oak forests in the state and can be easily found foraging on the sides of oak trees. This species is predaceous, collects dead insects and tends Homoptera. It is extremely pugnacious and attacks without hesitation. Although it does not sting, it can be very irritating due to bites by large numbers of individuals. Sexualls occur in nests from May to August. Males and females were collected on the ground in June to August, foundress females were commonly collected in July and August under stones, cow manure or logs. They can be found from March to September, one was collected in December. This species nests together with *Paratrechina austroccidua*, *Lasius sitchensis* (several nests), *L. pallitarsis*, *Tapinoma sessile*, *Forelius* and *Camponotus vicinus*. Inquilines appear to be especially common in the nests of this species. The small cricket, *Myrmecophila* spp., commonly occurs in the nests throughout its range. Staphylinids including *Apteronina schmitti* Wasmann and *Dinardilla liometopi* Wasmann are also found in nests.

Wheeler, 1905, 1917, Gregg, 1963, 1963, Van Pelt, 1971

***Liometopum luctuosum* Wheeler**



Discussion. This ant can be separated from *L. apiculatum* by the shorter hairs on the pronotum. In the field the smaller workers look similar to *Tapinoma sessile*, but can be separated by the lack of an indentation at the metanotal suture (can be seen with a hand lens). It is also much more aggressive.

This species has been considered a subspecies of *L. occidentale*, but occurs at higher elevations (usually above 2000 meters). The distributions of the two are parapatric or sympatric in a number of areas, especially the mountains of southern California, with no hybridization. Based on this evidence, Wheeler and Wheeler (1986) and Mackay et al. (1988) considered this taxon to be a valid species. This species is not common in New Mexico.

Distribution. USA: CA east to W TX, north to WY; NM: **Catron Co.**, Catwalk, 15 k NW Datil, Ox Spring Canyon, Snow Lake, **Grant Co.**, Gila Mts. (Iron Creek, Wright's Cabin), 77 k E Silver City, 88 k E Silver City, 9 k NW White Signal, **Los Alamos Co.**, Los Alamos, Rio Grande, **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, 26 k S Cuba, **Socorro Co.**, Magdalena Mts. (Water Canyon).

Habitat. Sagebrush, piñón-pine, oak forests, ponderosa pine-riparian, Douglas fir, riparian habitats at high elevations, mixed canyon forests, widely distributed in New Mexico.

Biology. Nests are found in living or dead tree trunks or in the soil under stones or logs. Soils are usually rocky loam, but it also occurs in sandy areas. These ants are very aggressive. Flights occurred during June and July; sexuals can be collected at blacklights or in bodies of water the day after flights. We have not found myrmecophiles in nests.

Wheeler, 1905, Mallis, 1941, Gregg, 1963, Cole, 1966, Wheeler and Wheeler, 1973

Genus *Tapinoma*

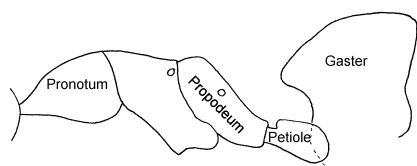
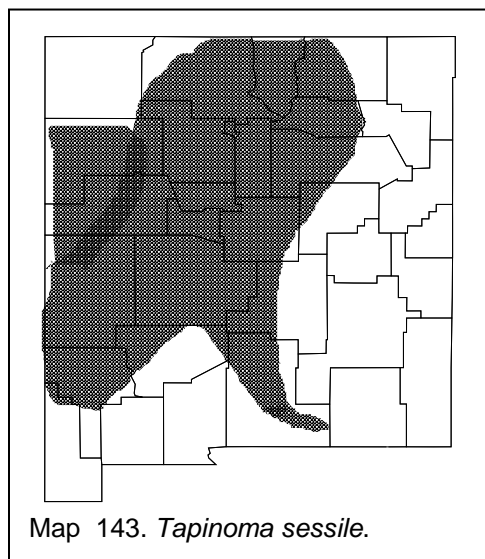


Fig. 309. Side view of the mesosoma, petiole and gaster of a worker of *Tapinoma sessile*.

Workers of this genus can be recognized by the numerous small teeth on the mandibles, the strong mesopropodeal constriction and rectangular shaped propodeum (Fig.), the petiolar node is very poorly developed and strongly inclined anteriorly, difficult to see due to the normal position of the

gaster (Fig.). Only one species of this genus occurs in New Mexico.

Tapinoma sessile (Say)

Map 143. *Tapinoma sessile*.

Discussion. In the field, this genus may be mistaken for *Lasius*, but can be easily distinguished by the characteristic odor. The small node of the petiole (Fig.) will separate it from all other genera in New Mexico. Additional characters include the suture between the mesonotum and propodeum is marked with a dark line, and the propodeum is narrowed at the dorsum (Fig.).

Distribution. USA: Most of North America; **NM:** **Catron Co.**, 30 k ENE Apache Creek ATM, 15 k NW Datil ATM,

Mogollon Mts. ATM, Ox Spring Canyon ATM, Sawtooth Mts. ATM, Snow Lake ATM, **Cibola Co.**, Mt. Taylor (9000'), **Colfax Co.**, 16 k E Eagle Nest ATM, 4 mi W Eagle Nest ATM, **Eddy Co.**, Hidden Cave ATM, **Grant Co.**, Mimbres Preserve ATM, 4 k W Mule Creek ATM, 77 k E Silver City ATM, **Lincoln Co.**, 2 mi W Alto ATM, Sacramento Mts. (Bailey Canyon) ATM, **Los Alamos Co.**, Los Alamos, 4 KN, and 8 KN of Los Alamos, Rio Grande near Los Alamos, Mortandad Canyon, Camp May, **McKinley Co.**, 8 mi S Gallup, **Mora Co.**, Coyote Creek State Park ATM, **Otero Co.**, 9 k N Timberon ATM, 14 k N Timberon ATM, 9 k NE Timberon ATM, **Rio Arriba Co.**, 7 k S Cebolla ATM, Truchas ATM, **Sandoval Co.**, Bandelier National Monument, 100 k E Cuba ATM, 45 k W Cuba ATM, Jémez Mts. ATM, 12 mi NE Jémez ATM, **San Miguel Co.**, 20 k NW Las Vegas ATM, **Socorro Co.**, 43 k SE Datil ATM, Grassy Lookout, Mt. Withington, San Mateo Mts. ATM, **Taos Co.**, 20 k S Taos ATM, 2 k W Tres Ritos ATM, **Torrance Co.**, 24 k S Mountainair ATM.

Habitat. Areas ranging from grasslands through oak forests into high elevation pine forests, including juniper forests, sagebrush, pinyon-juniper, pine-riparian, riparian, aspen. It is never found in completely arid zones, but occurs in most other habitats. It is often one of the most common species at higher elevations in pine forests.

Biology. This species nests in open soil, under stones and logs or in dead wood, in cavities of plants or in plant galls or even bird nests. The site of the nest is changed often. Nests are populous (2000 - 5000 workers)

and contain multiple queens. Brood is found in nests from April until September. Reproductives are found in nests from May until October, flights occur in June and July. This species is a group forager, which tends Homoptera and feeds on dead insects or the juices of decaying fruits and vegetables. It is strongly attracted to sweet substances. It is a common house-infesting ant in the area. Although it does not sting, it can be very annoying as it attacks in large numbers and swarms over the body of the intruder. One nest was found together with a nest of *Camponotus modoc*, another with *Lasius pallitarsis*.

Smith, 1928, 1947, Weber, 1941, Kanno, 1959, Wheeler and Wheeler, 1963, Gregg, 1963, Judd, 1964, Smith, 1965, Bobb, 1965, Kulman 1965

SUBFAMILY FORMICINAE

Ants of this subfamily are common ants throughout the state, especially in cooler, moister habitats. They can be recognized by the circular acidopore at the end of the gaster. Many of the genera, especially *Formica*, spray a formic acid mixture at enemies through this orifice. The pedicel consists of a single petiole and there is no constriction between the first and second segments of the gaster. The eye is well developed and three ocelli are sometimes present, the antenna is 12 segmented except in the genus *Brachymyrmex*, which has a 9-segmented antenna, there is no antennal club in any of the New Mexican species. These ants usually have smooth surfaces or are only weakly sculptured. Workers are usually dimorphic or polymorphic, although many genera have monomorphic species.

Pupae are usually in cocoons, but are naked in some species. Nests are in the soil, under stones, under logs or in plant cavities. Many species have very large nests, numbering in the thousands. Workers tend Homoptera, and feed on dead or living arthropods. Some of the species invade houses.

Genus *Acanthomyops*

(Key: Wing, 1968)

This genus is similar to *Lasius*, and is distinguishable in that the maxillary palps have only 3 segments and cannot be easily seen. The

maxillary palps are rarely extended enough to extend past the posterior border of the buccal cavity. The antennal fossa is extremely close to, or touches the posterior border of the clypeus. The eyes are small and the ants are usually golden yellow in color. Otherwise they are indistinguishable from *Lasius*.



Fig. 311. Maxillary palp of a worker of *Acanthomyops*.

These ants are difficult to identify, especially the workers, A number of species hybridize with others, which makes the identification of some specimens

impossible. Several of the species that hybridize should be synonymized.

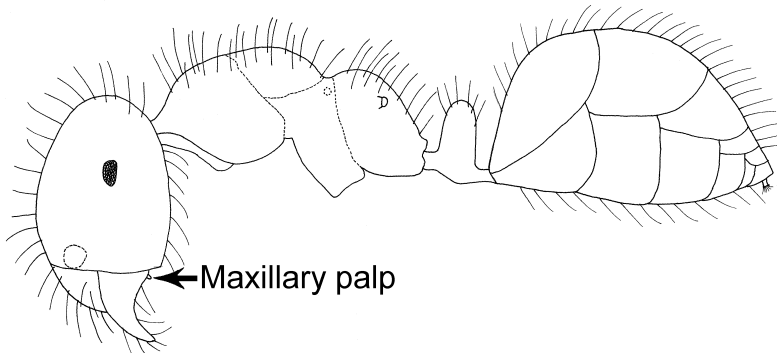


Fig. 310. Side view of a worker of *A. latipes*.

There is apparently an undescribed species in Los Alamos (based on a single female).

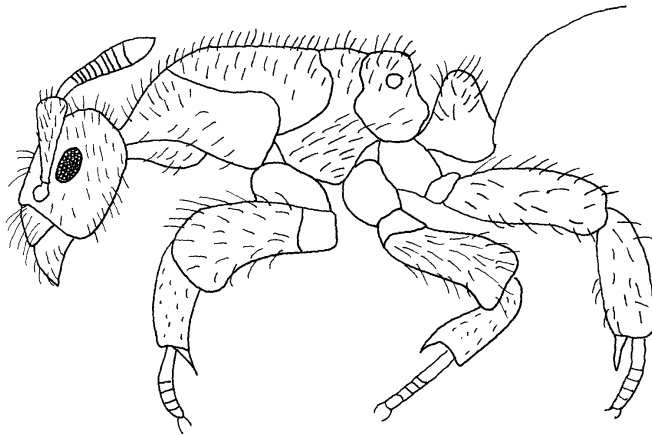


Fig. 312. Side view of a female of *A. latipes*.

Nests are usually located under stones, but may be in rotten wood. The workers have a pleasant, lemon odor. They tend Homoptera, mostly below the soil surface. Sometimes they become house pests. The females of some of the species are very peculiar, with large, flattened legs (Fig.).

Cole (1954c) discusses the genus in New Mexico. Many of the workers in the state may be separated using the following key.

Key to *Acanthomyops* workers (See Wing, 1968)

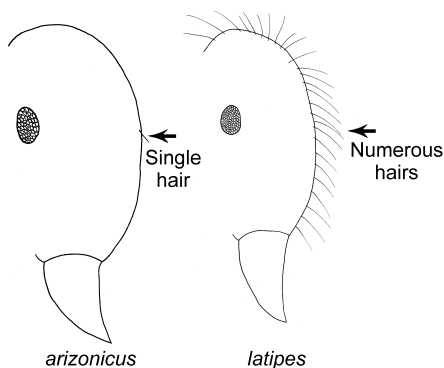


Fig. 313. Ventral surfaces of the heads of workers of *A. arizonicus* and *A. latipes*.

1. Underside of head without erect hairs (rarely 1 or 2, which are shorter than hairs on clypeus; erect hairs on gaster mostly or entirely confined to posterior edges of terga; decumbent pubescence on underside of head and gaster extremely dilute; southeastern Arizona, not recorded from New Mexico

***arizonicus* (Wheeler)**

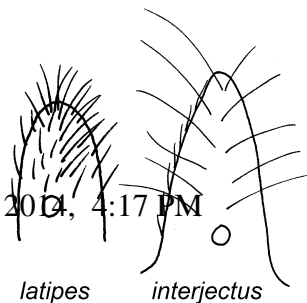


Fig. 314. Apices of the petioles of workers of *A. latipes* and *A. interjectus*.



Fig. 315. Petiole of a worker of *A. coloradensis*, as seen from the side and from the front.

scattered over surface; decumbent pubescence on underside of head and gaster moderate to dense 2

2(1). Length of standing hairs of dorsum of gaster 0.23 mm or more in length, those on underside of the head 0.20 mm or more; in side view, apex of petiolar moderately sharp, usually emarginate, standing hairs on dorsum of gaster confined to the posterior edges of the tergites (except for the first tergite) 3

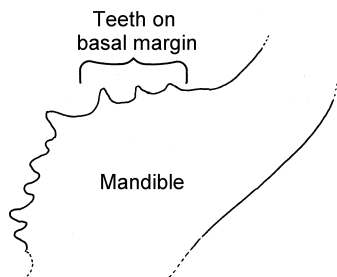


Fig. 316. Left mandible of a worker of *A. interjectus*.

- Standing hairs on dorsum of gaster usually less than 0.22 mm, those on the underside of the head usually less than 0.20 mm; scale of petiole variable; standing hairs on dorsum of gaster usually uniformly distributed 4

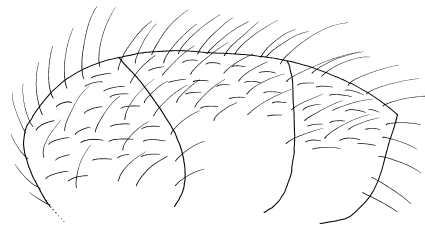


Fig. 318. Dorsum of the gaster of a worker of *A. colei*.

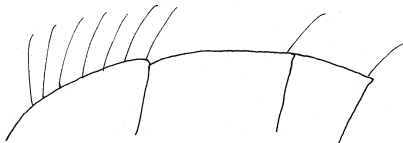


Fig. 319. Dorsum of the gaster of a worker of *A. interjectus*.



Fig. 317. Variation on the apices of petioles of workers of *A. latipes*.

3(2). Head width 1.08 mm or greater; erect hairs on second to last tergum mostly confined to posterior edge (Fig.); pubescence on head moderate to dense; mandibles with 1 or more denticles on basal border (Fig.) ***interjectus* (Mayr)**

- Head width 1.02 mm or less; at least a few hairs scattered over the surfaces of second to last tergum; pubescence on head dilute to very dilute (Fig.); mandibles rarely with denticle on basal margin (Fig.) ***colei***
Wing

Fig. 320. New figure to go here

4(2). Crest of petiolar scale blunt (in profile), convex, straight or rarely concave as seen from front (Fig. , left); standing hairs on underside of the head almost always distributed over entire surface (as seen from side)

..... 5

- Crest of petiolar scale at least moderately sharp, usually emarginate (Fig.); standing hairs on underside of the head usually covering the posterior $\frac{3}{4}$ or $\frac{1}{2}$ of the surface (Fig.) 7

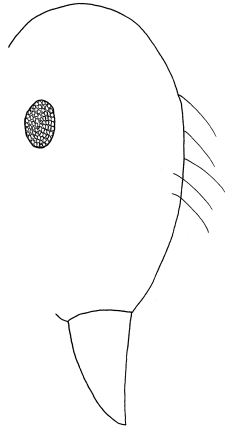


Fig. 321. Head of a worker of *A. coloradensis*, as seen from the side.

mesosoma; other characters vary 6 (*latipes* [Walsh] and *pogonogynous* Buren)

6(5). Body hairs of female unevenly distributed, bent, tangled and twisted, but not matted to surface; underside of head with most hairs appressed; rare in New Mexico (known only from Los Alamos) *pogonogynous* Buren

- Body hairs of female evenly distributed, not as above; commonly collected in New Mexico *latipes* (Walsh)

7(5). Pubescence on sides of second tergum of gaster dense to very dense, distance between bases of hairs usually averaging less than $\frac{1}{3}$ of their length, often contiguous; most of body and appendages quite densely pubescence *occidentalis* (Wheeler)

5(4). Erect hairs noticeably more numerous on propodeum than elsewhere on mesosoma (Fig.); lateral surface and flexor edge of fore femur usually with 10 or fewer erect hairs (Fig.), 0.05 mm or less in length; length of erect hairs on ventral surface of head, propodeum and dorsal surface of gaster usually 0.10 mm or less; antennal scapes with appressed pubescence

..... *murphyi* (Forel)

- Erect hairs evenly distributed over dorsum of

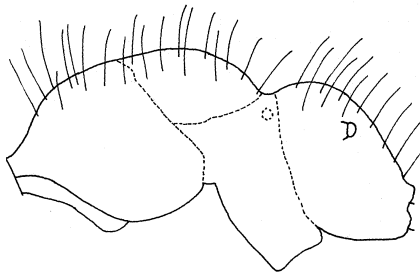
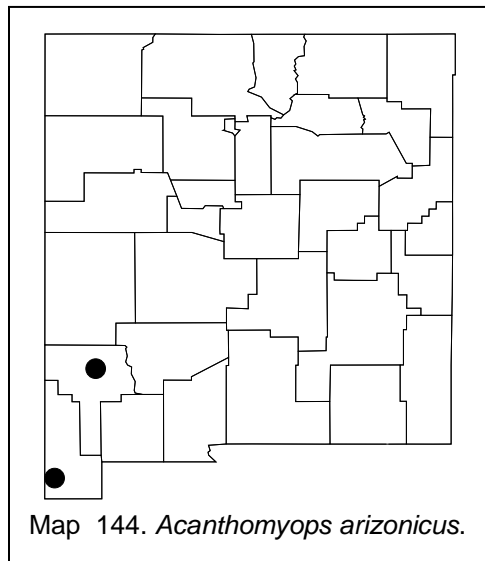


Fig. 322. Side view of a worker of *A. latipes*.

- Pubescence on sides of second tergum dilute to moderate, distance between bases of hairs usually averaging more than $\frac{1}{2}$ of their length, often several times their length; pubescence on remainder of body and appendages usually only moderate in abundance *coloradensis* (Wheeler)

***Acanthomyops arizonicus* (Wheeler)**

Discussion. This is the only species in the genus in which the workers are easily recognized and separated from all of the others. The workers differ in that there are often no erect hairs on the ventral surface of the head, occasionally there are 1 or 2 hairs present. Additionally the gaster has only a few erect hairs. The females are similar, with a very reduced number of hairs. The males also have few hairs, usually limited to 1 pair of long, coarse hairs on the underside of the head (usually none present).

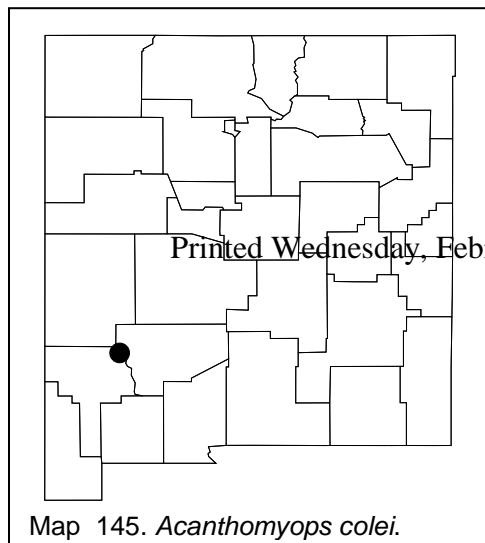


Distribution. USA: SE AZ, NM: Grant Co., 5 mi N Pinos Altos, Hidalgo Co. Peloncillo Mts. (Coronado National Forest). MEXICO: Chihuahua. These are the first records from New Mexico and from Chihuahua.

Habitat. Hardwood forests, especially in riparian areas, pinyon-juniper forests, pine oak transition.

Biology. Nests are found under stones, in areas with rocky loam. This species is very common in the Chiricahua Mountains of Arizona.

***Acanthomyops colei* Wing**



Discussion. This is one of the two species in which the erect hairs on the dorsum of the gaster are 0.23 mm or more in length and those on the underside of the head

are 0.20 mm or greater in length. Most of the hairs on the dorsum of the gaster are found near the posterior edges of each tergum, although there are a few hairs scattered over the surface. The pubescence on the head is sparse, and the mandibles rarely have a denticle on the basal margin.

Distribution. USA: southern AZ, NM: **Grant Co.**, Gila National Forest (Black Mt.).

Habitat. Moist pine slopes.

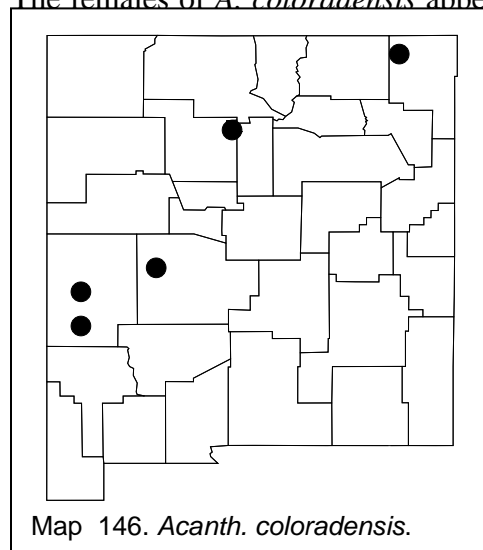
Biology. This species nests under stones. Males were collected in a nest in late July, flights probably occur in August.

Wing, 1968

***Acanthomyops coloradensis* (Wheeler)**

Discussion. The workers of this species have a petiole with a relatively sharp apex (as seen from the side), which is usually concave or notched as seen from the front. The hairs on the underside of the head are usually 0.20 mm or less in length, and usually cover only the posterior $\frac{3}{4}$ or $\frac{1}{2}$ of the length, the hairs on the gaster are usually less than 0.22 mm in length, and are uniformly distributed across the surface. The side of the second tergum of the gaster has dilute to moderate, decumbent pubescence, the pubescence on the remainder of the ant is usually only moderately abundant.

This species is difficult to distinguish from *A. occidentalis*. The sparse decumbent pubescence on the second tergum will often separate workers. If females are present in the series, identification is much easier. The females of *A. coloradensis* appear black to the naked eye, those of *A.*



nce on the dorsum of the gaster of the and the surface of the gaster is easily *tal* is covered with a dense, golden, uch of the underlying surface of the

United States as far south as NM; 37 k S Apache Creek, **Sandoval Co.**, in and Pippin, 1984), **Socorro Co.**, **ion Co.**, Capulin Mountain National

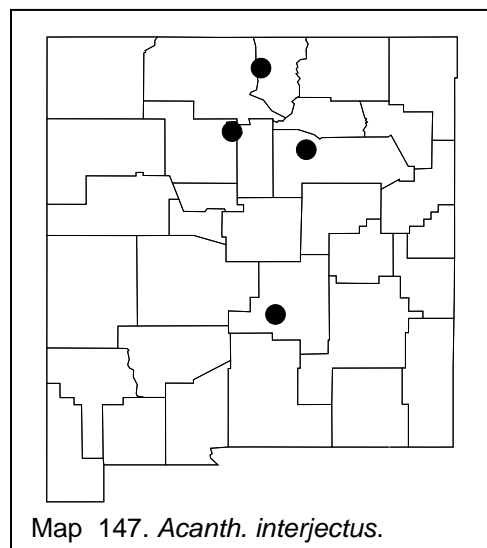
Habitat. Ranging from prairies and deciduous forests, ponderosa pine - Gambel oak transition, to coniferous forests.

Biology. This species nests under stones in rocky soils. Brood and reproductives were found in nests in August. One colony was nesting together with *Monomorium cyaneum*.

Gregg, 1963, Wheeler and Wheeler, 1963 (as *A. claviger*)

Cole check wing for distribution

***Acanthomyops interjectus* (Mayr)**



Discussion. The hairs of this species are long, those on the ventral surface of the head are often at least 0.20 mm in length, and those on the gaster are often at least 0.23 mm. Most of the hairs on the gaster are confined to the posterior edges of each terga. The apex of the petiole is moderately sharp, usually concave or notched.

Distribution. USA: Most of United States; NM: **Lincoln Co.**, Nogal, **Los Alamos Co.** Los Alamos, 8 k N Los Alamos, **San Miguel Co.**, 20 k NW Las Vegas, **Taos Co.**, 5 k W Tres Piedras.

Habitat. Residential areas and meadows up to pinyon-juniper, mixed forests and ponderosa pine forests.

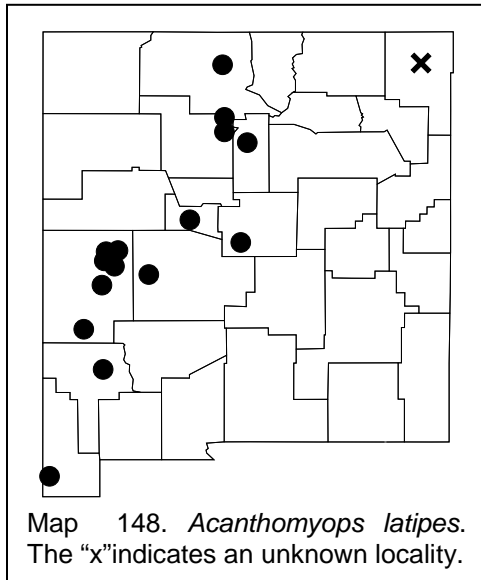
Biology. This species nests under stones or logs and in soil, occasionally with a small mound. This species is primarily subterranean. Reproductives were found in nests from March to August, dealate females were found in July and October. It is also a house-infesting ants.

Wheeler, 1905, Smith, 1928, 1965, Dennis, 1938, Carter, 1962, Talbot, 1963, Wheeler and Wheeler, 1963, Gregg, 1963, Smith, 1965, DuBois and Danoff-Berg, 1994

***Acanthomyops latipes* (Walsh)**

Discussion. The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire

surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of the petiole is blunt (when viewed in profile) and convex or straight as seen from the front (rarely slightly concave). Specimens from the Sawtooth Mts. (#16625) differ in that the body hairs are shorter and somewhat blunt-tipped or spatulate. They may represent an undescribed species.



The workers of *A. pogonogynous* cannot be separated from those of *A. latipes*. *Acanthomyops murphyi* workers may also key to *A. latipes*. *Acanthomyops latipes* is one of the most common species in New Mexico and therefore most or all samples that would key to one of these three species would be *A. latipes*. If the females are in the sample, separation is much easier. Those of *A. latipes* are very unusual and especially attractive. The funiculus of the antenna is widened at a point about $\frac{2}{3}$ of its length (Fig.). The anterior femora

is widened and plate-like (Fig.). The other two femora are similar in form, but less developed. Most surfaces of the body have well developed, erect hairs. *Acanthomyops murphyi* and *A. pogonogynous* do not have the funiculi nor femora modified like this. The segments of the funiculi are approximately the same width throughout (slightly enlarged apically in *A. murphyi*). The femora of the latter 2 species are little modified. Both of these species have abundant, appressed hairs, few hairs are suberect or erect. The hairs on *A. murphyi* are dense enough to be matted, twisted and tangled (Fig.). The decumbent hairs on the dorsal surface of the gaster are small and sparse (Fig.). The hairs on *A. pogonogynous* are less dense and matted, but the decumbent hairs on the dorsum of the gaster are well developed, similar to the hairs on the remainder of the body (Fig.). Therefore, although the workers of the 3 species are similar and difficult or impossible to separate, they are definitely valid species. See Wing (1968) for further details.

Distribution. USA: Most of the United States; **NM: Bernalillo Co.**, NE Albuquerque, **Catron Co.**, 14 k N Datil, 10 k W Datil, 12 k E Datil, Mogollon Mts, Regarte, Sawtooth Mts., **Grant Co.**, 88 k E Silver City, **Hidalgo Co.**, Peloncillo Mts., (Clanton Draw); **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Rio Grande, **Rio Arriba Co.**, 7 k S Cebolla, **Santa Fe Co.**, Santa Fe, **Sandoval Co.**, Bandelier National Monument, **Socorro Co.**, near Grassy Lookout, **Torrance Co.**, 24 k S Mountainair, **Union Co.**.

Habitat. Meadows and sagebrush communities, pinyon-juniper, ranging up to deciduous forests and ponderosa pine-riparian and fir forests.

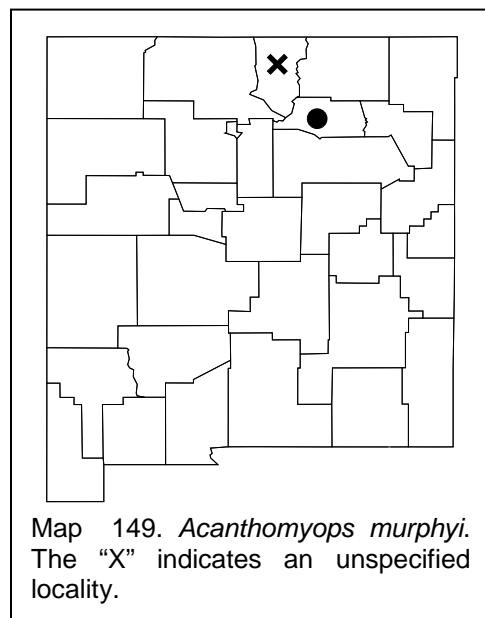
Biology. This species nests under stones or logs and in the soil, occasionally with a small mound, in clay soils or fine, sandy loam, with scattered rocks. Brood was found in August, reproductives occurred in nests in July and August, dealatqueens were found loose in August. Flights occurred in the afternoon (one flight began at 18:15 MST). This species is a temporary social parasite of *Lasius alienus*, and nests together with *Myrmica hamulata*. One nest also contained *Formica occulta*, *Lasius*

sitiens and *Myrmica hamulata*.

Wheeler, 1905, 1917, Mallis, 1941, Talbot, 1963, 1973, Wheeler and Wheeler, 1963, Gregg, 1963, Smith, 1965, Cole, 1966

***Acanthomyops murphyi* (Forel)**

Discussion. The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of



the petiole is blunt (when viewed in profile) and convex or straight as seen from the front (rarely slightly concave). The workers of this species are difficult to separate from those of *A. latipes*. They differ in that the erect

hairs are more numerous on the propodeum than on the remainder of the mesosoma. The females of the two species are very different, and are usually necessary to separate these two species. See discussion of *A. latipes* for more details.

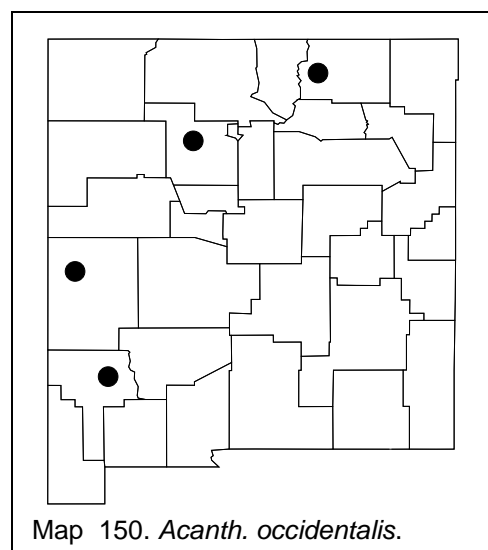
Distribution. USA: Most of United States; NM: **Mora Co.**, 10 k SE Mora, **Taos Co.**

Habitat. Open woodlands or at edges of deciduous woodland forests, ponderosa pine forests, especially in riparian habitats.

Biology. This species nests in sandy soils or fine loam under stones or logs. Reproductives were found in nests in August, dealate females were also found in August. It nests together with *Tapinoma sessile* and *Formica argentea*, and is a temporary social parasite of *Lasius* spp.

Wheeler, 1905, 1917, Gregg, 1963, Talbot, 1963, 1973, Smith, 1965

***Acanthomyops occidentalis* (Wheeler)**



Discussion. The petiole of workers of this species has a moderately sharp apex of the petiole, which is usually notched. The hairs on the underside of the head are relatively short (less than 0.20 mm) and are present only on the posterior $\frac{1}{2}$ to $\frac{3}{4}$ of the surface (Fig.). The erect hairs on the gaster are relatively short (less than 0.23 mm) and are scattered over the entire surface.

This species is difficult to distinguish from *A. coloradensis*. The pubescence on the side of the second tergum is denser, as it is on

other body parts. If females are available, these species are easily separated. See the discussion of *A. coloradensis* for more details.

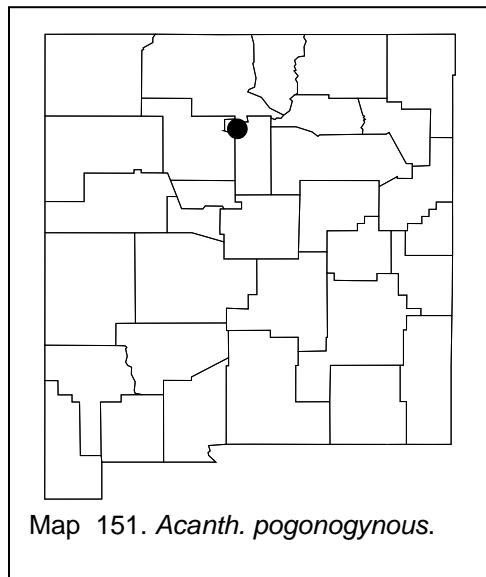
Distribution. USA: Central and western North America south to NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 32 k NE Apache Creek, **Colfax Co.**, 41 k E Eagle Nest, **Grant Co.**, 88 k E Silver City, **Sandoval Co.**, 26 k S Cuba; MEXICO: Chihuahua.

Habitat. Meadows, pinyon-juniper, ponderosa pine forests, to spruce and aspen forests, including riparian meadows.

Biology. This species nests under stones in sandy soil or loam with scattered rocks. Nuptial flights occurred at night during July (sexuals are attracted to black light traps). A dealate female was found in September.

Wheeler, 1917, Gregg, 1963

***Acanthomyops pogonogynous* (Buren)**



Discussion. The hairs on the ventral surface of the head of workers are relatively short (0.20 mm or less) and distributed over the entire surface. The hairs on the gaster are also short (0.22 mm or less) and are also scattered over the entire dorsal surface. The apex of the petiole is blunt (when viewed in profile) and convex or straight as seen from the front (rarely slightly concave).

This species is listed as a hybrid of *A. murphyi* and *A. latipes* in Wing (1968), although it is difficult to believe that two species with completely different females could interbreed. Workers cannot be distinguished from those of *A. latipes*. The females are easily separated (see discussion of *A. latipes*) and are necessary for the identification of these two species.

Distribution. USA: IO, CO; NM: Los Alamos Co., Los Alamos.

Habitat. Ranging from residential areas to meadows and deciduous forests in Los Alamos,

Biology. This ant nests under stones. Dealate females were collected loose on the ground during June and July.

Gregg, 1963

Genus *Brachymyrmex*

(Key:)

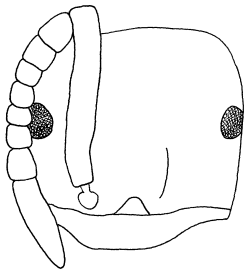


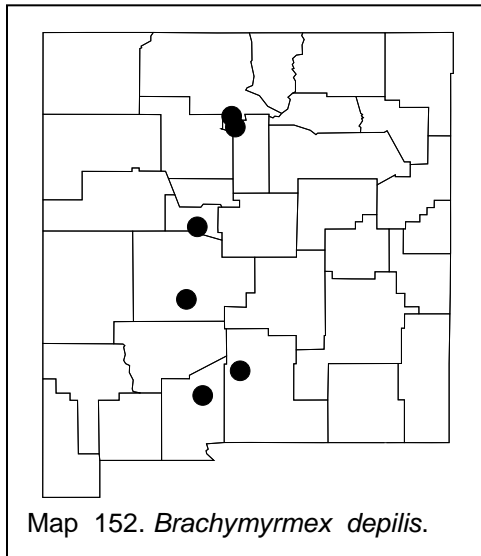
Fig. 323. Head of a worker of *B. depilis*.

This genus is easily separated from all other genera in the United States by the 9-segmented antenna.

This is a group of small, drab ants, which are extremely difficult to identify. Most of the species are found in Latin America, only 3 species occur in the United States (*B. depilis*, *B. musculus* and *B. obscurior*). They are normally very rare in the United States, but at

certain times of the year they can be very commonly found under stones in almost any habitat.

***Brachymyrmex depilis* Emery**



Map 152. *Brachymyrmex depilis*.

Discussion. This is the only ant species in New Mexico with a nine-segmented antenna. Unfortunately they are very small and soft bodied and become distorted when dried, making it difficult to count the segments. These are monomorphic, inconspicuous ants, which are rarely collected. The antennal fossa touches the posterior border of the clypeus. The petiole is small and is covered by the anterior part of the gaster, which may make it easy to confuse with *Tapinoma*.

Distribution. USA: Most of United States; NM: **Bernalillo Co.**, Bosque Forest, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Los Alamos Co.** along the Rio Grande, **Otero Co.**, White Sands National Monument, **Sandoval Co.**, Bandelier National Monument. Cole (1954d) discusses the distribution in New Mexico.

Habitat. This species is found in arid deserts (especially in arroyos), creosotebush scrub, grasslands, juniper and sagebrush, oak woodland, up to ponderosa pine.

Biology. This species is rarely collected due to its primarily subterranean habits, although may be common in some areas at certain times of the year. Nests are found under stones or in rotten wood. Females and nests are usually found from July to October. These ants tend subterranean aphids and mealybugs. This species nests in or near nests of *Myrmica emeryana*, *Formica fusca*, and *Messor lobognathus*.

Wheeler, 1905, Smith, 1927, Dennis, 1938, Headley, 1952, Wheeler and Wheeler, 1963, 1973, Gregg, 1963, Rojas-Fernández and Fragoso, 1994, 2000, DuBois and Danoff-Burg, 1994

Genus *Camponotus* (Key: Creighton, 1950)

This is the largest genus of ants, with probably more than 1000 species (Brown 1973 from Rojas-Fernández and Fragoso 1994). Most of the species in New Mexico have a strongly arched mesosoma with none of the sutures breaking the outline of the arch. The acidopore is round and well formed, but normally has few or no hairs on the lips. Most species are strongly polymorphic. One New Mexican species (*C.*) has a depression posterior to the mesopropodeal suture, which breaks the outline of the arched back. They can be confused with *Liometopum* (Dolichoderinae),

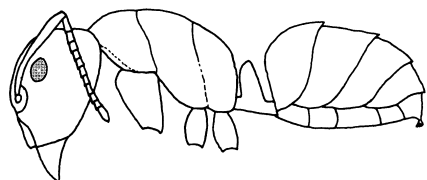


Fig. 324. Side view of a worker of *C. vicinus*.

but can be separated on the basis of the round acidopore which usually as at least a few hairs on the lips. Ants of this genus are not likely to be confused with those of any other genus in New Mexico. The genus is divided into a number of subgenera, which are identified in the key.

This is a genus of common “carpenter” ants. A number of the species can damage houses. This is probably the only genus in North America, which tunnels through solid wood. They often nest in logs and stumps or under stones. Cole (1954d) includes the distribution of the species in New Mexico. This genus is extremely common in New Mexico

and can be found in all habitats in the state. One must be careful to collect major workers as identification is difficult or impossible without them.

Key to the subgenera of the major workers of *Camponotus*

1. Head of major circular in cross section and abruptly truncated in front, the truncated portion consisting of the clypeus and adjacent parts of the cheeks with the mandibles forming the ventral segment; majors and minors present in nest, intermediates absent; nests in twigs
Subgenus *Colobopsis* (*Camponotus papago* Creighton)

- Head of major not circular in cross section and not abruptly truncated in front, if truncated, the slant is oblique and involves frontal lobes as well as the clypeus, intermediates usually present; usually nests in soil or under stones **2**

2(1). Front of head of major obliquely truncate (Fig.), the truncation involving frontal lobes, with large, bordered, concave hollow at either side which usually extends across cheek from insertion of antenna to level of middle of clypeus (Fig.); minor small, concolorous black ant with evenly rounded mesosoma subgenus ***Myrmaphaenus***
(*Camponotus ulcerosus* Wheeler)

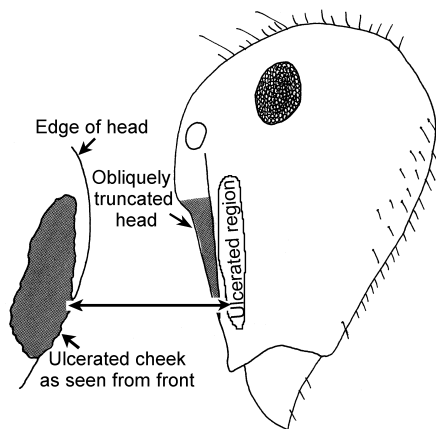


Fig. 325. Head of a major worker of *C. ulcerosus* as seen from the side. The arrows indicate the obliquely truncated clypeus, and the ulcerated cheek as seen from the front.

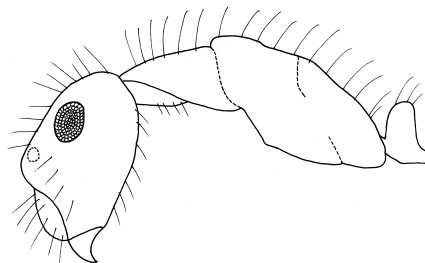


Fig. 326. Head and mesosoma of a minor worker of *C. ulcerosus*.

- Front of head of major not obliquely truncate, more or less convex; clypeus convex or angular and distinctly higher than the adjacent portions of the cheeks ... **3**

3(2). Mesosoma short, that of major not much longer than head (excluding mandibles); humeral angles of pronotum well marked (Fig.), monomorphic or not strongly polymorphic; known only from fossils in

New Mexico Subgenus *Myrmobrachys* (*Camponotus mina* Forel)

- Mesosoma of major longer than head; humeral angles rounded; strongly dimorphic or polymorphic; common in New Mexico 4

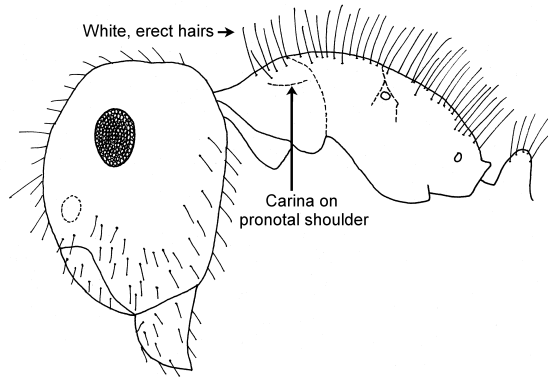


Fig. 327. Head and mesosoma of a major worker of *C. mina*. The arrows indicate the carina on the pronotal shoulder and the dense hair on the dorsum of the mesosoma.

4(3). Anterior border of clypeus feebly projecting, depressed in middle and with narrow, median notch, behind which is a short, triangular impression; not common in New Mexico Subgenus *Myrmentoma*

- Anterior border of clypeus not as above, rarely with median notch and never with impression; very common in New Mexico 5

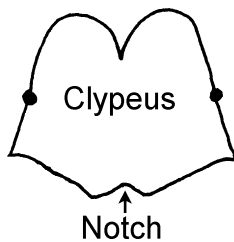


Fig. 328. Clypeus of a worker of *C. hyatti*, showing the notch along the anterior margin.

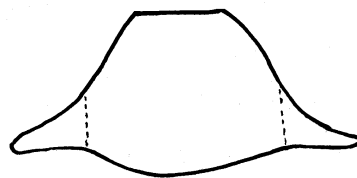


Fig. 329. Clypeus of a worker of *C. sansabeanus* showing the convex anterior margin of the clypeus.

5(4). Clypeus with carina or ridge (Fig. 320); antennal scape often flattened at base; antennal fossae shallow; head of major as long or longer than broad; nest in soil or under stones; most

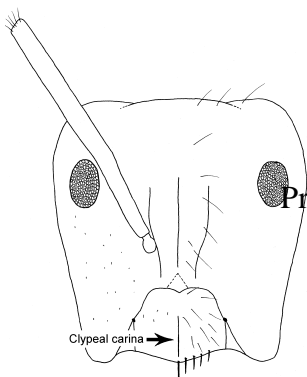


Fig. 330. Head of a major worker of *C. ocreatus*, showing the clypeal carina.

common subgenus in New Mexico Subgenus *Tanaemyrmex*

- Clypeus usually without carina (Fig. 319); antennal scapes never flattened at base; antennal fossae deep; head of major usually wider than long (mandibles excluded); nest usually in logs or stumps; usually found in pine forests Subgenus *Camponotus*

Key to major workers of the subgenus *Camponotus*

1. Anterior margin of clypeus of major worker with angle which median portion makes with lateral portions sharp and tooth-like;

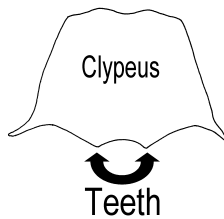


Fig. 332. Clypeus of a major worker of *C. schaefferi*, showing the teeth on the lateral portions.

antennal scape with scattered, erect hairs; concolorous yellowish red;

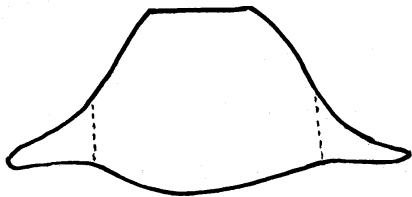


Fig. 334. Clypeus of a major worker of *C. sansabeanus*, showing the lack of teeth on the clypeus.

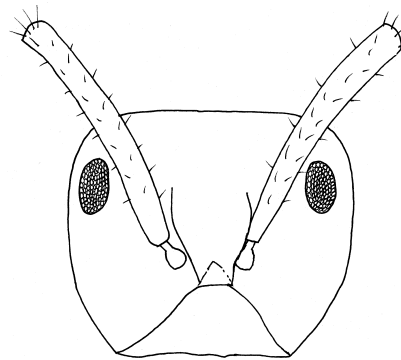


Fig. 331. Head of a major worker of *C. laevigatus*, showing the elongate antennal scapes.

nest in living oak trees or logs; not common *schaefferi*
Wheeler

- Anterior margin of clypeus

not as above, usually scalloped and meeting lateral portions in blunt angles; rarely concolorous yellow red, usually bicolored or dark brown; if yellow-red, scapes without erect hairs **2**

2(1). Antennal scape with numerous, short, erect hairs; surface strongly polished and black in color with bluish reflections *laevigatus* (Smith)

- Antennal scape without erect hairs, except for a few at tip (Fig.); if



Fig. 335. Right antennal scape of a major worker of *C. laevigatus*, showing the erect hairs along the shaft.

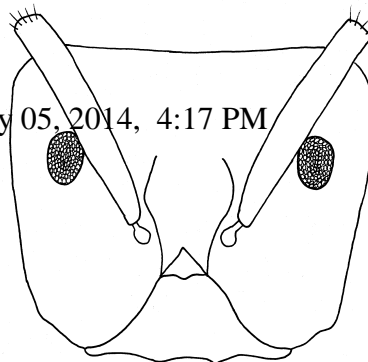


Fig. 333. Head of a major worker of *C. herculeanus*, showing the short antennal scape.

black, surface not strongly polished 3

3(2). Antennal scapes of major worker just reaching, or barely surpassing occipital corners **herculeanus (Linnaeus)**

- Antennal scapes of major worker surpassing occipital borders

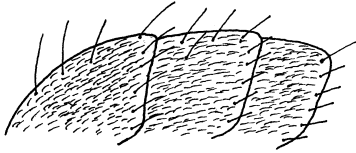


Fig. 336. Dorsum of the gaster of a major worker of *C. modoc*.

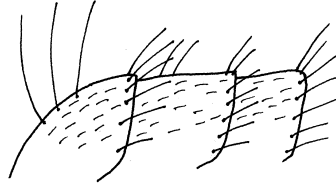


Fig. 337. Dorsum of the gaster of a major worker of *C. noveboracensis*.

by more than 1 diameter 4

4(3). Pubescence on gaster absent or fine and sparse, entire surface of gaster distinctly shining; head and gaster brownish black, mesosoma red; rare in New Mexico **noveboracensis (Fitch)**

- Pubescence on gaster coarse and/or dense, surface of gaster dull, except for narrow band at posterior edge of each tergum 5

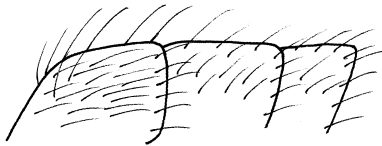


Fig. 339. Dorsum of the gaster of a major worker of *C. pennsylvanicus*, showing the sparse, decumbent pubescence.

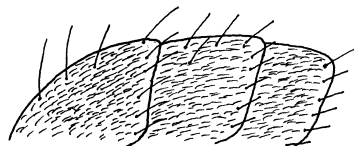


Fig. 338. Dorsum of the gaster of a major worker of *C. modoc*, showing the short, dense, decumbent pubescence.

5(4). Pubescence on gaster less than half as long as erect hairs; clypeus with moderately developed carina; common in New Mexico **modoc Wheeler**

- Pubescence on gaster about as long as erect hairs; clypeus without carina; rare in New Mexico **pennsylvanicus (DeGeer)**

Key to major workers of the subgenus *Myrmentoma* (see Snelling, 1988)

1. Gastral terga with roughened surfaces; appressed hairs abundant on terga, distance between hairs distinctly less than their length; west Texas and Chihuahua **cuauhtemoc Snelling**

- Gastral terga shiny; appressed hairs sparse on gaster, distance between hairs distinctly greater than length; New Mexico **2**

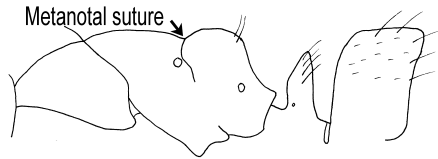


Fig. 340. Mesosoma, petiole and first gastral tergite of a major worker of *C. hyatti*.

more or less definitely roughened interspaces (if punctures distinctly separated by smooth interspaces (*C. essigi*), metanotal suture not depressed (Figs.) **3**

Fig. 342. Mesosoma of a major worker of *C. sayi*. Need figure

Fig. 341. Mesosoma of a major worker of *C. decipiens*. Need figure

2(1). Mandible smooth and shiny between fine punctures separated by two puncture diameters or more; mesosomal profile distinctly depressed at metanotal suture (Figs.

) **hyatti Emery**

- Mandible usually closely punctate or striatopunctate and with interspaces; if punctures distinctly separated by smooth interspaces (*C. essigi*), metanotal suture not depressed (Figs.) **3**

3(2). Propodeum, in profile, with basal face flat, or nearly so, almost entirely on same plane as mesonotum, abruptly rounded or subangulate at juncture with posterior face (Figs.); **sayi Emery**

- Propodeum, in profile, curved or straight, but sloping toward broadly rounded juncture with declivity (Figs.) **decipiens Emery**

Key to major workers of the subgenus *Myrmobrachys*

1. Bicolored, head and mesosoma red, gaster black; gaster covered with dense, fine, silky pubescence **planatus xxx**

- Concolorous black; appressed pubescence on gaster sparse..... **trepidulus Creighton**

Key to major workers of the subgenus *Tanaemyrmex*

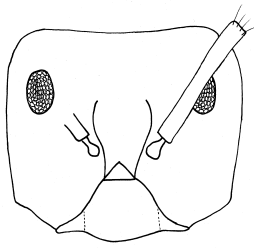


Fig. 343. Head of a major worker of *C. sansabeanus*.

hairs 4

3(2). Scapes barely reach posterior corner of head (Fig.) or surpass it by about one diameter *sansabeanus* (Buckley)

- Scapes surpassing posterior corners of heads by two or more diameters *acutirostris* Wheeler

4(2). Female (queen) usually small, total length about 1 cm or less, about as large as largest worker; head elongate, vertex convex; common and widely distributed in New Mexico

1. Cheeks with 6 or more erect hairs, if fewer, base of scape flattened and widened (Fig.)

..... 2

- Cheeks with 5 or less (usually none) erect hairs, if more, base of scape not flattened and widened 5

2(1). Antennal scapes without erect hairs (except at tip) 3

- Antennal scapes with erect

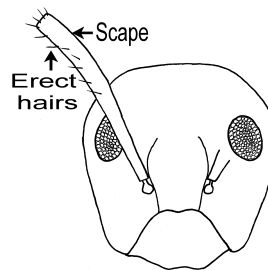


Fig. 344. Head of a minor worker of *C. festinatus*, showing the erect hairs on the antennal scape.

festinatus Buckley

- Female large, about 1.3 cm or greater in total length, much larger than largest worker; head widened posteriorly, vertex concave; rarely collected and known only from SW AZ and SE

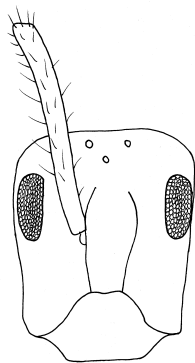


Fig. 347. Head of a female of *C. festinatus*.

Fig. 346. Base of the antennal scape of *C. semitestaceous*. Need figure

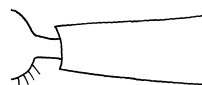


Fig. 345. Base of antennal scape of a major worker of *C. vicinus*.

NM *vafer* **Wheeler**

5(1). Scape of major distinctly flattened at base, forming a small lateral lobule (Fig.); not reported from NM *semitestaceous* **Snelling**

Scape of major may be flattened, but lateral lobule absent (Fig.)
..... **6**

6(5). Cheeks strongly shining, with small, inconspicuous punctures
..... *ocreatus* **Emery**

- Cheeks feebly shining or dull, the punctures coarser and conspicuous *vicinus* **Mayr**

Key to the majors of the subgenus *Camponotus*:

1. Entire body, including legs, black **2**

- Mesosoma usually reddish or yellowish, lighter than head and gaster, or at least the legs are reddish-brown **3**

2(1). Antennal scape covered with short scattered white, erect hairs, mesosoma strongly shining *laevigatus* (**F. Smith**)

- Antennal scape without short scattered erect hairs (a few hairs are present at the tip); mesosoma not strongly shining
..... *modoc*

3(1). Clypeus with a distinct notch in the anterior border, rarely collected ants **4**

- Clypeus without a distinct notch in the anterior border; commonly collected ants **5**

4(3). ???



Fig. 348. Right scape of a major worker of *C. schaefferi*.

5(3). Most or all of mesosoma black and as dark as gaster; legs reddish-brown, contrasting sharply with dark mesosoma
..... *herculeanus* (**Linnaeus**)

- Mesosoma brown and usually much lighter in color than the head and gaster **6**

6(5). Antennal scape extending past the occipital borders by an amount equal to or greater than the length of the first funicular joint7

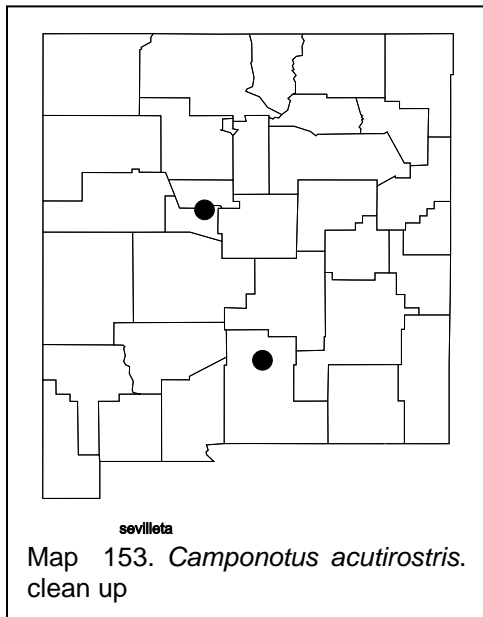
- Antennal scape of major not surpassing the occipital corners, or surpassing them by an amount less than the length of the first funicular joint *sansabeanus* (Buckley)

7(6). Antennal scape distinctly flattened at the base with the flattened portion forming a small lateral lobule; rarely collected *semitestaceus* Snelling

- Antennal scape slightly flattened at the base without the presence of a small lateral lobule; common species *vicinus* Mayr

***Camponotus acutirostris* Wheeler**

Discussion. ### ??? Major workers and females always have 10 or



more erect hairs on the cheeks, the first two usually have none (up to 5 hairs on each cheek). It can be easily separated from *C. sansabeanus* as the scapes are very long. This species is difficult to separate from *C. ocreatus* and *C. vicinus*. material in previous draft was here.

Distribution. USA: TX, AZ, NM: _____ Co., 8 k NE Tularosa, _____ Co., Sevillita, Otero Co., ATM Timberon, Torrance Co., ATM Manzano Mt.; MEXICO: Chihuahua.

Habitat. Arid foothills up into pine forests.

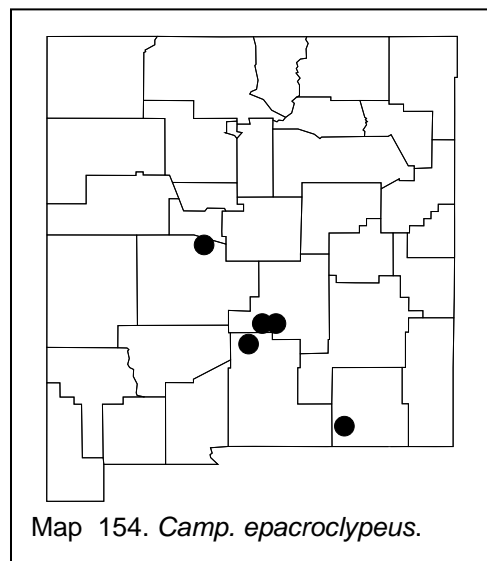
Biology. This species is rarely collected and nests under stones.

***Camponotus epacroclypeus* Mackay add to key**

Discussion. The majors of this species are easily recognized as the clypeus is extended into a sharpened angle or beak-like protection (Fig.). The head is wide as seen from front. The cheeks and malar area have

several erect hairs. The metanotal suture is well depressed, with the mesosoma in profile. The clypeus of the minor worker is similar, but not as elongate. The female and male are unknown.

This species is not likely to be confused with any others in the subgenus *Tanaemyrmex* due to the shape of the clypeus. It can be separated from *C. ocreatus* by the shape of the clypeus and by the presence of erect hairs on the cheeks and the malar area. Species that have erect hairs in these areas do not have a pointed clypeus.



Map 154. *Camp. epacroclypeus*.

Distribution. USA: TX; NM: **Eddy Co.**, Guadalupe Mts. (5.3 k SE Sitting Bull Falls), **Lincoln Co.**, Oak Grove Camp, 4 mi W Alto (Rd. 532), **Otero Co.** (type series), 3 Rivers Campground, **Socorro Co.**, Sevilleta National Wildlife Refuge.

Habitat. Pinyon - juniper forests, oak forests, with grassy areas between trees, usually found in more mesic sites in semiarid areas, at between 1560 - 2300 meters elevation.

Biology. This species nests under stones, in areas of rocky gravel. Brood was found in nests in March. Unknown, except that specimens are often collected

***Camponotus festinatus* (Buckley)**

Discussion. This is common yellowish-brown ant found throughout the deserts of New Mexico. The erect hairs on the antennal scapes further distinguish this species from the others. The small queens separate it from *C. vafer*. Females of a single series from Chihuahua (#5877 in Mackay collection) are as large as those of *C. vafer*. Females of *C. festinatus* also have an oval shaped head which is convex posteriorly (Fig.); those of *C. vafer* are wider posteriorly which is strongly concave posteriorly (Fig.).

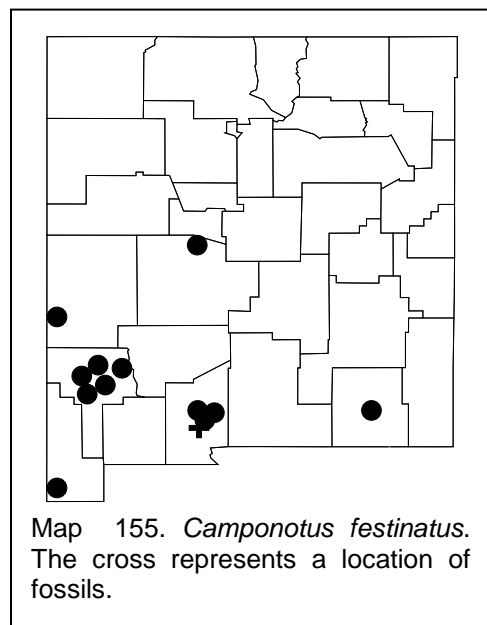
Creighton (1950) and Wheeler (1910) list a number of characters to separate the majors of this species from *C. vafer*. None of the characters

are valid, and except for the differences in the females, we can not distinguish the two species. Wheeler (1910) stated that *C. vafer* differed from *C. festinatus* in its greater size, the shape of the clypeus, coloration, had stiffer hairs on the scapes and coarser foveolation on the head. Wheeler also separated *C. vafer* from related species by a 5-6 toothed mandible, compared with other species that have 7 teeth. One of us (Mackay) compared three cotypes of *C. vafer* with specimens of *Camponotus festinatus* collected from southern California, throughout southeastern Arizona, southern New Mexico, the western half of Texas south throughout the state of Chihuahua east to Coahuila, Mexico, and can see no consistent differences between the two species. With regards to size, cotypes of *C. vafer* are larger than most *C. festinatus*, but we have specimens that are equally large that are typical *C. festinatus*. The clypeus of the cotypes could best be characterized as concave at the anterior medial margin (not actually notched as Wheeler describes). Specimens that could be considered *C. festinatus* range from a straight margin, to a broadly concave margin to a narrowly concave margin as in the cotypes of *C. vafer* (as in well illustrated *C. festinatus* in Snelling, 1968. Proc. Entomol. Soc. 70: 352, Fig. 1). A considerable amount of variation is seen in the shape of the anterior clypeal border within many series. Thus the shape of the clypeal border is an unreliable character in *C. festinatus*. The coloration of *C. festinatus* is variable, ranging from specimens with a nearly black head and gaster, clear yellow mesosoma, to specimens that are concolorous light yellow. Thus the color differences Wheeler used to separate *C. vafer* are insignificant. Erect hairs on the scape of *C. festinatus* range from few to abundant hairs. Wheeler characterized those on the scape of *C. vafer* as being "stiffer" than those of *C. festinatus*. They do not appear to be any stiffer than those on the scape of *C. festinatus*, nor do they appear to be coarser or thicker. The foveolation on the head of *C. vafer* is supposed to be coarser. We can not see any difference when we compare workers of similar sizes. Finally one of the cotypes of *C. vafer* has 7 teeth, although the basal tooth is small. I cannot see the entire mandibles of the other two cotypes and thus cannot count the teeth. The basal tooth on the mandible of *C. festinatus* is also normally small, similar to the *C. vafer* cotype. Creighton (1950) states that the hairs on the underside of the head are uneven in length in *C. festinatus*, and even in length in *C. vafer*. We cannot see any consistency in this character.

Thus workers of *C. vafer* do not appear to differ in any significant way from workers of *C. festinatus*. Therefore one must collect the females

to be sure of the correct identification. *C. vafer* Wheeler apparently occurs only in the extreme SE (Hidalgo Co.) of New Mexico and most specimens collected in the state can be assumed to be *C. festinatus*.

Distribution. USA: CA, AZ, CO, TX; NM: **Catrón Co.**, 21 k N Glenwood, **Doña Ana Co.**, Dripping Springs, 45 k NE Las Cruces, 3 mi E Las Cruces, Organ Mts., La Cueva, **Eddy Co.**, Carlsbad Caverns, **Grant Co.**, Leopold Vista, Mimbres, 60 k E Silver City, 100 k N Silver City, near White Signal, **Hidalgo Co.**, Coronado National Forest (Cloverdale Creek, Clanton Draw), **Otero Co.**, Dog Canyon (fossil). MEXICO: northern part of country.



Habitat. Chihuahuan Desert scrublands, up to juniper forests at 1680 meters elevation.

Biology. This species nests under stones, and is active nocturnally. Brood was found in nests in March, sexuals were found in nests as early as March. Two colonies were nesting under stones with *Crematogaster cerasi*, one

nest was mixed with that of *Solenopsis amblychila*. This species can be a problem in cities as they nest in rock walls and in bricks of houses, removing the mortar.

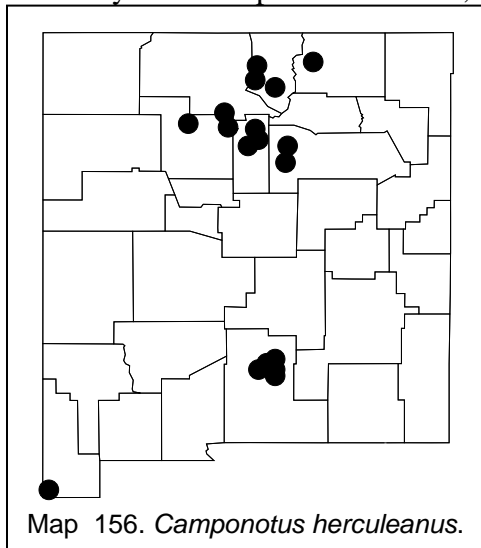
Wheeler 1901

***Camponotus herculeanus* (Linnaeus)**

Discussion. This is a common dark brown or black ant with a dark red petiole, antennae, legs, and base of first gastral segment. The scapes of the majors barely reach, or only slightly surpass the occipital corners. Erect hairs are moderately abundant, being found specifically on the clypeus (along margins), on the dorsal surface of the head, ventral surface of the head, dorsal surface of the mesosoma petiole and gaster, they are absent on the cheeks, scapes (except at apex) and tibiae (except for a double row on flexor surface); decumbent pubescence is sparse, and is

limited to a few tiny hairs on the head, dorsum of the mesosoma, and dorsal surface of the gaster. The minors are similar except for size, having an oval shaped head, and the scapes extend well past the occipital corners. The females are large, mostly black specimens. The scape extends more than 2 funicular segments past the occipital corners.

This species is relatively easy to recognize among the ants of the subgenus *Camponotus*, as the scape reaches or barely surpasses the occipital corners. The scape of the majors of all of the other species in the subgenus nearly always extends at least 1 - 2 (or more) funicular segments past the occipital corners. It would be most likely to confuse this species with *C. (Tanaemyrmex) sansabeanus*. Both of these species have relatively short scapes. In addition, the clypeus of *C. sansabeanus* has a



poorly developed carina, which could result in it being confused with members of the subgenus *Camponotus*. The species can be separated, as the antennal scapes of *C. herculeanus* are never flattened at the base, whereas they nearly always are in *C. sansabeanus*. This species is also somewhat dull in appearance, whereas *C. sansabeanus* is usually shiny and little sculptured. The shape of the clypeus is completely different in the 2 species: *Camponotus herculeanus* has a wide clypeus,

which is convex, but without any raised or depressed areas in the medial region. The clypeus of *Camponotus sansabeanus* is narrower (compare Figs.), and the central region is usually somewhat upraised, and occasionally there are longitudinal oblique depressions which point towards the medial region in *C. sansabeanus*. Finally, this species has no erect hairs on the cheeks, whereas *C. sansabeanus* normally does.

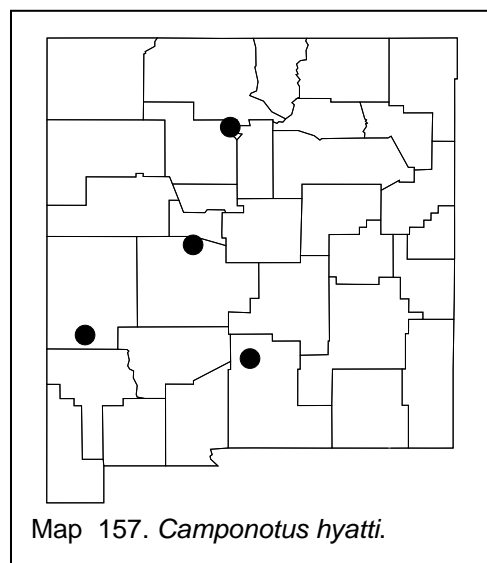
Distribution. CANADA: Quebec; USA: Most of United States; NM: Colfax Co., 4 k W Eagle Nest, Los Alamos Co., Los Alamos (Camp May), Otero Co., Cloudcroft; Sacramento Mts., James Canyon, Cox Canyon, San Miguel Co., Beulah, Pecos Mts. Santa Fe Co., Hyde Park (Sangre de Cristo Mts.), near Santa Fe, Little Tesuque Canyon, Sandoval Co., Jémez Canyon.

Habitat. Meadows, deciduous forests, and especially common in pine, aspen and spruce-fir forests. Widely distributed in northern New Mexico.

Biology. This very common species normally nests in rotten logs and stumps, but nests are occasionally found under stones, especially incipient nests. This species may form a plesiobiotic relationship with *Formica neorufibarbis*. Foragers tend several species of aphids on many different plant species. Reproductives and brood were present in the nests from June to August, reproductives until September. Foundress females were found from late June to October.

Jones, 1929, Gregg, 1946, 1963, Brown, 1949, Hölldobler, 1950, Weber, 1950, Perttunen, 1955, Brown, 1955, Hölldobler, 1961, 1962, 1962, Wheeler and Wheeler, 1963, Gregg, 1963, Sanders, 1964, 1972, Ayre, 1963, Ayre and Blum, 1971

***Camponotus hyatti* Emery**



Discussion. The majors of this species can be recognized by the deep impression at the metanotal suture, and by the convex dorsal face and concave posterior face of the propodeum (Fig.). They are generally bicolored, with the head and mesosoma reddish-brown, and the gaster dark brown. The antennal scapes fail to reach the occipital corners by about 2 funicular segments. The petiole is slender as seen in profile. The majors have few erect hairs, with none on the sides of the head, on the cheeks, or

on the scapes. The dorsal and posterior faces of the propodeum are about equal in length. There are usually few erect hairs on the dorsum of the mesosoma, on the petiole, and dorsum of the gaster. Most surfaces are at least moderately shining, the gaster is transversely striolate and shining. The area between the punctures on the mandibles and the dorsum of the gaster are smooth and shining. The minors are similar, with the metanotal

suture impressed on the dorsum of the mesosoma, but not as deeply as in the major worker. The pilosity, sculpture, and color are similar to that of the major workers.

Both the majors and minors of this species can be separated from those of most other species by the depressed metanotal suture, and by the reduced numbers of hairs on the mesosoma, especially on the pronotum. Additionally most of surfaces are moderately smooth and shining.

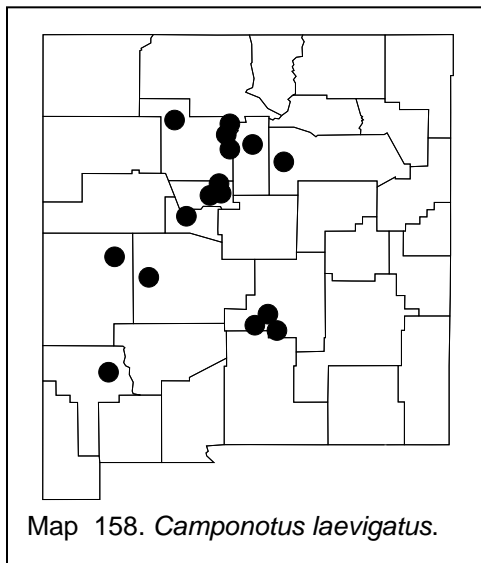
Distribution. USA: ID, NV, CA, TX, AZ, (Cochise Co.); NM: **Catron Co.**, Mogollon Mts., **Los Alamos Co.**, Rio Grande, **Otero Co.**, 8 mi NE Tularosa, **Socorro Co.**, Sevilleta National Wildlife Refuge; MEXICO: Baja California.

Habitat. This species appears to be limited to areas of sagebrush at around 1770 m elevation.

Biology. This species nests in the roots of sagebrush (*Artemisia* spp.) in New Mexico.

Cole, 1966

***Camponotus laevigatus* (F. Smith)**



Discussion. The majors, minors, and females are easily recognized, as it is the only species which is shiny black with small, erect hairs on the scape (Fig.), as well as other body parts. The males may be easily recognized by the abundant, white, erect hairs on many body parts including the head, scape, mesosoma, petiole, gaster, and tibiae. The erect hairs on the scapes may cause confusion with *C. schaefferi*, which also has erect hairs on the scapes and is glossy and shiny. It can be easily separated as it is black, and *C.*

schaefferi is yellowish-brown.

Distribution. CANADA: British Colombia; USA: Western United States, NM: **Bernalillo Co.**, Cupin Crest, Sandia Mts., **Catron Co.**, Ox Spring Canyon, **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, 2 k NE

Los Alamos, **Grant Co.**, 88 k E Silver City, **Lincoln Co.**, 2 mi SE Alto, 2 mi W Alto, Plume Canyon (Sierra Blanca Rd.), **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, **Sandoval Co.**, Bandelier Nat. Mon., 4 k W Cuba, **San Miguel Co.**, Pecos, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, near Grassy Lookout, **Valencia Co.**, 57 k SW Grants, **Habitat.** Deciduous forests, oak forests (Gamble), pinyon-juniper, fir and pine forests at higher elevations or latitudes, 2130 - 2447 meters in elevation. Nests are occasionally found in urban areas.

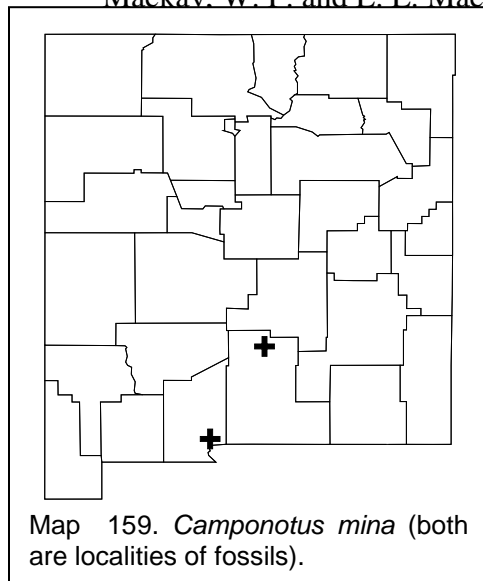
Biology. This species nests in rotten logs and stumps and is an occasional pest in buildings. Brood was found in nests in August, new nests were established in August. They are prey of *Pogonomyrmex montanus* in southern California.

Wheeler, 1917, Eckert and Mallis, 1937, Furniss 1944, Gregg, 1963.

***Camponotus mina* Forel**

Discussion. The major of this species can be recognized as has abundant erect hairs, most with blunt tips, some are nearly spatulate, these hairs cover the head, several similar hairs are found on the scapes, longer erect hairs are present on the mesosoma, as are those on the gaster. The decumbent pubescence is sparse. The anterior border of the clypeus is concave, the ant is black with reddish-brown or brown mandibles, antennae, and the tibiae. The minor is similar, except the hairs are finer. The region posterior to the eye and the pronotal shoulder is swollen.

The minor workers of this species are easily confused with the minor workers of the sympatric *C. ulcerosus* (the obliquely truncate head of the majors of *C. ulcerosus* make them easily distinguished). This is apparently due to convergent evolution, as the 2 species are not closely related. The minors of *C. mina* have several erect or suberect hairs on the scapes, whereas the scape of the minor of *C. ulcerosus* has few or none. The occipital corner of *C. mina* is angulate (as seen in full-face view), that of *C. ulcerosus* is rounded. The clypeus of the minor worker of *C. mina* is proportionally wider (clypeal index at least 123, compared with the CLI of *C. ulcerosus* ranging up to 111). The region posterior to the eye of *C. mina* is swollen, that of *C. ulcerosus* is not. The pronotal shoulders are swollen, although the swelling in *C. mina* is more developed. The propodeum of *C. ulcerosus* is lower than that of *C. mina*. *Camponotus mina* nests in plant cavities, *C. ulcerosus* nests in the soil. The clypeal carinae of the minors of



both species are approximately equally developed. Hopefully these suggestions will help in separating isolated minor workers, but will also underscore the need to collect majors of *Camponotus*.

Distribution. USA: S AZ, TX; Fossils have been found (Mackay and Elias, 1992) in Texas and NM: **Otero Co.**, Dog Canyon, **Doña Ana Co.**, Shelter Cave; MEXICO: Baja California, Chihuahua, Sonora.

Habitat. Mesquite dominated desert.

Biology. This species was present in the Chihuahuan Desert from at least 40,000 years ago until nearly recent time (Mackay and Elias, 1992). Specimens often nest in mesquite shrubs (*Prosopis glandulosa*).

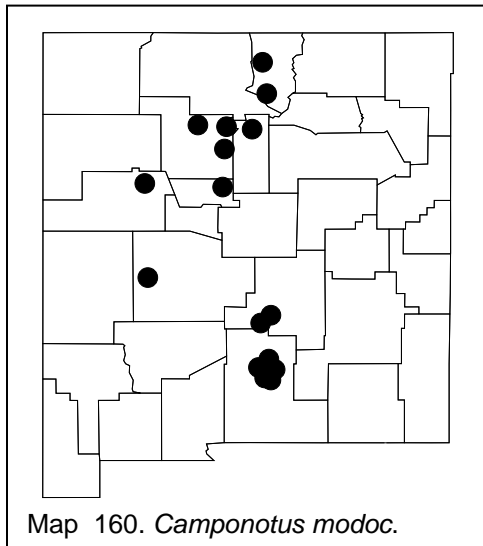
Wheeler, 1910, Creighton, 1965

***Camponotus modoc* Wheeler**

Discussion. The majors, minors, and females of this species are predominantly black, dull ants, with slightly reddish legs and funiculi. The scapes are without erect hairs (except at the apex), the hairs on the clypeus are located mostly along the borders, the dorsum and ventral surface of the head have few erect hairs, the cheeks and sides of the head are without erect hairs. Most surfaces have golden, decumbent hairs, which are scarce on the head and mesosoma, and slightly more abundant on the gaster, where at least a few of the hairs overlap adjacent hairs.

This species has been considered to be a subspecies of either *C. herculeanus* or *C. pennsylvanicus*. It can be easily and reliably separated from both of these species, as the decumbent hairs on the gaster are much shorter than the erect hairs (about equal in length in the other 2 species). The decumbent hairs on the mesosoma are sparse and do not overlap adjacent hairs, whereas the decumbent hairs on the mesosoma of the other 2 species are abundant, and even extend on to the lateral surface of the propodeum, and many hairs overlap adjacent hairs. The scapes of the

majors of this species extend nearly 1 funicular segment past the occipital corner, which separates it from *C. herculeanus*.



Distribution. USA:

Western North America; **NM:** **Bernalillo Co.**, Embudo Canyon, **Cibola Co.**, Mt. Taylor, **Lincoln Co.**, Alto, Sierra Blanca, **Los Alamos Co.**, 2 k NE Los Alamos, **Otero Co.**, Cloudcroft, Timberon, (Timberon, Agua Chiquita, Jim Lewis Spring), 9 k NE Timberon, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **Santa Fe Co.**, 12 k NE Santa Fe, **Socorro Co.**, Grassy Lookout, **Taos Co.**, 20 k S Taos, 6 k W Tres Piedras; **MEXICO:** Chihuahua, Nuevo León.

Habitat. Forested areas, ranging from deciduous through pinyon pine and ponderosa pine, pine-spruce-popular and spruce forests up to subalpine fir (2490 - 3000 meters altitude).

Biology. This species nests in rotten logs and stumps, or rarely under stones. Brood and reproductives occurred in nests from June to September, dealate females were found from July to October. Workers escape with brood when the nest is disturbed, and are preyed on by members of the *Formica rufa* species complex. One colony was nesting together with *Formica argentea*, another with *F. hewitti*, a third with *F. neoclara*. Another colony was together with *Tapinoma sessile*.

Wheeler, 1917, Eckert and Mallis, 1937, Mallis, 1941, Furniss, 1944, Gregg, 1963

***Camponotus nearcticus* Emery**

add to map

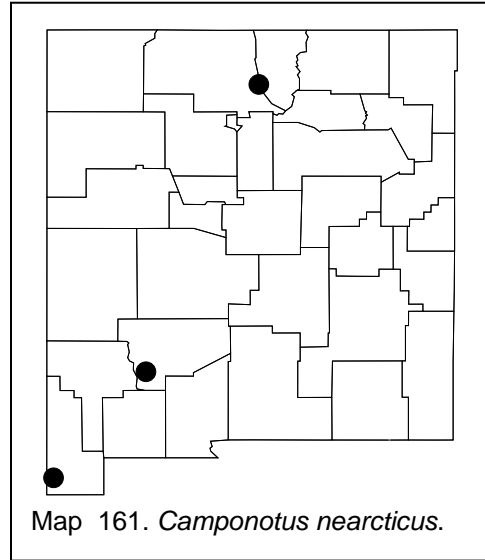
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Discussion. This is a small, bicolored carpenter ant. The majors of this species can be recognized by the shiny gaster, by the dull surface of the mandible, lack of erect hairs in the sides of the heads and cheeks, and by the convex propodeum (and mesosoma). There are few erect hairs,

specifically 1 - 2 pair on the basal margin of the clypeus, none on the cheeks or malar area, few on the dorsum of the mesosoma, petiole and gaster. *Camponotus rasilis* is a synonym.

Distribution. CANADA: southern region; USA: Most of the United States; NM: **Hidalgo Co.**, Peloncillo Mts. (Coronado National Park, Clanton Draw, Cloverdale Creek), **Sierra Co.**, 21 k S Hillsboro, **Taos Co.**, Ojo Caliente.

Habitat. Prairies and woodlands, especially riparian



Map 161. *Camponotus nearcticus*.

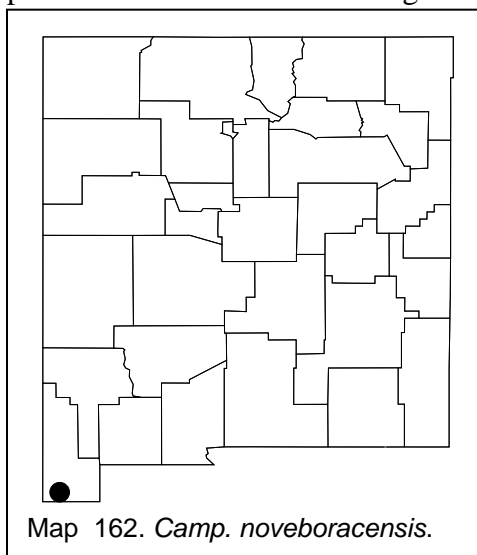
habitats, ranging from deciduous forests, oaks, pinyon-juniper forests up to ponderosa pine forests.

Biology. This is an arboreal species (Deyrup et al., 1988), especially of oaks (*Quercus arizonica* in New Mexico), cottonwoods and even pines, although specimens collected by S. Cover and N. Carlin were nesting in a royal palm hummock (pers. comm.). The series from Arizona was collected in the stump of a dead Arizona oak. In central and southern Texas, this species nests in galls of the cynipid *Disholcaspis cinerosa* in live oaks (*Quercus virginiana*) (Wheeler, 1910; Wheeler and Longino, 1988, reported as *C. decipiens*, *C. rasilis*). Specimens from the Everglades were collected in a dead branch hanging in the understory of a mature hammock forest. Brood and reproductives were found in nests in March. An average nest contained 198 minors and 36 majors. The largest complete nest we collected contained 531 minors, 188 majors, 5 alate females, 1 dealate nest gyne, and 144 males. All nests contained a single gyne. The brood was not counted. Reproductives occur in nests in March to October. This is a very timid species that hesitates to rescue brood when the nest is disturbed. Workers tend coccids and aphids and carry pieces of dead insects to the nest. This can be a house-infesting ant.

Wheeler, 1906, 1910, Davis and Bequaert, 1922, Kanno, 1959, Gregg, 1963, Wheeler and Wheeler, 1963, Smith, 1965, DuBois and Danoff-Burg, 1994

***Camponotus noveboracensis* (Fitch)**

Discussion. This is a large, attractive, red and black species. The majors, minors and females of this species have a black head and gaster, and a red mesosoma. The punctures on the head are 2 sizes, most are very fine, larger punctures are scattered over the surface of the head. The lateral clypeal angles are present, but are not well developed, the antennal scapes are without erect hairs (except at apex), the scapes extend nearly 1 funicular segment past the occipital corner in both the majors in the females. Erect hairs are sparse on the head, mesosoma, petiole and gaster, and absent on the cheeks, malar area, sides and head, occipital corners, and tibiae, except for 2 rows of hairs on the flexor surface. The pubescence on the gaster is very fine, with none of the hairs overlapping adjacent hairs. These characteristics would separate this species from all others of the subgenus *Camponotus*.



Map 162. *Camp. noveboracensis*.

Distribution. CANADA: Nova Scotia, Quebec; USA: northern part of country south to New Mexico NM: check id. **Hidalgo Co.,** Guadalupe Canyon.

Habitat. Wooded areas.

Biology. This species nests in rotten logs and stumps. It is an occasional house pest.

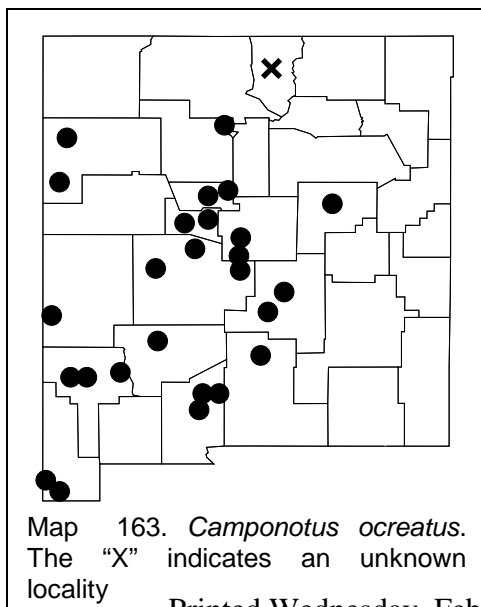
Jones, 1929, Gregg, 1944, 1963, Wheeler and Wheeler, 1944, 1963, Kanno, 1959, Sanders, 1964, 1972, Gotwald, 1968, Wing 1968

***Camponotus ocreatus* Emery**

Discussion. Majors, minors and females can be recognized by having no erect hairs on the cheeks or sides of the head, the base of the

scapes are not flattened, or weakly flattened, the sides of the head are punctate, but moderately shining, the gaster is strongly shining, with the sculpture of the gaster consisting of punctures, decumbent pubescence on the gaster is sparse and tiny (> 0.04 mm). The scape extends well past the occipital corner. Color varies, but usually these ants have a black head with the remainder brown.

This species is very difficult to distinguish from *C. vicinus*, but is usually easily distinguished. The gaster of *C. ocreatus* is glossy and shining. Upon closer inspection one can see that it is finely punctate, or if striate, there are box-like structures in the striae (Fig.). It also differs in that the genae are strongly shining with inconspicuous punctures. The reflection is very strong (enough to be uncomfortable under the scope when a strong light is reflected from the surface). It also has 10 or less erect hairs on the pronotum, *C. vicinus* has 7 or more (see discussion of *C. vicinus*). Additionally, the decumbent pubescence is very sparse and small, with non-overlapping along their length. *Camponotus vicinus*, on the other hand, has a gaster with a dull surface, with distinct, transverse striae, and with long, abundant pubescence. *Camponotus ocreatus* is usually brown with a black head, whereas *C. vicinus* is usually black with a brown mesosoma (this is nearly always the case with the majors of the two species). Other minor characters would include the more shining cheeks in *C. ocreatus*, and the less flattened antennal scape base. Occasionally specimens are found that are intermediate between the two species, but most can be easily separated.



Distribution. USA: CA, AZ, NV, TX, NM: throughout the mountains of the state (Map), including **Bernalillo Co.**, Albuquerque, Elena Gallego, **Catron Co.**, 21 k N Glenwood, **Cibola Co.**, 22 k S Fence Lake, **Doña Ana Co.**, Dripping Springs, 45 k NE Las Cruces, (Jornada Long Term Ecological Site), **Grant Co.** Leopold Vista, 60 k E Silver City, **Guadalupe Co.**, Santa Rosa, **Hidalgo Co.**, 2 mi W Cloverdale, Guadalupe Canyon, **Sierra Co.**, 11 mi NW Cuchillo,

Socorro Co., Gran Quivira, 21 k S Magdalena, Sevilleta National Wildlife Refuge, **Taos Co.**, without locality, **Torrance Co.**, near Mountainair; MEXICO: Baja California, Baja California Sur, Chihuahua.

Habitat. Foothills of surrounding desert areas, including oak-juniper woodland (*Quercus turbinella*, *Rhus trilobata*, *Juniperus* sp.), with trees up to 4 meters tall, pinyon pine forests, riparian desert canyons with sycamore, cottonwoods and grass.

Biology. This species nests under stones in rocky loam soils, often on rocky, north-facing slopes. Nests are often in partial shade at the edge of a forest. Brood was found in nests from March to July. A dealate female was found in July. Foraging activity is nocturnal. One colony was nesting with *Trachymyrmex arizonensis*.

Cole, 1954, 1966, Wheeler and Wheeler, 1973

***Camponotus papago* Creighton**

Discussion. This species can be easily recognized by the truncate anterior part of the head of the major, which is nearly perpendicular to the long axis of the head as seen from the side (Fig.). It could be confused with *C. ulcerosus*, but the head of the latter species is obliquely truncate. Additionally, *C. papago* nests in dead branches, *C. ulcerosus* nests under stones. The minors of both species are difficult to recognize, and to distinguish from those of other species. The minors of these two species can be separated as the metanotal suture is depressed in *C. papago*, but is not in *C. ulcerosus*.

Distribution. USA: southern and southeastern AZ; may occur in New Mexico; MEXICO: Sonora.

Habitat. Oak and mesquite forests.

Biology. This species nests in dead limbs of oaks (*Quercus emoryi*, *Q. oblongifolia*), or mesquites, and are difficult to find. They are most common in the stubs of broken branches, with a diameter of 4 cms or more, and point vertically (apparently catch more rainwater). The nest has several entrances, which are blocked by the large, round, truncated portion of the heads of majors (see figure in Creighton, 1967). They move to allow the minors to exit and enter the nest. Creighton (1967) wrote one of the most interesting articles ever written on ants for a general audience, and is well worth reading. When the majors are disturbed, they exude a sticky, gray fluid from the region of the mouth (probably mandibular glands?), which spreads over the truncated portion of the head. It dries to a

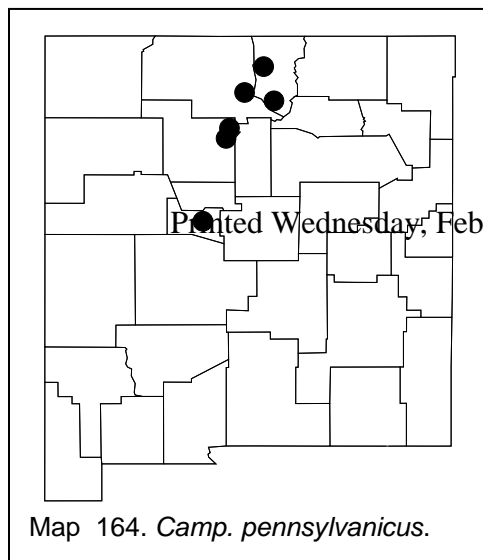
crust, which is difficult to remove. Mating flights occur throughout July, during the first half of the rainy season. Workers apparently forage at night, as they are not found on during the day on trees which contain nests.

Creighton, 1952, 1967

***Camponotus pennsylvanicus* (DeGeer)**

Discussion. This was the first native North American ant species to be described. The majors, minors, females, and males of this species are large, black ants without hairs on the cheeks or sides of the head, or occipital corners, the scapes are without erect hairs, except at the apex, the mesosoma has numerous hairs on the dorsal surface, as does the petiole. The gaster has erect hairs scattered over the entire surface, the tibiae are without erect hairs, except for 2 rows along the flexor surface, in which most hairs are present along the apical half. Decumbent pubescence is sparse on most surfaces, including the head, and mesosoma, although the hairs on dorsum are more numerous, but non-overlap or few overlap adjacent hairs, the side of the propodeum has a few decumbent hairs. The hairs on the gaster are long (over 0.02 mm) and abundant, nearly all hairs overlap adjacent hairs, and are nearly as long as the erect hairs on the gaster.

This species is a member of a group of 3 species (with *C. herculeanus* and *C. modoc*), which are difficult to separate. Majors can be separated from those of *Camponotus modoc*, as the appressed hairs on the gaster are nearly as long or as long as the erect hairs, whereas these hairs on *Camponotus modoc* are generally shorter than the erect hairs. The decumbent hairs on the gaster overlap adjacent hairs, whereas they rarely do in *C. modoc*. *Camponotus pennsylvanicus* is nearly always concolorous black, whereas *Camponotus herculeanus* generally has a deep red mesosoma, or at least deep red legs. Along the western edge of the distribution (Wyoming south to northern New Mexico) specimens usually have red legs, which may be evidence of hybridization. The scapes of the major of *Camponotus pennsylvanicus* extend 1 - 2 funicular segments past the occipital corner, whereas in *Camponotus herculeanus* they rarely reach the occipital corner, or extend less than 1 funicular segment past the occipital corner. The decumbent hairs on the gaster are much denser in *Camponotus pennsylvanicus*.



Map 164. *Camp. pennsylvanicus*.

The minors of the 3 species are very difficult to separate. The minors of *Camponotus pennsylvanicus* are usually concolorous black, whereas at least the legs of *Camponotus modoc* and *Camponotus herculeanus* are often dark red. The decumbent hairs of *C. modoc* and *C. herculeanus* are usually shorter than they are in *C. pennsylvanicus*.

The females of the 3 species cannot be reliably separated, as the decumbent hairs on the gasters of the females of *C. pennsylvanicus* are often short and similar to those of *C. modoc* and *C. herculeanus*. The females of *Camponotus pennsylvanicus* are concolorous black, whereas the legs of the other 2 species are occasionally dark red. The scapes extend about the same distance past the occipital corners in all 3 species.

The males of the three species cannot be distinguished, and in general cannot be separated from other species of *Camponotus*.

Distribution. CANADA: New Brunswick and Quebec; USA: Eastern North America as far west as TX; NM: **Los Alamos Co.**, Los Alamos, Camp May, **Taos Co.**, Ojo Caliente, 20 k S Taos, 6 k SW Tres Piedras. It is not widely distributed in New Mexico, but is locally common.

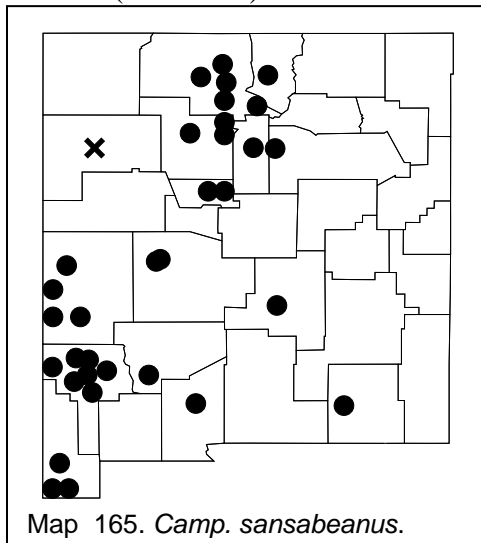
Habitat. Ranging from prairies to forested areas (ponderosa pine), including riparian habitats with cottonwoods.

Biology. This species, the black carpenter ant, and the first North American ant to be described, nests in living and dead trees, rotten logs or stumps in forested areas. This is an important, destructive pest that attacks fences, poles and buildings. This is probably the most destructive carpenter ant in North America (Wheeler and Wheeler 1963), although Creighton (1950) argued that its destructive capacities were somewhat exaggerated and that they only tunnel in decayed wood. It often forages inside homes, making it an important house pest. Reproductives were found in nests from April to October. This species is found in the same logs and stumps as members of the genera *Lasius*, *Formica* (i. e. *F. podzolica*), and *Leptothorax*. Workers tend aphids, with the smaller workers collecting honeydew and transferring it to larger workers that carry it back to the nest. In addition, foragers feed on dead insects and plant juices.

McCook, 1877, Pricer, 1908, Herrick, 1914, Gibson, 1916, Graham, 1918, Jones, 1929, Back, 1937, Van Pelt, 1958, Wheeler and Wheeler, 1963, Sanders, 1964, 1972, Smith, 1965, DuBois and Danoff-Burg, 1994

***Camponotus sansabeanus* (Buckley)**

Discussion. This is a very common species in northern New Mexico. Majors have wide heads, and the scape usually just reaches the occipital corner, or passes the occipital corner by less than 1 first funicular segments. Erect hairs on the head are mostly restricted to the clypeus, but can be found on other parts of the head, and even the sides of the head and ventral surface of the head. The base of the scape is flattened and may even be lobe-like. Color ranges from pale yellow to black, most specimens are bicolored with the head darker than remainder of the ant. Females are similar, except the scapes are relatively longer and the head is usually noticeably widened near the level of the eye (Fig.). The petiole of the female is slender in profile, with a sharp apex, the anterior face near the apex is slightly concave. The scape of the male is not flattened at the base. Specimens from southeastern Arizona (Cochise Co.) and western New Mexico (Grant Co.) often have erect hairs along the sides of the head.



This species could be confused with two other species: *C. dumetorum* and *C. semitestaceous*. Unfortunately the distributions of all three species overlap, further complicating identification.

Camponotus sansabeanus can usually be separated from *C. semitestaceous* as the antennal scape extends < one funicular segment past the occipital border, not > 1 as in *C. semitestaceous*. It can usually be separated from *C. dumetorum* as that the decumbent pubescence on

the gaster is usually sparse, not abundant as in *C. dumetorum*, and *C. dumetorum* does not occur in New Mexico. The minors of *C. sansabeanus* and *C. dumetorum* can often be distinguished from those of *C. semitestaceous* as the antennal scape extends about halfway past the occipital corner, whereas in *C. semitestaceous* it usually extends more than half length past the corner. The females of the first two species can usually be separated from *C. semitestaceous* as the scapes extend past the occipital corners by about 1 ½ funicular segments, whereas in *C. semitestaceous* the

scape extends at least 2 segments past the occipital corner. The males of the first two species are easily separated from those of *C. semitestaceous* as the entire outline of the head this see the frontal view is covered with erect hairs, whereas the hairs are sparse in *C. semitestaceous*.

Distribution. USA: Southwestern United States CA, AZ, NV, UT, CO, TX east to MO, OK, LA and AR, MEXICO: Baja California, Chihuahua, Coahuila; NM: **Bernalillo Co.**, Albuquerque, NW Albuquerque, Tijeras, **Catron Co.**, Catwalk, 2 mi N Frisco Hot Springs, 23 k N Glenwood, 8 k N Reserve, **Doña Co.**, 45 m NE Las Cruces, **Eddy Co.**, Hidden Cave, **Grant Co.**, Leopold Vista, Mimbres, Mule Creek, 100 k N Silver City, 60 k E Silver City, 10 mi S Silver City, White Signal, **Hidalgo Co.**, Animas Mts., Clanton Draw, Guadalupe Canyon, **Lincoln Co.**, 5 mi W Capitan, **Los Alamos Co.**, Los Alamos, Rio Grande near Los Alamos, **McKinley Co.**, **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 7 k S Cebolla, 2 k N Dixon, **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, **Santa Fe Co.**, Santa Fe, **Sierra Co.**, 31 k SW Hillsboro, **Socorro Co.**, Bear Mt., 17.6 k NW Magdalena, **Taos Co.**, 20 k NW Taos., **San Miguel Co.**, Pecos.

Habitat. Sagebrush, pinyon-juniper (most common in this habitat), oaks, ponderosa pine, Chihuahuan pine, rocky ridges near pines.

Biology. The nests are usually found under stones, but may be in (and under) rotten stumps and logs, or even under cow manure (especially founding gynes and young nests), in rocky, gravelly or loam soils. Brood and reproductives were found in nests in August and September. Dealate females were found in March, May and June and September. This species forages diurnally. Workers are timid and escape when the nest is disturbed. One colony was nesting together with *Forelius*.

Wheeler, 1917, Cole 1954, Gregg, 1963, Wheeler and Wheeler, 1973

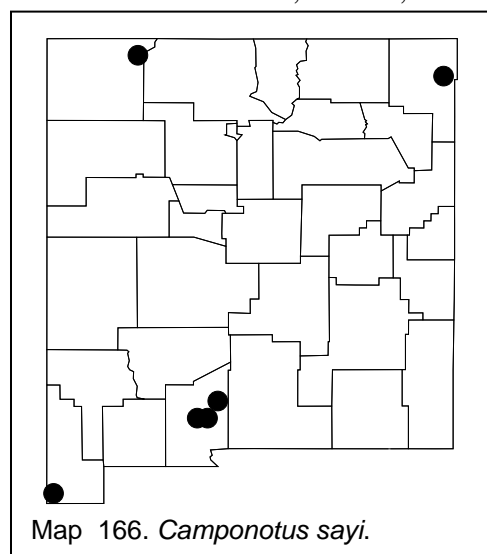
***Camponotus sayi* Emery**

Discussion. Major workers of this species have a well defined notch on the anterior border of the clypeus, usually have 2 erect hairs along the basal border of the clypeus, the cheeks and the malar area are without erect hairs, the pronotum is usually without erect hairs, but they have as many as 4, the dorsum of the mesosoma is very weakly convex, or even straight, the angle of the propodeum is relatively sharp as seen in

profile, the petiole is narrow, with sharp apex, the head and mesosoma are usually red, gaster black.

The majors of this species are usually easy to identify, based on the shape of the mesosoma, with the dorsal surface being relatively flat and the propodeum relatively sharply angulate between the 2 faces. The usual lack of hairs on the pronotum also help in the identification. Minor workers are difficult to recognize, and can be confused with those of *C. hyatti*, as the mandible can be moderately shiny. The smaller workers can also be confused with those of *C. nearcticus*. As the distributions of these 3 species overlap, it is usually necessary to collect major workers to distinguish them.

Distribution. USA: Eastern United States as far west as OR, south to CA; NM: **Doña Ana Co.**, 18 k E Las Cruces, 40 k E Las Cruces, Aguirre Springs, **Hidalgo Co.**, Peloncillo Mts, (Coronado National Park), **San Juan Co.**, Archuleta, **Union Co.**, Kiowa National Grasslands; MEXICO: Chihuahua, Sonora, Durango.



Map 166. *Camponotus sayi*.

Habitat. Chihuahuan Desert (in New Mexico), arroyos with hackberry (*Celtis*), cottonwoods (*Populus*) in other areas habitats range from prairies to oak-hickory forests, scrubby juniper-pinyon-oak woodland or scrubby ponderosa pine on rocky slopes next to washes, steep, shaded streambanks of seasonal creek valleys with scattered sycamores, walnuts, junipers and large *Quercus grisea*.

Biology. This species occurs in arid ecosystems where it nests in mesquite (*Prosopis* spp.) and oaks (*Quercus* spp.), such as dead limbs (2 - 8 cm diameter) of *Quercus arizonica*, *Q. emoryi* and *Q. grisea*, about 2 meters above soil surface. Dealate females begin nests in such limbs. It is a minor house pest in some areas. Reproductives were found in nests in April.

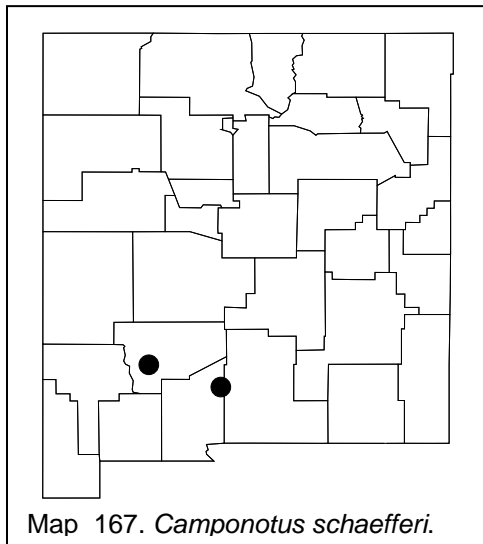
Wheeler, 1910, Dennis, 1938, Gregg, 1963, Smith, 1956, DuBois and Danoff-Burg, 1994

Camponotus schaefferi* Wheeler*add to key**

Discussion. This is an unusual member of the subgenus *Camponotus*. The teeth on the anterior border of the clypeus are well-developed (Fig.), the sides of the head of the major are nearly parallel, or even slightly wider anterior to the eyes, the scapes have erect hairs, but the remainder of the ant has few erect hairs, and the anterior and posterior faces of the petiole are nearly parallel. The entire ant is yellowish-brown or reddish brown.

This species is easily separated from all of the other members of the subgenus *Camponotus*, by a combination of having erect hairs on the scapes, being concolorous yellowish-brown, and having the sides of the head of majors, minors and females nearly parallel. It could be confused

with *C. laevigatus*, which also has numerous erect hairs on the scapes, and both species are shiny, but they are easily separated as *C. laevigatus* is black. Additionally, the teeth on the clypeal border are much more developed than they are in *C. laevigatus*. The shiny sculpture and color will separate it from all other New World species of the subgenus, except *C. texanus*. It can be separated from this latter species by color: *C. texanus* is bicolored, with the head and gaster black, mesosoma red or reddish-brown.



Map 167. *Camponotus schaefferi*.

Distribution. USA: AZ, NM: **Doña Ana Co.**, 40k E. Las Cruces (Aguirre Springs), **Sierra Co.**, 20.7k E Hillsboro.

Habitat. Scrubby ponderosa pine, Arizona oak, oak pine-juniper woods, oak foothills, from elevations of 1,520 - 2,440m.

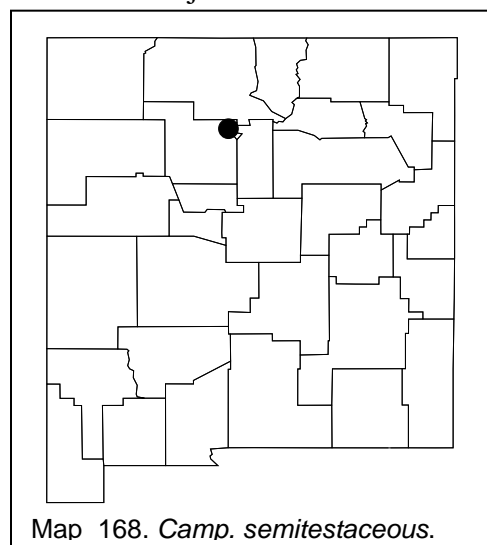
Biology. This carpenter ant nests in dead oak limbs and inside living trunk of half-dead Emory oaks. They are very agile and difficult to capture.

Wheeler, 1917

***Camponotus semitestaceus* Snelling**

Discussion. This species is closely related to *C. dumetorum* and *C. sansabeanus*. The base of the scape is flattened and enlarged into a lobe. It can usually be separated as the antennal scapes extend more than one segment past the occipital corner, usually about two segments. Further notes on this group of species, in addition to hints on the separation of the minors, females, and males, can be found in the discussion of *C. sansabeanus*.

Distribution. USA: Western United States as far east as OK; NM: Sandoval Co., Bandelier National Monument (Pippin and Pippin, 1984); MEXICO: Baja California.



Habitat Pinyon juniper forests.

Biology. Nests are found under stones or in the soil, surrounded by a small mound (few cms up to 30 cms in diameter). The colonies are large with many majors. Workers are active during the night or during cooler times of the day, and tend Homoptera. Nest density can be very high. Brood was found in a nest in May; reproductives were found in nests in September. The scarabaeid beetle *Cremastocheilus planatus*

and the ant cricket *Myrmecophila oregonensis* occur in nests.

Wheeler, 1906, 1910, 1917, Essig, 1926, Cole, 1934, Eckert and Mallis, 1937, Mallis, 1941, Cole, 1966, Wheeler and Wheeler, 1973

***Camponotus trepidulus* Creighton**

Discussion. This species can be recognized as the propodeal angle is low and completely rounded. The petiole is rectangular shaped in profile, with top of the node has a flattened face (Fig.). This species is not likely to be confused with any others due to the shape of the propodeum and petiole.

Distribution. USA: AZ (Baboquivari Mts.); may occur in New Mexico. MEXICO: Baja California.

Habitat. Oak woodlands.

Biology. This species nests in dead limbs of oak (*Quercus oblongifolia*). Specimens from Nogales were collected from wood in tunnels of *Ailanthus*.

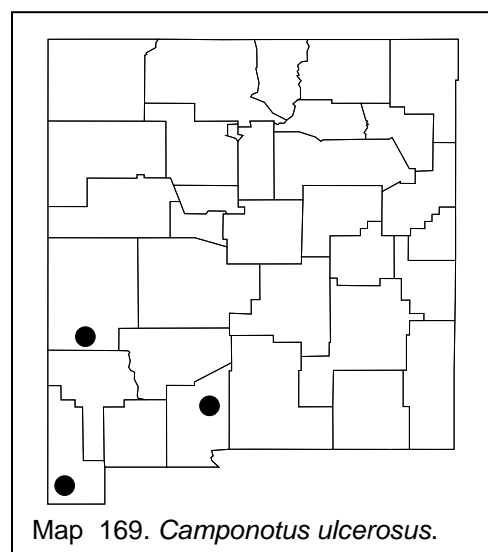
Creighton, 1965

***Camponotus ulcerosus* Wheeler**

Discussion. The majors are easily recognized as the head is obliquely truncate, very roughly sculptured and usually has deep, eroded areas on the cheeks. This will easily distinguish it from all other ground nesting *Camponotus* in New Mexico. Unfortunately the minor worker is much more common and is the form most often collected. The minor workers are more difficult to recognize, but are small, black, shiny species

in which the head and mesosoma are densely and coarsely sculptured. The mesosoma is evenly arched and is covered with long (0.25 mm), white, slightly twisted, erect hairs (Fig.). They are superficially very similar to the minor workers of *C. mina* (see *C. mina* discussion). They can be confused with *C. papago*, due to the form of the head. See the discussion of *C. papago* for hints on how to separate the two species.

Distribution. USA: AZ, TX, NM: NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45



Map 169. *Camponotus ulcerosus*.

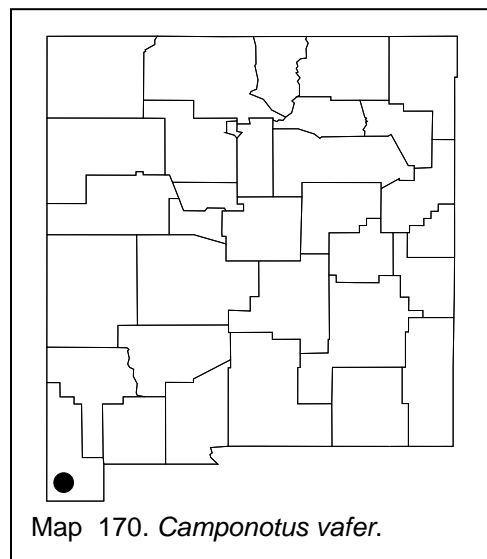
K NE Las Cruces, (Jornada Long Term Ecological Research Site); MEXICO: Chihuahua.

Habitat. Chihuahuan Desert and surrounding foothills. Grassy areas, herbaceous meadows with scattered junipers, blue oaks. oak-juniper woodland rocky soil. Broad mesquite dominated arroyo

Biology. This species nests in arid habitats under large stones or boulders. The nest is surrounded by a carton shield, a paper-thin sheet of vegetable material, cemented together with salivary secretions, with at least one nest entrance. The soldier uses its head to block the nest

entrance. Sexualls occur in nests in May. Minor workers are moderately common in rough, desert canyons, where they can be found foraging on large boulders. Majors capture workers of *Tetramorium spinosum* when they walk over its face, as it blocks the nest entrance.

Wheeler, 1917, Creighton, 1951, 1953, 1967, Samuelson 1961



Map 170. *Camponotus vafer*.

***Camponotus vafer* Wheeler**

Discussion. The workers of this species are difficult to separate from those of *C. festinatus*. The queens are larger than those of *C. festinatus*. See discussion of *C. festinatus* for a comparison of the two species.

Distribution. USA: AZ;
NM: %%% ???

Habitat. Desert foothills.

Biology. This species nests under stones.

***Camponotus vicinus* Mayr**

Discussion. The majors, minors, and females of this species have the area at the base of the scape flattened, which is sometimes enlarged into a poorly formed lobe (Fig.). The frontal carinae are widely separated (Fig.). The cheek, malar area, and sides of head are nearly always without erect hairs, up to 3 for 4 hairs may be present on the cheeks (usually located near the base of mandibles), and an erect hair on the ventral surface of the head may be visible in full face view, appearing as erect on the side of the head. The mesosoma has numerous erect hairs, as does the petiole and the gaster, the hairs on the gaster are positioned along the posterior edge of each tergum, as well as nearly always scattered across the surface. The middle and hind tibiae have 2 rows of erect, coarse hairs that extend nearly the entire length of the tibiae, but there are usually fewer than 10 present, and most are on the distal half. The head and

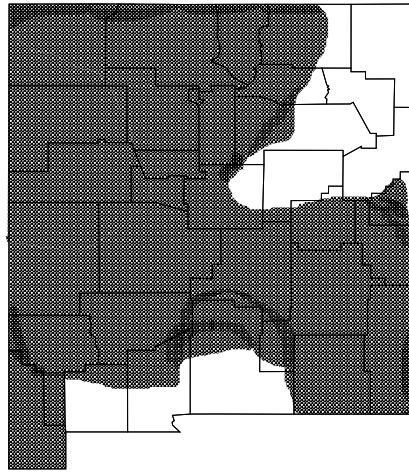
mesosoma have a few decumbent hairs. The decumbent hairs on the gaster are variable, ranging from a few tiny (0.01 mm) hairs, to coarse, long (up to 0.2 mm) hairs. The head is densely and evenly punctate, the mesosoma is coriaceous, and the gaster ranges from smooth and glossy to dull with coarse transverse striae. The color ranges from yellow brown to black, the most common color includes a black head and gaster with a red mesosoma and legs.

Majors of *C. vicinus* can be usually separated from the other closely related species of *Camponotus* by the near lack of erect hairs on the cheeks, malar area and sides of the head. The scape is nearly always flattened at the base. It could be confused with *C. acutirostris*, but the latter species has numerous erect hairs on the cheeks, and has erect hairs along the sides of the head, with some near the eyes. It is also difficult to separate from *C. ocreatus*, but has sculpture that is coarser and not strongly shining. In addition, there are at least 7 erect hairs on the pronotum, usually more than 10, whereas there are 10 or less on the pronotum of *C. ocreatus*.

Distribution. CANADA: southwestern region; USA: Western North America as far east as WY, KS, OK, TX.; NM: Common ant throughout the state, usually at higher elevations (Map). It has been collected in **Bernalillo Co.**, Albuquerque, **Catron Co.**, 13 k N Apache Creek, 37 k N Apache Creek, 33 k E Horse Springs, 12 k E Datil, 14 k E Datil, 15 k E Datil, Ox Spring Canyon, Sawtooth Mts., near Snow Lake, 29.6 mi N Catron Co. Line, **Chavez Co.**, Mescalero Sand Dunes W Caprock, **Colfax Co.**, 16 k E Eagle Nest, 41 k E Eagle Nest, **Curry Co.**, Clovis, 4 mi W Grady, **De Baca Co.**, 4 mi N Taiban, **Doña Ana Co.**, Aguirre Springs, Las Cruces, **Eddy Co.**, 32°22.2'N 103°46.9'W, 26 mi E Carlsbad, Hidden Cave, **Grant Co.**, Ft. Bayard, Silver City, 88 k E Silver City, Gila Mts. (Iron Creek), Mogollon Mts., **Hidalgo Co.**, Peloncillo Mts. (Coronado National Forest), Thompson Canyon (Big Hatchet Ranch), **Lea Co.**, 20 mi WSW Hobbs, **Lincoln Co.**, Cibola National Forest, Oak Creek Camp, 4 mi W Alto, Sacramento Mts., Eagle Creek - Sierra Blanca, **Los Alamos Co.**, East Bandelier, Los Alamos, **McKinley Co.**, Gallup, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Guadalupe Mts. (41 k NW Sitting Bull Falls), Sacramento Mts. (Hayne's Canyon), White Mts., **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 4 k NW Ajo City, 7 k S Cebolla, 4 k N Chama, 2 k N Dixon, 10 k SW Española, **Sandoval Co.**, 4 k W Cuba, 11 k E Cuba, 26 k S Cuba, Rio Rancho, **San Juan Co.**, Archuleta, 3 k E, 4 k E, 13 k E Aztec, Chaco Canyon, **San Miguel Co.**, 20

Mackay, W. P. and E. E. Mac

k NW Las Vegas, Romeroville, **Santa Fe Co.**, Glorieta Battlefield (SW Pecos), Santa Fe, **Socorro Co.**, Bosque del Apache, 5 k N Camp Luna, Grassy Lookout, Sevilleta, Magdalena Mts. (Water Canyon), 16 k S Magdalena, 21 k S Magdalena, 19 k S Magdalena, 3 mi from Highway 107, **Torrance Co.**, 5 mi W Capitan, 6.2 mi E Clines Corner, 5 mi NE Corona, 24 k S Mountainair, **Taos Co.**, Ojo Caliente, Taos, 20 k NW Taos, 6 k SW Tres Piedras, 14 k SE Tres Piedras, **Valencia Co.**, Belen; MEXICO: Baja California, Chihuahua, Coahuila, Nuevo Leon.



Map 171. *Camponotus vicinus*.

Habitat. Chihuahuan Desert, areas of mesquite, sagebrush, meadows, deciduous forests, oak forests, riparian cottonwood forests, ponderosa pine-riparian, pinyon-juniper, ponderosa pine, Douglas fir, aspen forest, usually at higher elevations in relatively mesic sites (1930 - 2960 meters).

Biology. This is a very common species in New Mexico, which nests under stones and logs (rare) in open areas of fine sand to rocky soils. Brood and reproductives were found in nests from March to October, dealate females were captured from March to mid September. A flight occurred on 19-vii-1986 at 7:00 p.m. Nests are occasionally started by pleometrosis (multiple females start nests together). Much of the foraging occurs at night, although workers are also diurnal; workers tend Homoptera. Workers forage into vegetation, especially cholla (*Opuntia* sp.), and *Yucca* sp. Workers are attracted to baits, including liver, especially rotten liver. *Monomorium minimum*, *Myrmica striolagaster*, *Liometopum apiculatum*, *Leptothorax crassipilis*, and *Solenopsis* live in nests. One nest inhabited an abandoned nest of *Pogonomyrmex occidentalis*. Gynes are prey of *Formica* and *Solenopsis*.

Jones, 1929, Mallis, 1941, Gregg, 1963, Wheeler and Wheeler 1963, 1973, Cole, 1966, DuBois and Danoff-Burg, 1994

Genus *Formica*

(Keys: Creighton, 1950, Francoeur, 1973, Wheeler and Wheeler, 1977, 1986, Snelling and Buren, 1985, Mackay et al., 1988)

Ants of this genus are common in New Mexico, especially in montane forests. This is the largest genus in North America in terms of

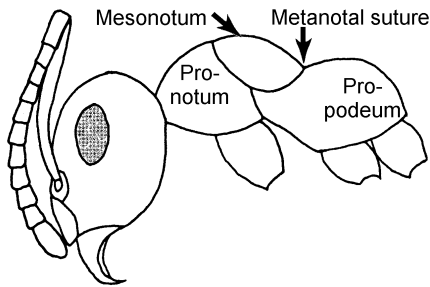


Fig. 349. Side view of a worker of *F. perpilosa*.

numbers of species. There are a number of species in the state, and identification to species is very difficult. One needs considerable experience with ants before tackling this genus. Without experience, identifications are usually incorrect.

Workers are quite variable in form, but the following characteristics will distinguish this genus and separate it from all others. Many species are polymorphic and bicolored, with a red head and mesosoma and a black gaster. Other species are mostly concolorous black or dark brown, although some are concolorous yellow or light brown. The antenna has 12 segments with the first segment of the funiculus about as long as the two following segments. The frontal carinae are short and almost parallel. The frontal area is clearly defined. The maxillary palp is long, obvious and composed of 6 segments. The mesosoma is depressed at the metanotal suture (Fig.). The petiole is convex anteriorly and flattened posteriorly. Although there is considerable variability within the genus, specific characteristics listed with the other genera will usually distinguish them from *Formica*.

These ants nest in the soil, in thatched or earthen mounds (Fig.) or in logs and stumps. Most species are predaceous, although they will also tend Homoptera. Some of our species are among the most aggressive ants. Although they cannot sting, they attack with a vengeance, biting and spraying formic acid on their enemies, often



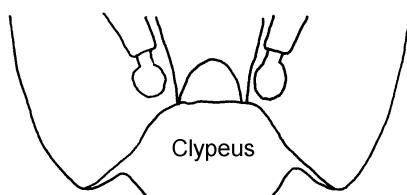
Fig. 350. A natural nest of a member of the *Formica rufa* group.

in the wound made by the mandibles. Repeated exposure to the formic acid can peel the skin. They are common pests at picnics in the forest. Many species enslave other species, which makes them a fascinating group to observe.

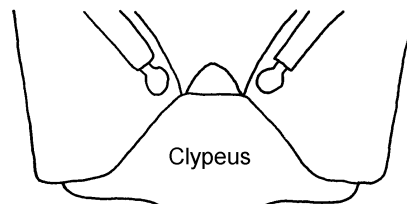
This is a very large, difficult and common genus, especially in the northern part of the state. It is also in desperate need of revision. Most species determinations must be viewed with suspicion, as there are poorly characterized species in most species complexes and apparently several undescribed species. It is an especially interesting genus as species are involved in slave making, temporary social parasitism and various forms of nest founding ("normal", budding) and are involved in internest movement (Mackay and Mackay, 1983). These ants nest in a wide variety of sites, from logs and stumps to under stones, and in all community types in New Mexico. The species in the "*rufa*" species group usually build thatched dome-like nests. Many species enslave other species. Cole (1954e, 1955b) discusses New Mexican species. Wheeler and Wheeler (1977, 1986) present good keys to the species and provide illustrations for the characters used in the following key. We have followed Wheeler and Wheeler (1986) and have included the *microgyna* group as part of the *rufa* group. They differ from the *rufa* group in that the hairs are usually spatulate and the queens are small, approximately the size of the largest workers.

Key to the workers of the *Formica* species groups (Modified from Wheeler and Wheeler, 1977)

1. Anterior border of clypeus notched in middle (Fig.); integument dull to feebly shining; decumbent pubescence dense, at least on gaster; bicolored, head and mesosoma reddish brown or reddish yellow, gaster brown or black; propodeum short and usually angulate in profile; facultative slave-makers ***sanguinea* group**
- Anterior border of clypeus not notched (Fig.) or, if so, decumbent pubescence is very sparse and body shining; other characters vary **2**



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Notched anterior
medial clypeal border
Fig. 352. Clypeus of a worker of *F. pergandei*, showing the notched anterior clypeal border.



Convex anterior clypeal border
Fig. 351. Clypeus of a worker of *F. ciliata*, showing the convex anterior clypeal border (arrow).

2(1). Slender (Fig.); surface shining; propodeum rounded (Fig.) in profile (i.e., base and declivity not differentiated) **3**

- Generally robust (Fig.); surface usually dull; propodeum usually angulate (Fig.) in profile (i.e., base and declivity clearly differentiated) **4**

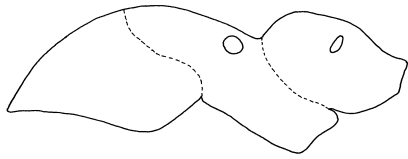


Fig. 354. Mesosoma of a worker of *F. ciliata*.

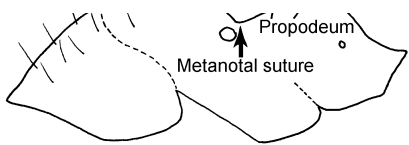


Fig. 353. Mesosoma of a worker of *F. limata*. The arrow indicates the rounded propodeum.

head length) (Fig.); frontal carinae subparallel, not diverging posteriorly (Fig.); smaller ants (2 1/2 - 6 mm long)

neogagates group

4(2). Larger workers with occipital border distinctly concave (Fig.); propodeum (in profile) with dorsal and posterior faces meeting at an angle **exsecta group**

- Larger workers with occipital border at most slightly concave, usually flat or slightly convex; pronotum (in profile) evenly convex, not angulate **5**

5(4). Frontal area usually shining; bicolored: head and mesosoma reddish or yellowish red and notably lighter than gaster or, if infuscated, infuscation not completely masking reddish ground color in larger workers; gaster brown or black; surface mostly dull; strongly polymorphic **rufa group**

3(2). Scape slender, long (1 1/4 - 1 1/3 length of head), scarcely curved at base (Fig.); median segments of funiculus more than 1 1/2 times as long as broad; posterior face of petiolar scale convex; frontal carina curved inwards posteriorly (Fig.), larger ants (4 - 7mm long)

pallidefulva group

- Scape shorter (less than 1 1/4

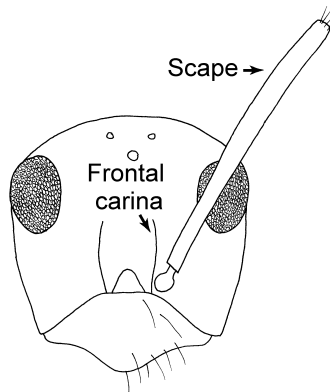


Fig. 356. Head of a worker of *F. pallidefulva*.

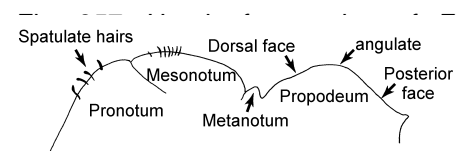
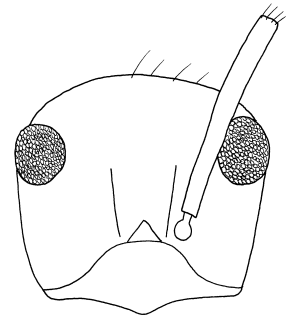


Fig. 355. Outline of the mesosoma of a worker of *F. opaciventris*.

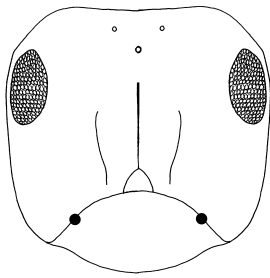


Fig. 358. Head of a worker of *F. opaciventris*.

The following key may be useful, due to its simplicity. Unfortunately sorting specimens of *Formica* on the basis of their size does not always work, and there is overlap of size in the key. Once a species group has been determined, it is a good idea to check it with the first key. Sorting specimens of *Formica* to the proper species complex is often the most difficult step, when you first begin with this group. Once you have experience, most specimens can be sorted by simply looking at them. If there is any doubt about the identity of the species group, it is wise to run the specimens of a series through more than one key, and compare them to the discussion of all of the species, to increase the probability of correct identification.

Simplified key to the species groups of *Formica*

1. Predominantly small (2.5 - 6 mm), mostly monomorphic ants **2**
- Predominantly large (4 - 7 mm), mostly polymorphic ants **3**
- 2(1). Most body surfaces shiny, especially gaster **neogagates group**
- Most body surfaces dull **fusca group**
- 3(1). Anterior margin of clypeus notched or concave in the middle (Fig.) **sanguinea group**
- Anterior margin of clypeus convex or straight **4**
- 4(3). Occipital margin of largest workers concave; rarely collected in New Mexico **exsecta group**
- Occipital margin of largest worker straight or only very weakly concave **5**

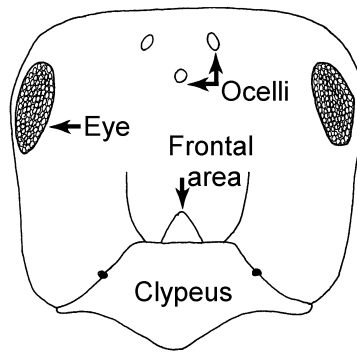


Fig. 359. Head of a worker of *F. obscuripes*.

- 5(4). Relatively slender, partially smooth and shiny ants; usually yellow or concolorous light brown ***pallidefulva* group**
 - Relatively robust, with most surfaces dull; usually bicolored (head and mesosoma red, gaster black) ***rufa* group**

Key to workers of the *Formica exsecta* group

1. Pronotum and gaster each with at least 4, usually more than 12 erect hairs ***opaciventris* Emery**
 - Pronotum without erect hairs (or less than 5), dorsum of first gastral tergum usually without erect hairs (except possibly few along posterior edge) ***exsectoides* Forel**

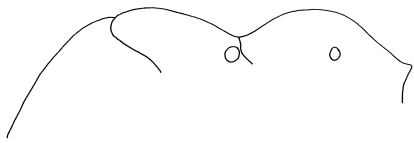


Fig. 361. Outline of the mesosoma of a worker of *F. exsectoides*.

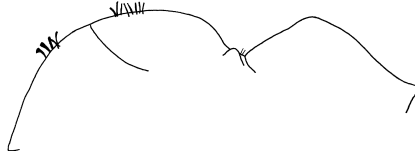


Fig. 360. Outline of the mesosoma of a worker of *F. opaciventris*.

Key to workers of the *Formica fusca* group

1. Metasternum with a pair of distinctly pilose lobes (Fig.), arising one on either side of median sternal cavity; mesometasternal profile composed of a concavity followed by a pilose triangle (Fig.) **2**
 - Metasternum without such lobes (Fig.); mesometasternal profile composed of concavity followed by a straight or convex line **10**

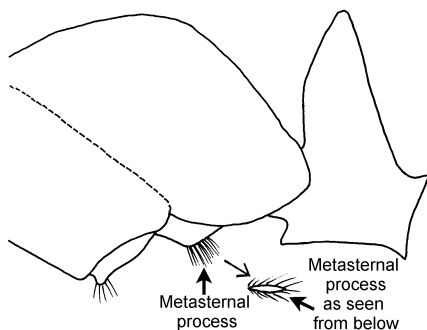


Fig. 362. Mesosoma and petiole of a worker of *F. occulta*, showing the pilose, well developed metasternal process. The second arrow shows the median sternal cavity as seen from below.

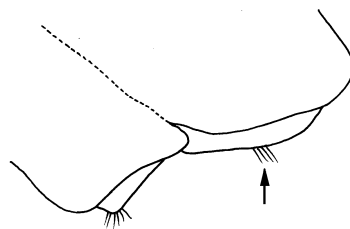


Fig. 363. Mesosoma of a worker of *F. fusca*, showing the poorly developed metasternal process.

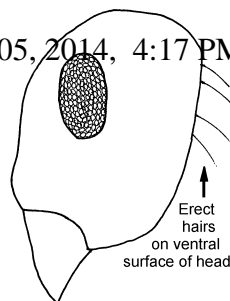


Fig. 364. Side of the head of a worker of *F. montana*, as seen from the side.

- 2(1). Concolorous black, dark brown or yellowish brown 3
 - Head and mesosoma red or yellow, gaster black or dark brown ... 8
 3(2). Dark brown or black 4
 - Pale brown or yellowish brown 7
 4(3). Underside of head without erect hairs (Fig.) .. ***occulta* Francoeur**
 - Underside of head with erect hairs (Fig.) 5

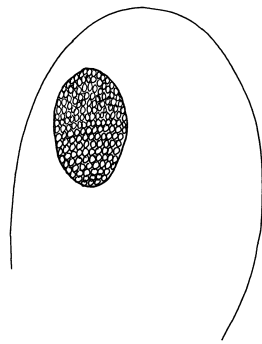


Fig. 365. Side of the head of a worker of *F. occulta*.

- Erect hairs present below

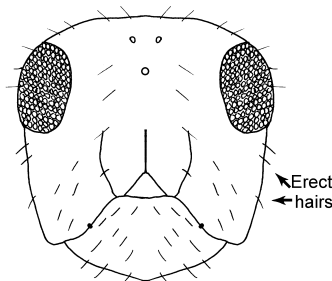


Fig. 367. Head of a worker of *F. canadensis*, showing the erect hairs on the side of the head anterior to the eye.

hairs ***canadensis* Santschi**

- 7(3). Underside of head without erect hairs (Fig.) ***neoclara* Emery**
 - Underside of head with erect hairs (Fig.) ***montana* Emery**
 8(2). Underside of head without erect hairs (Fig.) ***neoclara* Emery**

- 5(4). Erect hairs present on genae (Fig.) 6

- Erect hairs absent from genae (Fig.) ***altipetens* Wheeler**

- 6(5). Head as seen in full face, with erect hairs present only from the occiput to the level of the ventral border of eye; genae usually with 1 or 2 erect hairs

..... ***montana* Wheeler**

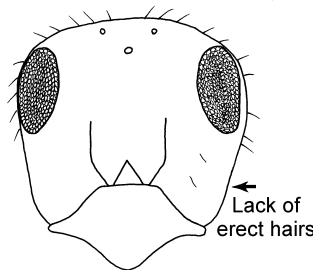


Fig. 366. Head of a worker of *F. montana*. The arrow indicates the lack of hairs on the side of the head anterior to the eye.

the level of the ventral border of the eye; genae with more than 2 erect

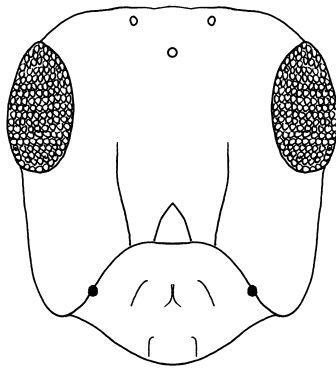


Fig. 368. Head of a worker of *F. altipetens*, showing the lack of erect hairs on the occipital angles and gena.

- Underside of head with erect hairs (Fig.)

9

9. Occipital angles (Fig. 353) and usually genae with erect hairs

***montana* Emery**

- Occipital angles and genae without erect hairs (Fig.)

***altipetens* Wheeler**

10(1). Concolorous **11**

- Head and body bicolored (minors and some majors may be so dark that the lighter color is reduced

to patches on gena and mesosoma) **18**

11. Dark brown or black; underside of head often with erect hairs (Fig.) **12**

- Pale brown or yellowish brown; underside of head never with erect hairs (Fig.) ***argentea* Wheeler**

12. Area between eye and mandibles with coarse elongate punctures (Fig.), widely spaced on dorsal half of gena **13**

- Area between eye and mandible without coarse elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine circular punctures

..... **14**

13(12). Erect hairs numerous on the ventral surface of head (Fig.), dorsal surface of mesosoma and dorsal margin of petiole; all workers are brownish-black or black

..... ***hewitti* Wheeler**

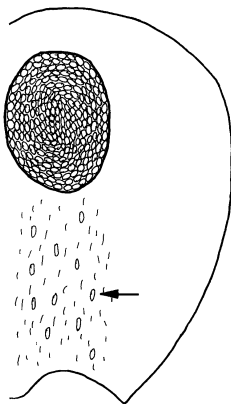


Fig. 369. Side of head of a worker of *F. neorufibarbis*, showing the elongate punctures (arrow).

- Erect hairs absent on above-mentioned structures (1 or 2 may be present); usually larger workers are at least somewhat bicolored (at least the anterior section of head is reddish-black) ***neorufibarbis* Emery**

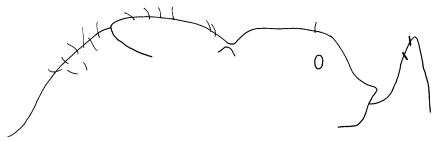


Fig. 371. Dorsal surface of the mesosoma and petiole of a worker of *F. hewitti*, showing the presence of erect hairs.

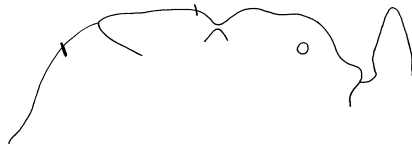


Fig. 370. Dorsal surface of the mesosoma and petiole and petiole of a worker of *F. neorufibarbis*, showing the lack of erect hairs (note 2 hairs are present).



Fig. 372. Dorsal surface of the first gastral tergum of a worker of *F. fusca*.

- 14(12). Erect hairs abundant on most surfaces, including ventral surface of head, occiput, dorsum of mesosoma, dorsum of petiole, and 4 faces of all femora ***lepida* Wheeler**

- Erect hairs sparse, absent at least on propodeum, dorsum of petiole and at least 1 other above mentioned structures **15**

- 15(14). Hairs on first gastral tergite (exclusive of posterior row) sparse (average 4, rarely more than 10); metasternum more pilose, hairs surrounding metasternal cavity **16**

- Hairs on first gastral tergite (exclusive of posterior row) abundant (average 20, rarely fewer than 10); metasternum less pilose, hairs not surrounding metasternal cavity, but usually restricted to region behind it **17**



Fig. 373. Dorsal surface of the first gastral tergum of a worker of *F. argentea*.

- 16(15). Smaller ants (length of mesosoma 1.35 - 2.36); scapes often shorter than head length; anterior border of clypeus broadly convex, rarely angulate in middle; erect hairs on anterior part of clypeal carina usually shorter than

- height of frontal area; common ***fusca* Linnaeus**

- Larger ants (length of mesosoma 1.75 - 2.85); scapes longer than head length (Fig.); anterior margin of clypeus usually angulate; hairs adjacent to clypeal carina longer than or equal to length of frontal area in most workers; rarely collected ***accreta* Francoeur**

17(15). Pubescence dense to very dense on genae and first four gastral tergites, producing a silvery luster ***argentea* Wheeler**

- Pubescence dilute to normal on fourth gastral tergite and on genae (at least on dorsal half), with a silky luster ***podzolica* Francoeur**

18(10). Gena between eye and mandible with coarse, widely spaced elongate punctures (Fig.); head and gaster dark brown, mesosoma yellowish or reddish brown; mesosoma sometimes infuscated, with lighter color reduced to mere patches; lower half of head sometimes paler; smallest workers may be entirely black; mesic habitats ***neorufibarbis* Emery**

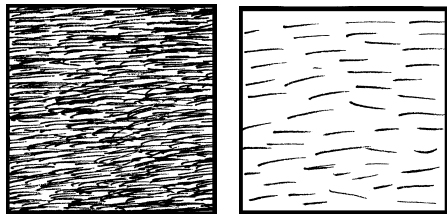


Fig. 374. Dorsal surface of the fourth gastral tergum of a worker of *F. argentea* (left) and of *F. podzolica* (right).

- Gena between eye and mandible without coarse elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine circular punctures; color varies; often in arid habitats **19**

19(18). Dorsum of gaster with long, flexuous, erect hairs (Fig.), erect hairs on first gastral tergite abundant

(24 - 43, exclusive of posterior row), long (more than 1.2 times length of frontal area), 1 - 30 erect hairs on pronotum

***foreliana* Wheeler**

- Dorsum of gaster with shorter, stiff, erect hairs (Fig.), less abundant on first gastral tergite (1 - 24, exclusive of posterior row), shorter (about equal in length to length of frontal area), 0 - 16 erect hairs on pronotum **20**

20(19). Propodeum high, angulate (Fig.) ***gnava* Buckley**

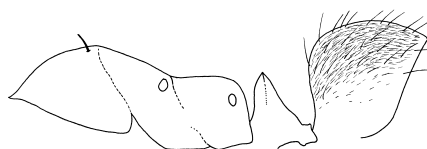


Fig. 375. Mesosoma, petiole and first tergum of the gaster of a paratype worker of *F. foreliana*.

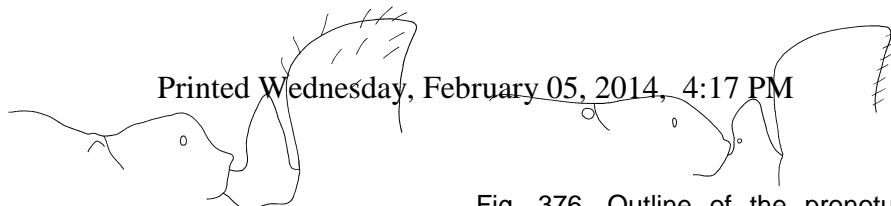


Fig. 377. Outline of the propodeum and gaster of a worker of *F. gnava*.

Fig. 376. Outline of the pronotum and gaster of a worker of *F. xerophila*.

- Propodeum long and low, rounded posteriorly (Fig.)
xerophila M. Smith

Key to the workers of the *Formica neogagates* group

(Includes all North American species)

1. Anterior border of clypeus notched or concave in the middle (Fig.), or entire border is straight 2
- Entire anterior border of clypeus convex and rounded (Fig.) 6

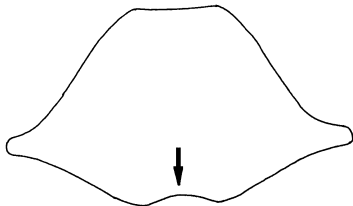


Fig. 378. Clypeus of a worker of *F. perpilosa*, showing the notched clypeus (arrow).

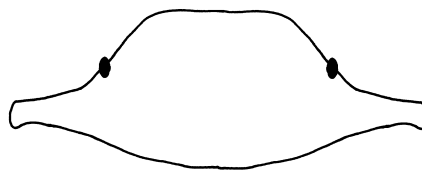


Fig. 379. Clypeus of a worker of *F. lasioides*, showing the convex, rounded anterior border of the clypeus.

- 2(1). Gaster clear reddish-yellow, no darker than head and mesosoma; clypeus concave in the middle, but with little evidence of a notch; petiole very thick when viewed in profile (Man., MN, IA west to Alberta, MT, WY, CO) *bradleyi* Wheeler
- Gaster darker than mesosoma and head; other characteristics are usually different 3
- 3(2). Gaster strongly shining, with dilute pubescence which does not obscure the delicate shagreened sculpture 4
- Gaster opaque or feebly shining, the pubescence dense enough to

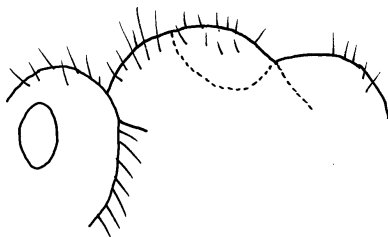


Fig. 380. Head and mesosoma of a worker of *F. perpilosa*, showing the numerous, erect hairs.

partially obscure the finely coriaceous sculpture, evenly covered with long, stout, silvery, erect hairs which are blunt at the tip; hairs on other parts of body only a little less abundant than those on gaster (MN west to Alberta south to NB, NM, UT, NV)

.....
..... *obtusopilosa*

Emery (See *sanguinea* species group.)

4(3). Basal face of propodeum with many long, erect hairs (Fig.), body hairs in general long and numerous (Fig.); underside of head with about 10 long, but erect hairs (WY, CO, KS, OK, TX, NM, CA, state of Chihuahua, Mexico) ***perpilosa* Wheeler**

- Basal face of propodeum with few or no erect hairs, underside of head usually with 2 erect hairs (Fig.)

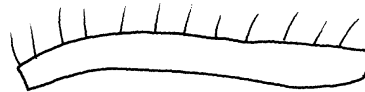


Fig. 381. Scape of a worker of *F. lasioides* with erect hairs, as seen from the side.

. 5*

5(4). Anterior border of clypeus straight, with a prominent central, longitudinal carina; head and mesosoma yellowish orange; a few erect

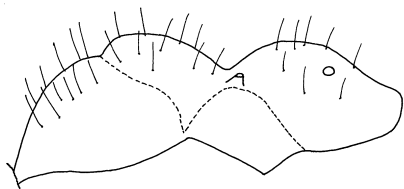


Fig. 382. Mesosoma of a worker of *F. neogagates*, showing the numerous erect hairs.

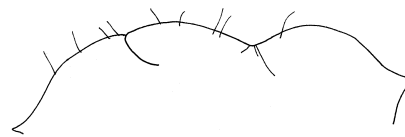


Fig. 383. Mesosoma of a worker of *F. limata*, showing a reduced number of erect hairs.

hairs are usually present on propodeum (ID, UT, WA, OR, NV, CA) ***manni* Wheeler***

- Anterior border of clypeus notched or concave in the middle, central longitudinal carina on clypeus poorly defined; head and mesosoma piceous brown; erect hairs usually absent on propodeum (OR) ***oregonensis* Cole***

6(1). Scape (Fig.) bearing a number of short, very delicate erect whitish hairs (Fig.), (NS, Que. west to BC, south to MA, MI, SD, CO, NM, AZ, CA) ***lasioides* Emery**

- Scape without erect hairs except for a small clump at the extreme tip 7

7(6). Mesosoma with numerous erect hairs (Fig.); surface of body moderately shining; NS, Que. west and north to AL, south to NC, IL, IA, NB, NM, AZ, CA ***neogagates* Viereck**

- Mesosoma with 10 or fewer erect hairs (Fig.); surface of body strongly shining; MN, ND, CO, NM, UT, NV ***limata* Wheeler**

Key to the workers of the *Formica pallidefulva* group

1. Clear golden yellow, gaster little darker than mesosoma, its surface feebly shining ***pallidefulva* Latreille**
- Head and mesosoma yellowish brown to piceous brown, gaster notably darker, its surface moderately shining ***nitidiventris* Emery**

Key to the workers of the *Formica rufa* group

(Includes the *microgyna* species group) (Modified from Wheeler and Wheeler, 1986).

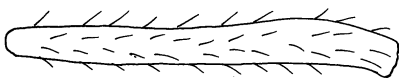


Fig. 384. Antennal scape of a worker of *F. oreas*, showing the numerous, erect hairs.

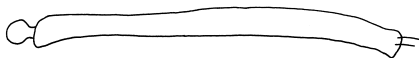


Fig. 385. Antennal scape of a worker of *F. laeviceps*, showing a lack of erect hairs.

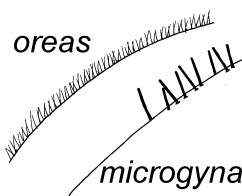


Fig. 386. Dorsal surface of the pronotum of workers of *F. oreas* and of *F. microgyna*.

- mesosoma partially or completely red as in major worker ***oreas oreas* Wheeler**

1. Scapes with numerous erect or suberect hairs on all surfaces (Fig.) **2**

- Scapes with very few or no erect hairs (Fig.) **4**

- 2(1). Hairs on mesosoma slender, tapering to sharp points (Fig.); erect hairs on propodeum and gaster short (less than 0.1 mm and equal in length), slender, with pointed tips **3**

- Some hairs on mesosoma spatulate (Fig.), all short and subequal in length, hairs on propodeum and gaster coarse, thick and many greater than 0.12 mm in length, and with dull tips (female no larger than largest worker) ***microgyna* Wheeler**

- 3(2). Minor worker not extensively infuscated, head and

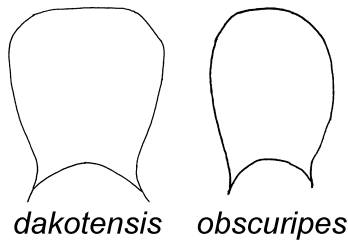


Fig. 388. Petioles of workers of *F. dakotensis* and *F. obscuripes*, as seen from behind.

scale parallel, tapering only in lower half (female sometimes no larger than largest worker, strongly shining, color dull brown with some yellow markings) ***dakotensis* Emery**

- Petiolar scale (seen from behind) with crest convex or

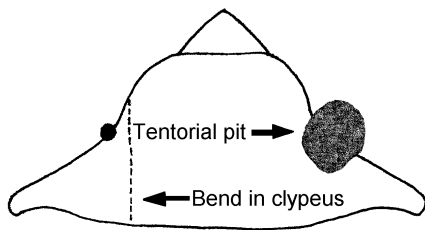


Fig. 389. Clypeus of a worker of *F. laeviceps* showing the deep, pitlike tentorial pit (depression indicated by dark stippling at end of arrow). The dashed line indicated by the other arrow represents a bend in the clypeus, which makes the middle part of the clypeus protrude into a box-like or rectangular surface.

5

5(4). Clypeal fossa deep and pit-like; edge of clypeus anterior to pit sweeping upward to median lobe; median lobe box-like (i.e. sides descending abruptly to fossae and making angles with its anterior face)

6

- Clypeal fossa shallow and scarcely pit-like; edge of clypeus anterior to pit broadly united to base of lobe and not forming a distinct curve with it; median lobe not box-like (i.e., sides descending to fossae

- Minor worker extensively infuscated, head and mesosoma mostly deep brown, distinctly darker than major worker

***oreas comptula* Wheeler**

4(1). Petiolar scale (seen from behind) with a flat or broadly concave crest; sides of upper half of

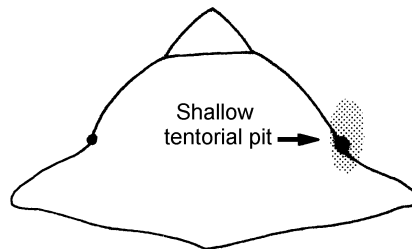


Fig. 387. Clypeus of a worker of *F. obscuripes*, showing the shallow tentorial pit (indicated by arrow and light stippling). Note that this clypeus is not strongly bent, and the surface only weakly convex, without a box-like surface.

angularly produced upward in middle; sides of scale tapering inward from crest to base

through even curves which begin at carina) 8

6(5). Middle and hind tibiae with numerous erect hairs on all surfaces 7

- Middle and hind tibiae without erect hairs except for double row on flexor surfaces *laeviceps* Creighton



Fig. 390. Hind tibia of a worker of *F. laeviceps*, as seen from below, showing 2 rows of bristles on the flexor surface.



Fig. 391. Posterior tibia of a worker of *F. obscuriventris clivia*, showing numerous erect hairs on all surfaces.

7(6). Minor workers extensively infuscated with brown, majors and intermediate sized workers with at least part of petiole infuscated *obscuriventris clivia* Creighton

- Minor workers less deeply infuscated, dirty yellowish brown, petiole of majors clear red or yellow *obscuriventris obscuriventris* Mayr

8(5). Erect hairs on middle and hind tibiae usually abundant on all surfaces, but at least there are 2 erect hairs in addition to those on flexor surfaces (Fig.) 9

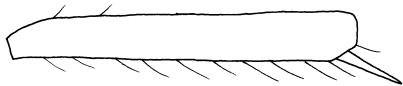


Fig. 392. Middle tibia of a worker of *F. planipilis* as seen from the front, showing 2 erect hairs in addition to the rows of hairs on the flexor surface.

- Erect hairs on middle and hind tibiae, when present, confined to double row on flexor surface (Fig.), rarely 1 or 2 erect hairs elsewhere 11

9(8). Head of largest worker as broad as or broader than long, erect hairs on mesosoma unequal in length (Fig.); hairs on head only a little less abundant and not much longer than those on mesosoma *obscuripes* Forel

- Head of largest worker longer than broad; erect hairs on mesosoma short and of about equal length (Fig.); hairs on head notably longer and sparser than those on mesosoma 10

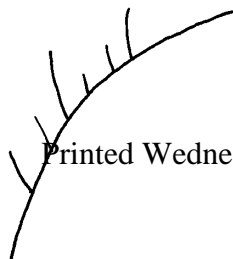


Fig. 394. Hairs on the dorsal surface of the pronotum of a worker of *F. obscuripes*, showing the hairs of unequal lengths.

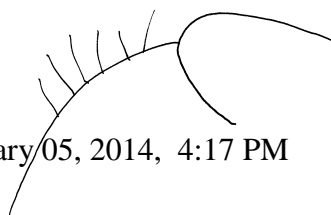


Fig. 393. Hairs on the dorsal surface of the pronotum of a worker of *F. planipilis*, showing the hairs of approximately equal length.

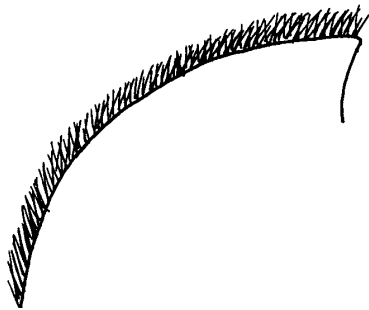


Fig. 395. Dorsal surface of the first tergum of the gaster of a worker of *F. ciliata*, showing the dense, erect hairs.



Fig. 396. Dorsal surface of the first tergum of the gaster of a worker of *F. criniventris*, showing the relatively sparse erect hairs.

10(9). Smaller workers extensively infuscated, intermediate workers more or less infuscated; legs in all sizes of workers, brownish black

..... ***planipilis* Creighton**

- Head and mesosoma of all workers (except an occasional minor) clear red; legs scarcely or not at all darker than mesosoma

..... ***coloradensis* Creighton**

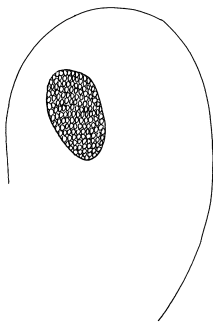


Fig. 398. Underside of the head of a worker of *F. ciliata*



Fig. 397. The side of the pronotum of a female of *F. ciliata*, showing the long, yellow hairs. label pronotum and head

11(8). Gaster densely clothed with short erect hairs, which (in profile) are so close together that they give appearance of a loose plush-like vestiture (Fig.)

12

- Erect hairs on gaster much more widely spaced and not forming an even vestiture (Fig.) **14**
12(11). Underside of head usually without erect hairs (1 or 2 may be present); female yellow, hairs very long, (Fig.) ***ciliata* Mayr**
- Underside of head with at least 12 erect hairs (count across entire surface); female brownish yellow, dirty brown, or bicolored, mostly dull **13**
13(12). Erect gastral hairs very short (Fig.), averaging 0.06 mm in length ***comata* Wheeler**

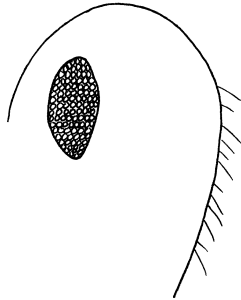


Fig. 399. Side view of the head of a worker of *F. comata*.



Fig. 400. Outline of the dorsum of the gaster of a worker of *F. comata*.

- Erect gastral hairs longer, averaging 0.12 mm long ***mucescens* Wheeler**
14(11). Row of erect bristles on middle and hind tibiae extending at least ½ length of tibia **15**
- Middle and hind tibiae nearly lacking erect hairs, or with 3 - 4 erect hairs near spur ***criniventris* Wheeler**
15(14). Clypeus, underside of head, and gena strongly shining ***subnitens* Creighton**
- Clypeus, underside of head, and gena dull **16**
16(15). Underside of head, crest of petiole, and thoracic dorsum usually without erect hairs, rarely 1 or 2 inconspicuous hairs ***ravida* Creighton**
- Pronotum, propodeum and crest of petiole with numerous erect or suberect hairs in at least a considerable part of nest series **17**

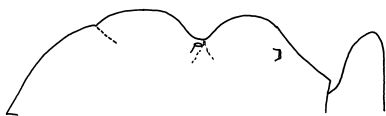


Fig. 402. Outline of the mesosoma and petiole of a worker of *F. ravida*.

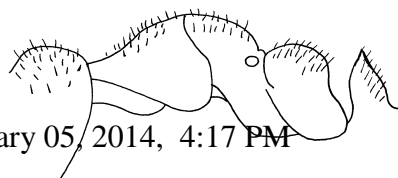


Fig. 401. Outline of the posterior part of the head, mesosoma and petiole of a worker of *F. coloradensis*.

17(16).Erect hairs slender and pointed at tip; female at least as large as largest worker**18**

- Erect hairs blunt or spatulate (see Fig.); female no larger than largest worker**19**

18(17).Erect hairs on occipital angles in most of nest series *integroides* **Emery***

- Occipital angles without erect hairs.....*propinqua* **Creighton**

19(17).Erect hairs always present on crest of petiole (Fig.); pubescence on gastral dorsum dense and wholly concealing the surface; sides of gaster feebly shining**20**

- Erect hairs never present on crest of petiole (Fig.); pubescence of gastral dorsum rather dilute and not wholly concealing surface at rear edge of terga; sides of gaster strongly shining **21**

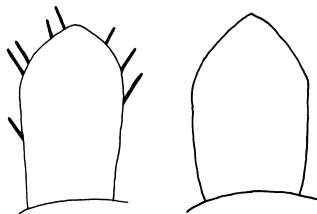
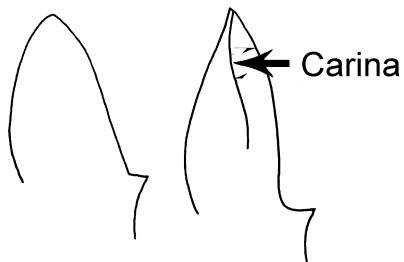


Fig. 403. Petiole of a workers of *F. densiventris* and *F. reflexa*, as seen from behind.



densiventris *calviceps*

Fig. 404. Side view of the petioles of workers of *F. densiventris* and *F. calviceps*.

20(19).Crest of petiole broadly rounded in side view; body hairs broadly spatulate at tips *densiventris*

Viereck

- Crest of petiole sharp in side view; body hairs narrowly spatulate at tip *calviceps*

Cole

21(19).Head and mesosoma extensively infuscated *adamsi adamsi* **Wheeler**

- Head and mesosoma with little or not at all infuscated *adamsi alpina* **Wheeler**

Key to the workers of the *Formica sanguinea* group

(See Snelling and Buren, 1985)

1. Underside of head and pronotum with no erect hairs or pronotum with fewer than 6 very short (less than 0.06 mm long), stiff, blunt bristles; crest of petiole without erect hairs **2**

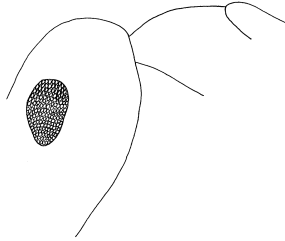


Fig. 406. Ventral surface of the head of a worker of *F. aserva*, showing the lack of erect hairs.

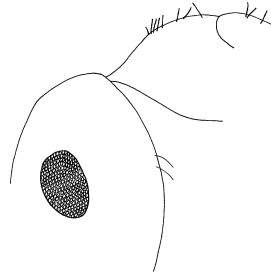


Fig. 405. Ventral surface of the head of a worker of *F. rubicunda*, showing the erect hairs on the underside of the head and on the pronotum.

- Underside of head with 1 or more erect hairs on each side

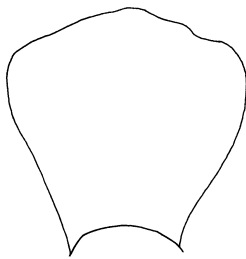


Fig. 409. Petiole of a worker of *F. aserva*, as seen from the back. Note that the dorsal margin is not always symmetric.

and (or) pronotum with six or more flexuous hairs, at least some of which are more than 0.10 mm long; crest of petiole with erect hairs **3**

- 2(1). Crest of petiole sharp, petiole broadly fan-shaped in posterior view; longest hairs on disc of second tergum of gaster about 0.06 mm long; clypeal disc distinctly but finely striate along middle and often laterad along

apical margin *aserva* Forel

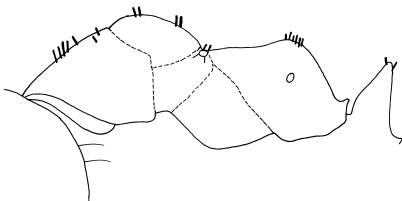


Fig. 408. Mesosoma of a worker of *F. rubicunda*.

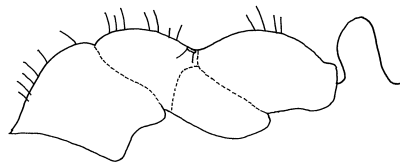


Fig. 407. Mesosoma and petiole of a worker of *F. obtusopilosa*.

- Crest of petiole blunt,

petiole narrowly fan-shaped in posterior view; longest hairs on disc of second tergum about 0.10 mm long; clypeal disc without very fine striae along middle **emeryi Wheeler***

3(1). Erect hairs of thoracic and gastral dorsa short (0.06-0.14 mm long), stiff and bristle-like, usually more or less flattened and blunt-tipped, or abruptly tapering **4**

- Erect hairs longer (0.10-0.25 mm long), often evenly tapering to tip **5**

4(3). Scape shorter than head length; propodeum subangulate in profile (Fig.) and crest of petiole is sharp (Fig.) **rubicunda Emery**

Suberect hairs

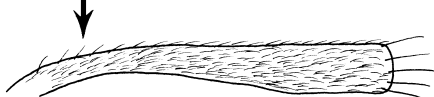


Fig. 410. Right antennal scape of a worker of *F. puberula*, as seen from the side, showing the numerous decumbent and suberect hairs.

- Scape longer than head length; propodeum broadly rounded between basal and posterior faces (Fig.); crest of petiole blunt in profile (Fig.)

..... **obtusopilosa Emery**

5(3). Pubescence of antennal scape fine and entirely appressed (Fig.)

..... **6**

- Pubescence of antennal

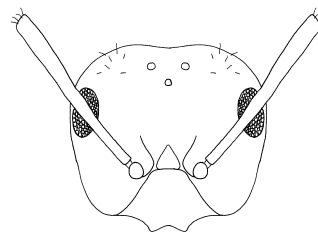


Fig. 411. Head of a worker of *F. pergandei*.

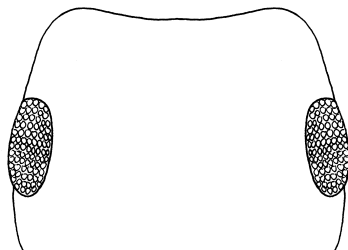


Fig. 412. Head of a worker of *F. wheeleri*.

scape coarse and at least partly decumbent to suberect (Fig.)

..... **puberula Emery**

6(5). Eyes large and protruding beyond sides of head in frontal view in all sizes; female microgynous, largest worker **wheeleri**

Creighton

- Eyes not protruding beyond sides of head, at least not in large workers; females normal, much

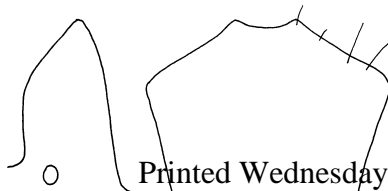


Fig. 414. Petiole of a worker of *F. wheeleri*, as seen from the side and from the front.

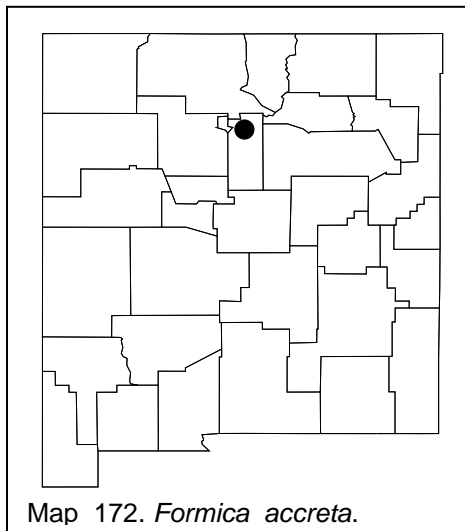
Fig. 413. Petiole of a worker of *F. xxxx*, as seen from the side and from the front. needed?

larger than largest workers *pergandei* Emery

List of *Formica* spp. of all species groups:

Formica accreta Francoeur (*fusca* group)

Discussion. This is a black species with the metasternal process poorly developed. The gena is without coarse punctures, although poorly defined, elongate punctures are located just anterior to the eyes. The scapes are usually longer than the head length. The anterior border of the clypeus is angulate, the eyes are large (maximum diameter 0.43 - 0.54



Map 172. *Formica accreta*.

mm). The ventral surface of the head, occiput, dorsum of the mesosoma and dorsum of the petiole are without erect hairs. The first gastral tergite has only 3 or 4 short (> 0.1 mm), blunt hairs. The dorsal surfaces of the head and mesosoma are weakly shining. This species is very difficult to separate from *F. fusca*. A combination of longer scapes, larger eyes and larger size will usually separate it from *F. fusca*. Wheeler and Wheeler (1986) considered it a synonym of *F. fusca*, Bolton (1995) removed it from

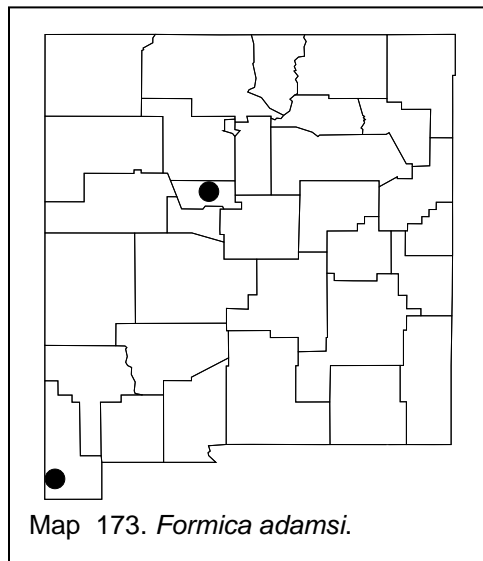
synonymy. It is very rare in New Mexico, and this is the first record from the state.

Distribution. Western Canada south to California, east to Montana, south to NM: **Santa Fe Co.**, Santa Fe. (Map 172). check id, probably shouldn't be in NM???

Habitat. ^^^ ???

Biology. Nest ###???

Formica adamsi Wheeler (*microgyna* group)



Discussion. See discussion of *F. adamsi alpina*. This species was previously known as *Formica whympersi* Wheeler.

Distribution. USA: WY, AZ (Cochise Co., Chiricahua Mts.); NM: **Bernalillo Co.**, NE Albuquerque, **Hidalgo Co.**, Peloncillo Mts. (Clanton Canyon).

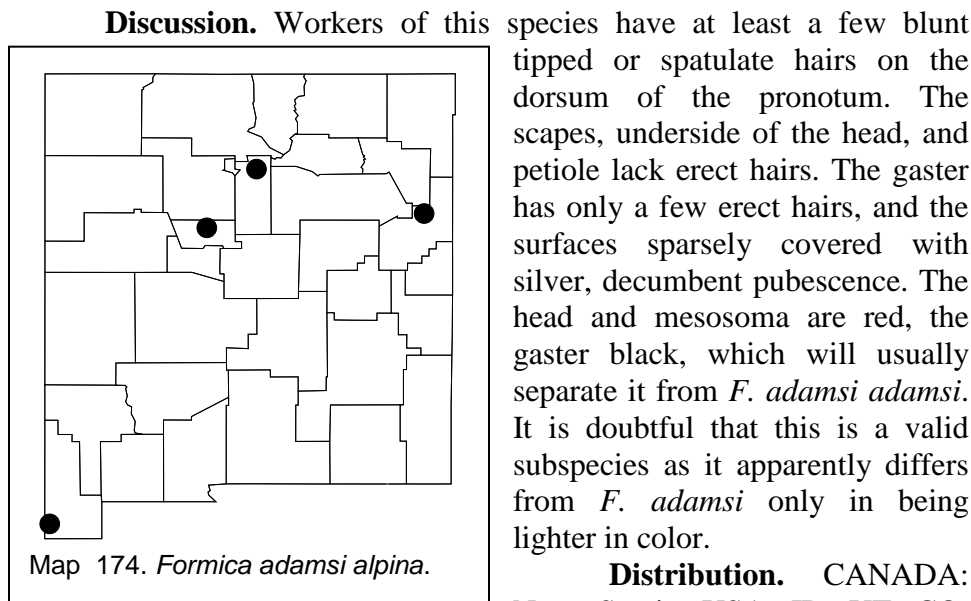
Habitat. Forests, including pinyon pine, oak, alligator bark

juniper.

Biology. This species nests under stones in rocky areas.

7810, 17990

***Formica adamsi alpina* Wheeler (*microgyna* group)**



Discussion. Workers of this species have at least a few blunt tipped or spatulate hairs on the dorsum of the pronotum. The scapes, underside of the head, and petiole lack erect hairs. The gaster has only a few erect hairs, and the surfaces sparsely covered with silver, decumbent pubescence. The head and mesosoma are red, the gaster black, which will usually separate it from *F. adamsi adamsi*. It is doubtful that this is a valid subspecies as it apparently differs from *F. adamsi* only in being lighter in color.

Distribution. CANADA: Nova Scotia, USA: ID, UT, CO;

NM: **Bernalillo Co.**, Albuquerque, **Hidalgo Co.**, Peloncillo Mts., **Quay Co.**, Ute Lake State Park (Cole, 1954), **Santa Fe Co.**, Tesuque Canyon (Cole, 1954).

Habitat. Higher elevations, above 2200 meters, in mixed forests, meadows, spruce-fir forests up into dry tundra.

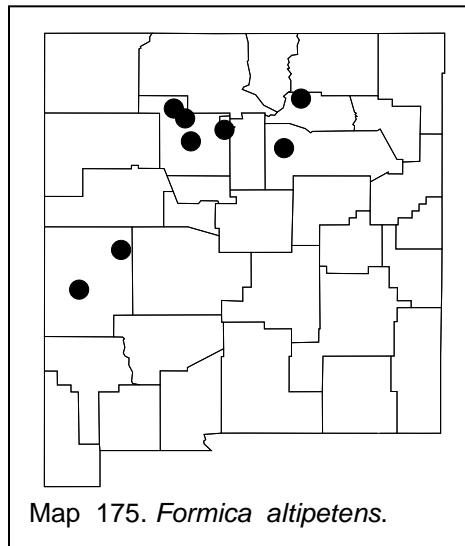
Biology. Nests are found under stones and logs (as well as in logs), usually banked with thatching, or simply in thatched nests. Reproductives were collected in nests from July to September. This species enslaves *Formica neorufibarbis*.

Cole, 1954, Gregg, 1963

***Formica altipetens* Wheeler (*fusca* group)**

Discussion. The metasternal process is well developed and surrounded by hairs. The eyes are large, the maximum diameter is about equal to the distance from the anterior border of the eye and the insertion of the mandibles. There is usually a pair of erect hairs on the ventral surface of the head, a few hairs on the vertex, and several blunt-tipped hairs on the propodeum, the mesopleuron is usually without erect hairs, as are the cheeks and occipital corners.

Distribution. USA: MT S to NM, W to CA; **NM: Los Alamos Co.,** Los Alamos, **Mora Co.,** Coyote Creek State Park, **Catron Co.,** 29 k NE Apache Creek, Ox Spring Canyon, **Los Alamos Co.,** Los Alamos, **Sandoval Co.,** Bandelier National Monument (Pippin and Pippin, 1984), Barley Canyon (Jémez Mts.), 4 k W Cuba, 11 k E Cuba, Jémez Canyon Overlook (8000ft), **San Miguel Co.,** 20 k NW Las Vegas. From (Cole, 1954) ATM: Cimarron Canyon (Cole, 1954), 8 mi E Eagle Nest (Cole, 1954), 18 m E Taos (Cole, 1954), Tesuque Canyon (Cole, 1954), Aspen Basin (Cole, 1954).



Map 175. *Formica altipetens*.

Habitat. Forested and open areas, ranging from meadows, pinyon-pine, ponderosa pines, Gambel oak forests to spruce forests.

Biology. This ant nests in soil with the entrances surrounded by a small mound or nest under stones and logs, sometimes covered with detritus. Nest populations are large, and the ants are very aggressive when

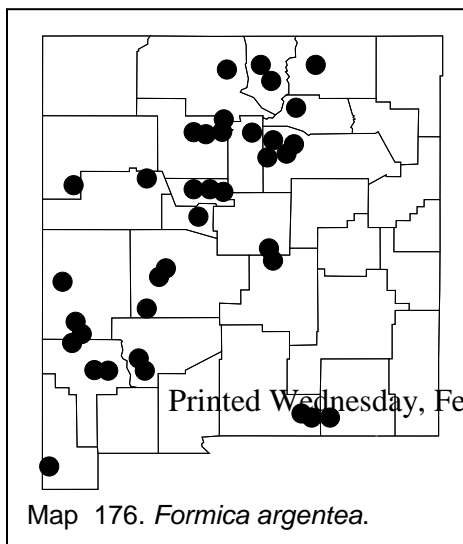
the nest is disturbed. Reproductives were found in nests in June and August, flights occurred during the first part of July (sexuals are attracted to lights). It is enslaved by *Polyergus breviceps*.

Wheeler, 1913, Gregg, 1963, Funk, 1975, Cole, 1954

***Formica argentea* Wheeler (*fusca* group)**

Discussion. The metasternal process of this species is poorly developed, but often is surrounded by abundant hair (exceptions common). The ventral surface of the head is without erect hairs. This species has a silvery sheen on the gaster, due to the abundance of pubescence, the remainder of the ant is usually brownish or even reddish or yellowish brown, with the gaster slightly darker, but may be concolorous black. Sometimes it is weakly bicolored. This usually distinguishes it for the similar *F. fusca*, which is usually black without a silvery gaster. The wings of the males and females are usually clear, whereas those of *F. fusca* are usually darkened. *Formica fusca* usually has fewer than 10 erect hairs on the dorsum of the first gastral tergite, *F. argentea* usually has more than 10. This species is similar to *F. podzolica* and may be distinguished using characteristics listed in the discussion of *F. podzolica*. It could be confused with *F. gnava* and may occur in similar habitats. It can be separated it is not as bicolored (the black gaster of *F. gnava* usually contrasts strongly with the red head and mesosoma), the mesosoma is less robust, and the propodeum is less angulate. Additionally, *F. gnava* usually has several blunt hairs on the pronotum, *F. argentea* has few or none. *Formica gnava* is dull, *F. argentea* has some of the surfaces shiny.

Distribution. USA: Most of North America; **NM: Bernalillo Co.**, Manzanaras, Sandia Mts. (Ciénaga Canyon, Kiwanas Meadow), **Catron Co.**, Mogollon Mts. (trail 206), Reserve, near Snow Lake, **Cibola Co.**, Mt. Taylor (9000 ft), **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, Iron Creek, 77 k E Silver City, 88 k E Silver City, Wright's Cabin, **Hidalgo Co.**, Coronado National Park (Clanton Draw), **Lincoln Co.**, 5 mi E Red Cloud Campground, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, 4 k N Los Alamos, 8 k N



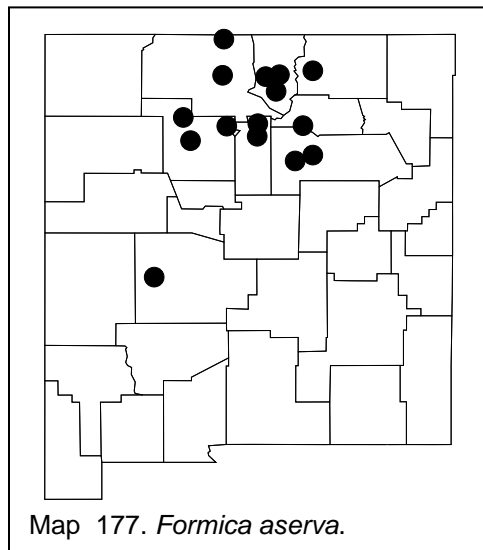
Los Alamos, **McKinley Co.**, 4 k E Ramah, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Guadalupe Mts., 41 k NW Sitting Bull Falls, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **San Miguel Co.**, Gallinas Canyon (Wheeler, 1913), Las Vegas (Wheeler, 1913), 20 k NW Las Vegas, Manzanares (Wheeler, 1913), Pecos (Wheeler, 1913), **Santa Fe Co.**, Hyde Park, **Sierra Co.**, Gila Mts. (Iron Creek), **Socorro Co.**, 5 k N Camp Luna, Durfee Canyon, near Grassy Lookout, San Mateo Mt. (10,000 ft), **Taos Co.**, Taos, 20 k NW Taos, **Torrance Co.**, 11 k SW Corona, **Valencia Co.**, Belen; MEXICO: Chihuahua.

Habitat. Disturbed urban sites, grasslands and sagebrush scrub, pinyon-juniper, oaks, pinyon-pine up to ponderosa pine-riparian and fir forests.

Biology. Nests are found under stones or logs, or under bark of pines. Brood was found in nests in July and August, sexuals in August. Multiple dealate females occur in nests (at least 3). Nests may have a small amount of thatching mixed with soil. They are generally relatively docile, and rapidly escape when the nest is disturbed. Flights occur in early July (sexuals are attracted to lights); a dealate female was collected in July. This species nests together with *Acanthomyops murphyi*, as well as with *Solenopsis molesta*, *Monomorium minimum*, *Lasius sitiens*, *L. pallitarsis*, and *Camponotus modoc*.

Gregg, 1963

***Formica aserva* Forel (*sanguinea* group)**



Discussion. This is an easily recognized species, as the ventral surface of the head is without erect hairs, the pronotum has fewer than 6 short (less than 0.006 mm) stiff, blunt bristles, and the apex of the petiole is without erect hairs. The petiole is broad and fan-shaped as seen from the front (Fig.). The central area of the clypeus is striate (Fig.). This species was previously referred to as *F. subnuda*.

Distribution. CANADA: Newfoundland w to Yukon; USA: AK south to CA, east to NM, north to NY, **NM: Colfax Co.**, 13 mi N Eagle Nest (Cole, 1954), **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, 45 k SE Cuba, **San Miguel Co.**, Beulah (Wheeler, 1913), Dailey Canyon (Beulah area) (Cole, 1954), Las Vegas Range (Wheeler, 1913), Sapello Canyon (Beulah area), **Santa Fe Co.**, 12 k NE Santa Fe, Tesuque Canyon (Cole, 1954), **Socorro Co.**, Withington Lookout, **Taos Co.**, 20 k S Taos, 12 mi E Taos (Cole, 1954), 18 mi E Taos (Cole, 1954).

Habitat. This species occurs in a wide variety of habitats, ranging from prairies through sagebrush scrub, juniper forests (*Juniperus monosperma*), aspen forests (*Populus tremuloides*) and mixed forests up to fir-aspen-spruce forests, subalpine fir (*Abies lasiocarpa*) and ponderosa pine. Nests even occur above the tree line.

Biology. This species nests in ponderosa pine logs and under stones, and may even construct thatched nests. Brood can be found in nests in early July until early August, reproductives were in nests in August, dealate females were found loose in July and August. This species enslaves *F. fusca*, *F. argentea* and *F. neorufibarbis*, and was found in a *F. argentea* nest together with *F. obtusopilosa*. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. lasioides* and *Myrmica*.

Wheeler, 1913, Gregg, 1963 (as *F. subnuda*)

***Formica bradleyi* Wheeler (*neogagates* group)**

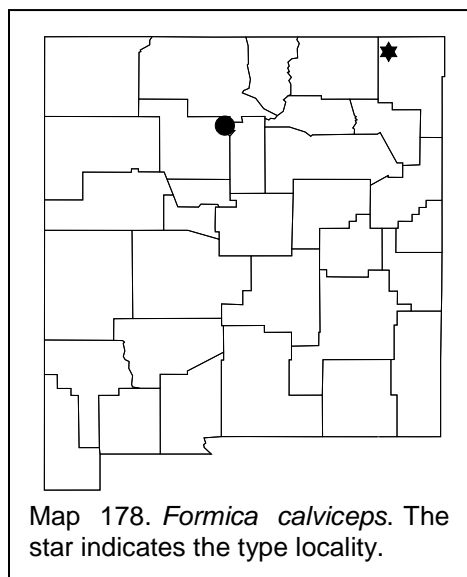
Discussion. This species is easily recognized as it is the only species of the *neogagates* group that is concolorous yellowish red. The entire ant, including the appendages, is covered with bristly, white hairs, except for the scape, which is without erect hairs. The surfaces are shiny and the anterior border of the clypeus is concave, nearly notched. The male is unusual as it has a shiny head and mesosoma.

Distribution. CANADA: Alberta, Manitoba USA: MN, IO, MT, ND, WY, NB, CO; although this species has not been collected in New Mexico, it is widely distributed in Colorado, and would be expected to occur in the northern part of the state.

Habitat. Found only in very sandy soils (Wheeler et al., 1989) at base of grass clumps (DuBois and Danoff-Burg, 1994).

Biology. Reproductives were found in nests in June and July.
Gregg, 1963

***Formica calviceps* Cole (*rufa* group)**



Map 178. *Formica calviceps*. The star indicates the type locality.

Discussion. The middle and hind tibiae of this species have a double row of erect hairs on the flexor surfaces. Erect hairs are present on the mesonotum near the mesopropodeal suture. It differs from *F. fossiceps* by the presence of erect hairs on the mesosoma, and from *F. laeviceps* in that the hairs on the mesosoma are not abundant.

Distribution. USA: NM: **Union Co.**, Capulin Volcano National Monument (type locality, Cole, 1954), **Los Alamos Co.**, Los Alamos (Map).

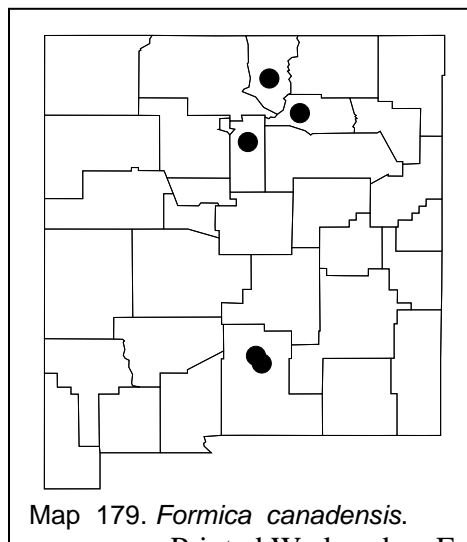
Habitat. Scrub oak, in dry, grassy area.

Biology. This ant nests under stones, with the site surrounded by thatching.

Cole, 1954

***Formica canadensis* Santschi (*fusca* group)**

Discussion. This species can be recognized by the short, bristly hairs covering most of the surfaces of the body. The sides of the head and cheeks usually have several erect hairs. The scape is without erect hairs (except at apex) and the legs have few erect hairs. The tibiae have erect hairs only on the flexor surface. The metasternal process is well developed and covered with hairs. This species is shiner than most of the other members of the *fusca* group, and is usually medium brown with a black gaster.



Map 179. *Formica canadensis*.

Distribution. USA: Western North America; NM: **Mora Co.**,

Coyote Creek State Park, **Otero Co.**, 5 mi E Cloudcroft, Sacramento Mts., **Santa Fe Co.**, Santa Fe (Audubon Center), **Taos Co.**, 20 k NW Taos.

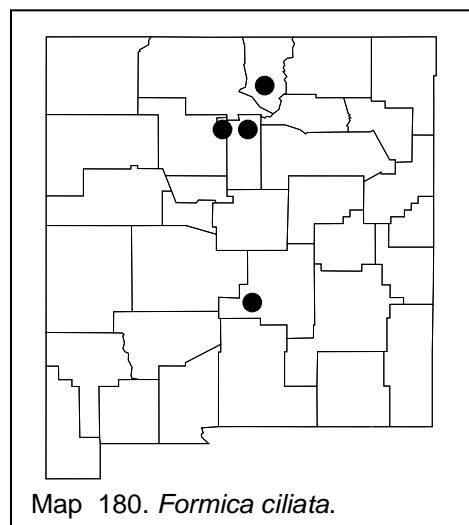
Habitat. Forested areas (ponderosa pine, Gamble oak) and surrounding open prairies, as well as areas of clover and milkweed.

Biology. Nests are found in the soil, usually with the nest entrance surrounded by mound of soil.

***Formica ciliata* Mayr (*rufa* group)**

Discussion. The workers of this species have few erect hairs, which are mostly restricted to the clypeus, pronotum, propodeum and gaster. The scapes are without erect hairs (except at apex), each tibia has only a few (less than 10) erect hairs on the flexor surfaces. The gaster is covered with short, erect hairs, in which the tips are closer than the length of the hairs. The females of this species are unusual as they are covered with long, curled, yellow hairs (Fig.), which suggests that it is a temporary social parasite (these types of hairs are typical of parasitic species). *Formica criniventris* females have similar hairs, but the workers of this latter species lack the dense, erect hairs on the gaster and are thus easily separated.

Distribution. USA: MT, ND S to NM: **Lincoln Co.**, Nogal, **Los Alamos Co.**, Los Alamos, **Santa Fe Co.**, Santa Fe, **Taos Co.**, 20k NW Taos (Map).



Map 180. *Formica ciliata*.

Habitat. Sagebrush, grasslands, disturbed areas (nuclear waste site), pinyon-juniper woodland, deciduous forests, up to ponderosa pine.

Biology. This species has nests thatched with pinyon pine needles and juniper needles, and also nests under logs and stones. The mound may completely lack thatching, and be covered with pebbles. The mound is small and is

not much higher than the surrounding soil surface. They are usually found on south facing slopes. This species appears to be polydomous, with individual colonies located 4 - 5 meters apart, although in one instance, 2

adjacent nests were fighting. Brood was found in nests in August, reproductives occurred in nests in July and August, dealate females were collected loose in August.

Wheeler, 1909, 1910, Wheeler and Wheeler, 1963, Gregg, 1963
comata? check smith, see Gregg 547.???

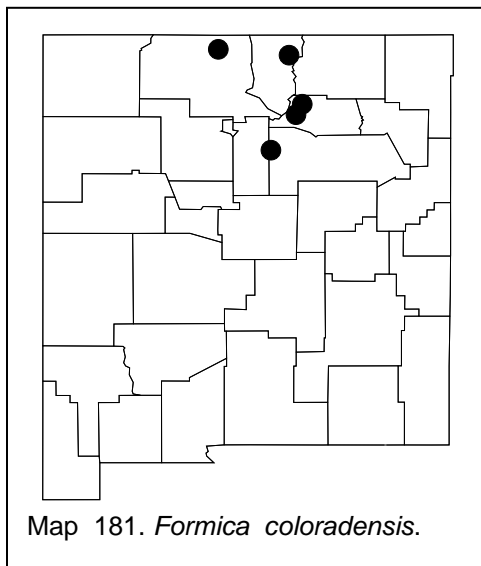
***Formica coloradensis* Creighton (*rufa* group)**

Discussion. The presence of bristly, short, erect hairs scattered over all surfaces of the tibiae, separate this species from most of the others in the *rufa* group. The lack of erect hairs on the scapes distinguishes it from *F. oreas*. Separation of this species from *F. obscuriventris* is more difficult, as both have scattered erect hairs on the tibiae. The clypeus of this latter species is box-like, protruding, with deep tentorial pits. *Formica coloradensis* has a less protruding clypeus, with shallow tentorial pits. Once these other species are excluded, we are left with a baffling group, which is nearly impossible to separate. The erect hairs on the mesosoma of the closely related *F. obscuripes* are unequal in length (Fig.), whereas those of *F. coloradensis* are short and equal in length (Fig.). Finally, we separate this species from *F. planipilis* on the basis of the color of the minor worker, the head and mesosoma of those of *F. coloradensis* being red, minor workers of *F. planipilis* are darker (especially the smaller specimens). The legs of all workers are red, whereas the legs of workers of

F. planipilis are dark. It is obvious that much work remains to be done on the systematics of the *rufa* group, as well as the remainder of the genus *Formica*.

Distribution. USA: ID, UT, CO; NM: Rio Arriba Co., 4 k N Chama, San Miguel Co., Beulah (Wheeler, 1913), Dailey Canyon (Cole, 1954), Pecos (Wheeler, 1913), Taos Co., 3.4 mi W Red River (Elephant Rock Campground).. check to be sure of counties. ???

Habitat. Higher elevation forests (1600 - 3500 meters), oak



forests, occasionally in meadows or near aspen-spruce forests.

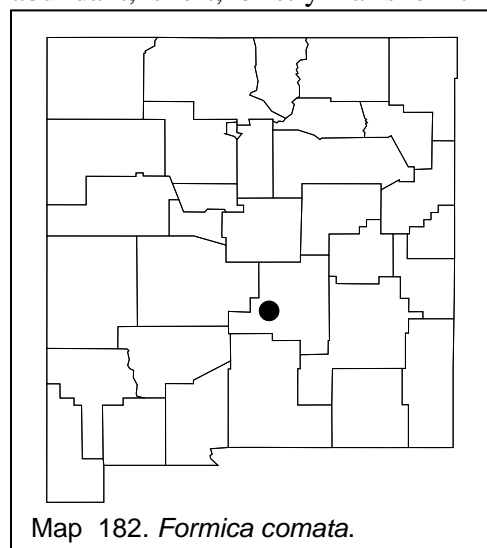
Biology. This ant nests under logs and stumps or stones, or simply in mounds with thatching. Reproductives were found in nests in July, dealate females were collected in July and August.

Wheeler, 1913, Creighton, 1940, Cole, 1954, Gregg, 1963

***Formica comata* Wheeler (*rufa* group)**

Add to sp. in NM +++

Discussion. The workers of this species can be recognized by the numerous snort, erect hairs on the underside of the head (Fig.), and by the abundant, short, bristly hairs on the dorsum of the gaster (Fig.). The



Map 182. *Formica comata*.

dorsum of the gaster is covered with a dense layer of fine, appressed, silver hairs. It can be separated from the similar *F. ciliata* by the hairs on the ventral surface of the head, and from *F. mucescens* by the short length of the hairs on the dorsum of the first tergum of the gaster.

Distribution. USA; NM: Lincoln Co., Nogal.

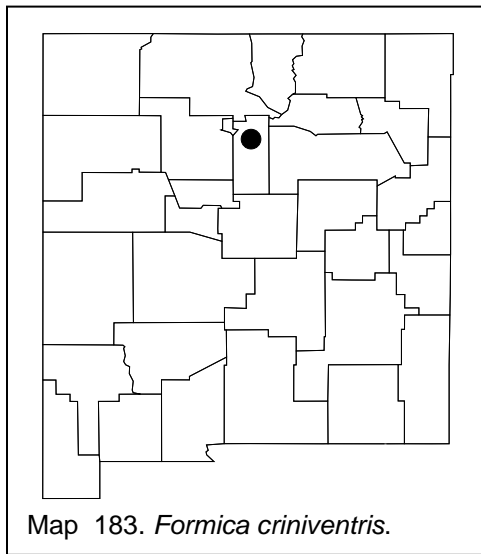
Habitat. Grasslands, Ponderosa pine forest, sagebrush.

Biology. These ants construct thatched nests. Sexu-

were found in nests in July.

***Formica criniventris* Wheeler (*rufa* group)**

Discussion. This as in attractive, bicolored ant (head and mesosoma red, gaster black), in which the mid and hind tibiae normally have only 1 or 2 erect or suberect hairs. These hairs are located near the apices of the tibiae. The scapes are without erect hairs (except at the apex). The clypeal fossa is shallow and the surface of the clypeus is broadly convex. The suberect hairs on the gaster are widely scattered and sparse.



Distribution. USA: MT, ND, south to CO; NM: **Santa Fe Co.**, Santa Fe (Audubon Center).

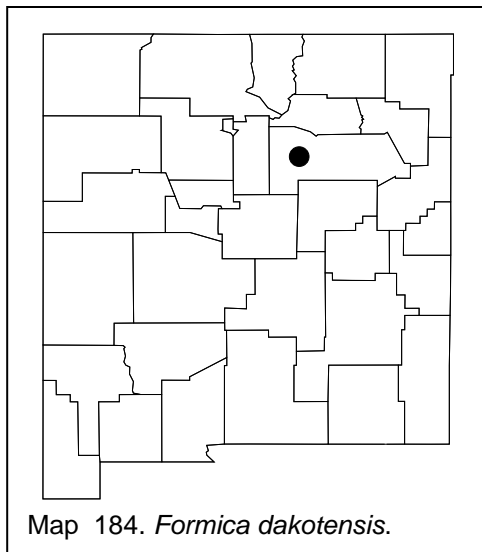
Habitat. Forested areas, open meadows.

Biology. These ants usually nest under stones and build thatched nests around the stone. It may enslave *F. argentea* or *F. neoclara* (Wheeler, 1913).

Formica dakotensis

Emery (*rufa* group)

Discussion. Workers, females (and even males) of this species are easily recognized as the node of the petiole is flat or has a slightly concave crest, as seen from the front or back (Fig.). The sides of the node are nearly straight and parallel. The shape of the petiole separates this species from all other New World species of the *rufa* group. The palpi are remarkably short. The female is smooth and shining, and smaller than the largest workers.



Distribution. CANADA: Que.; USA: Much of North America; NM: **San Miguel Co.**, Beulah (Wheeler, 1913, as *F. dakotensis* var. *montigena*).

Habitat. Grasslands up to ponderosa pine forests.

Biology. This ant nests in mounds, often thatched with detritus, or under stones. It enslaves *F. fusca*, *F. lepida*, *F. montana*, *F. nitidiventris*, *F. subsericea* and *F. pallidefulva*. Like most species of *Formica*, this species tends aphids.

Wheeler, 1904, 1910, Abbott, 1926, Gregg, 1963, Wheeler and Wheeler, 1963

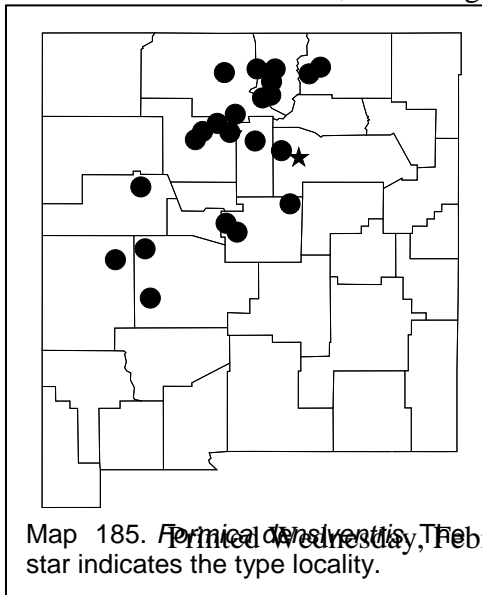
***Formica densiventris* Viereck (*microgyna* group)**

Discussion. The nomenclature and status of this ant have been very complicated. The description by Viereck (1903) is brief and completely inadequate, and based on two poorly preserved specimens (Brown, 1947). This has created considerable confusion. A number of species and subspecies have been synonymized with *F. densiventris* (Creighton, 1950; Cole, 1955b). Wheeler (1903) described a taxon, *F. rasilis* based on workers, females and males. Subsequently hybridization was observed between *F. rasilis* and *F. densiventris* (Creighton, 1950; Cole, 1955b; Gregg, 1963). Because of this, Gregg chose to consider *F. densiventris* as a subspecies of *F. rasilis*. We do not recognize a separate subspecies and due to precedence of date of publication (Viereck: Jan 1903; Wheeler: Nov 1903) we consider the proper name of the species to be *Formica densiventris* Viereck (Mackay et al. 1988).

Distribution. USA: Western United States; NM: **Catron Co.**, Ox Spring Canyon, **Cibola Co.**, Mt. Taylor, **Colfax Co.**, 16 k E Eagle Nest, 13 m N Eagle Nest, **Los Alamos Co.**, Los Alamos, 4 K W Los Alamos, 4 k N Los Alamos, 8 K N Los Alamos, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, Bandelier National Monument, 11 k E Cuba, Jémez Mts., **San Miguel Co.**, near Las Vegas, **Santa Fe Co.**, Sandia Mts., Tesuque Canyon, **Socorro Co.**, Beartrap Canyon, 43 k NE Datil, **Taos Co.**, 5 mi SE Dixon, 20 k NW Taos, 6 k S Tres Piedras, 14 k SE Tres Piedras, **Torrance Co.**, 6 mi E Cline's Corner, Manzano Mts., near Mountainair (Cole, 1954) **San Miguel Co.**, Sapello Canyon near Beulah (type locality), Pecos (Wheeler, 1913).

Habitat. Prairies, including disturbed, weedy areas, to semiarid scrub up to pinyon-juniper, ponderosa pine-riparian, Douglas fir, and spruce-fir forests.

Biology. Nests are usually found under stones, but may be found in logs and stumps, and under bark. These structures may be partially covered with thatching. Nests may be composed entirely of thatching. Brood and reproductives were found in nests in June to August. A dealate female collected



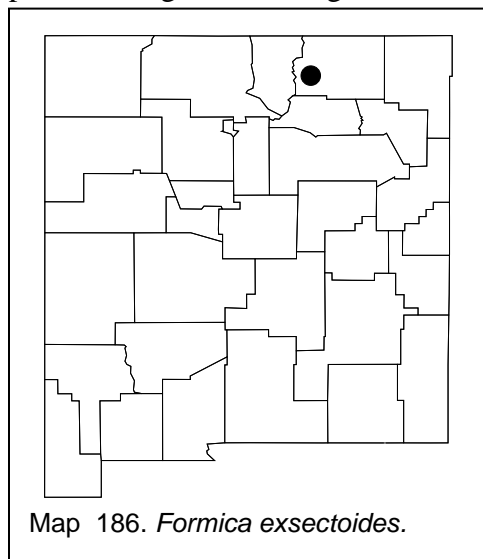
Map 185. *Formica densiventris*. February 05, 2014, 4:17 PM

on 3 July 1986. Workers are very aggressive when the nest is disturbed. Foragers tend aphids. This is one of the most common *Formica* spp. in northern New Mexico. It enslaves other *Formica* spp., including *F. argentea*, *F. fusca*, and *F. subsericea*.

Wheeler, 1913, Mallis, 1941, Cole, 1942, 1954, Gregg, 1963

***Formica exsectoides* Forel (*exsecta* group)**

Discussion. Workers of this species are easily confused with members of the *rufa* group, being large, bicolored (red head and mesosoma, black gaster) ants with a dull surface. The larger workers can be separated as the vertex of the head is concave (Fig.). The dorsum of the promesonotum is usually without hairs, at least in the largest workers. The propodeum and petiole are often without erect hairs. These characteristics separate this species from the other 2 species in the *exsecta* group, and from most of the species of the *rufa* group and the *microgyna* group. The gaster has few erect hairs, which are mostly confined to the posterior edge of each segment.



Distribution. USA: Most of North America; NM: **Colfax Co.**, Cimarron Canyon (Cole, 1954) (Map).

Habitat. Mountain meadows through juniper woodlands and grasslands, up to ponderosa pine forests.

Biology. This species nests in large mound (made of soil) nests, and enslaves *F. fusca* and *F. subsericea*. Cole (1954) reported it nesting under a stone. This species is not common in New Mexico. Colonies can be large, including over 1,600 individual nests. It is

extremely aggressive when the nest is disturbed.

Wheeler, 1913, Pierson, 1922, Manter, 1925:348, Andrews 1929:325, 1926, 1929, 1941, Haviland, 1947, Schread, 1949, Cole, 1954, Gregg, 1963, Christensen and Quick, 1970

***Formica foreliana* Wheeler (*fusca* group)**

Discussion. Workers of this species can be recognized by the abundant (24 - 43 on first tergum, exclusive of row along posterior edge of tergum) long, flexuous, erect hairs on the gaster. It is bicolored, with the head and mesosoma mostly red, the gaster is black.

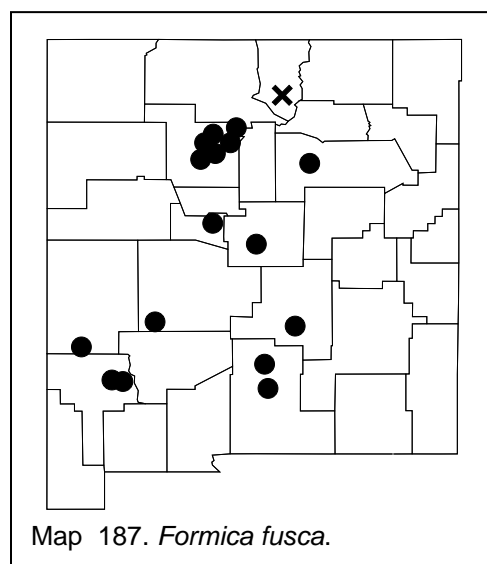
Distribution. USA, AZ; NM: We have no records for the state, but it occurs in southeastern Arizona (Cochise Co.) and would be expected to be found in southwestern New Mexico.

Habitat. Areas between 1370 and 1760 meters elevation (Francoeur, 1973).

Biology. Unknown.
Wheeler, 1913

***Formica fusca* Linnaeus (*fusca* group)**

Discussion. This species is similar to *F. occulta* but differs in that the metasternal lobe is absent or very poorly developed and usually has erect hairs around the metasternal cavity. It is concolorous black with



Map 187. *Formica fusca*.

abundant decumbent pilosity. The underside of the head has no erect hairs, and the first tergite of the gaster (excluding posterior edge) has only about 4 course, erect hairs. *Formica podzolica* and *F. argentea* are very similar, but have more than ten erect hairs on the first tergite (again excluding erect hairs on the posterior edge). Also the metasternal cavity has hairs only around the posterior edge or they may be absent. Most other similar species usually have hair surrounding the metasternal cavity.

Formica marcida is a

synonym.

Distribution. USA: Most of North America; NM: **Bernalillo Co.**, Sandia Mts., **Catron Co.**, Mogollon Mts. (trail 206), **Grant Co.**, 77 k E Silver City, Wright's Cabin, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Camp May, **Lincoln Co.**, without locality, **Otero Co.**,

Sacramento Mts. (Bailey Canyon), 13 k NW Timberon, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, 100 k E Cuba, Jémez Mts., 12 mi NE Jémez Springs, **San Miguel Co.**, Beulah, **Socorro Co.**, 33°48'32.8"N 107°26'10.7"W, **Taos Co.**, without locality, **Torrance Co.**, 24 k S Mountainair, **Valencia Co.**, 57 k SW Grants.

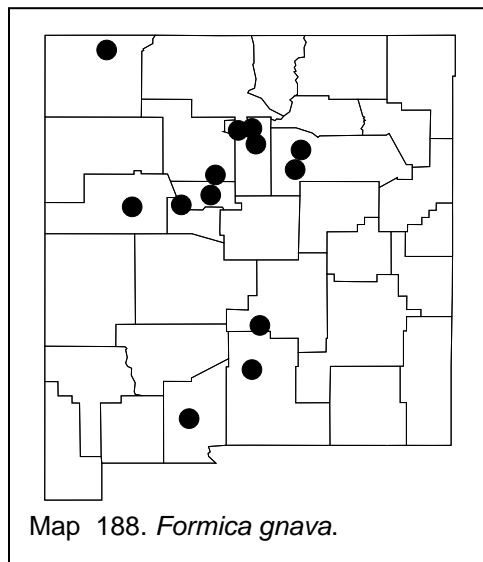
Habitat. Widely distributed in mesic habitats, including forests and open areas, ponderosa pine-riparian, pinyon juniper, aspen forests, Douglas fir forests, absent only in semiarid and arid habitats and above timberline.

Biology. This ant nests in soil or under stones and in logs (primarily very rotten and soft). They occasionally have an earthen mound. Brood was found in nests from May to August, reproductives were found in nests from July to September, dealate females were found in August and September. This species nests together with *Myrmica lobifrons* and with *Monomorium minimum* and *M. cyaneum*.

Cole, 1954, Gregg, 1963, Wheeler and Wheeler, 1963

***Formica gnava* Buckley (*fusca* group)**

Discussion. This is a second species of *Formica* which is often found in arid ecosystems (the other species is *F. perpilosa*). This species differs from *F. perpilosa* in that it is not as hairy and does not have a notched clypeus. It is also not common in arid sites, being found primarily



in desert-oak transitions and in semi-arid sites. It can be separated from *F. argentea* (which occasionally occurs in arid habitats) as it is bicolored and the surface is dull (*F. argentea* is usually concolorous yellow-brown or black, and at least some of the surfaces, especially parts of the head, are shiny).

Distribution. USA: Southwestern United States; NM: **Bernalillo Co.**, Albuquerque (Wheeler, 1913), **Cibola Co.**, Mesa Negra (Wheeler, 1913), **Doña Ana Co.**, Mesilla Park, **Lincoln Co.**,

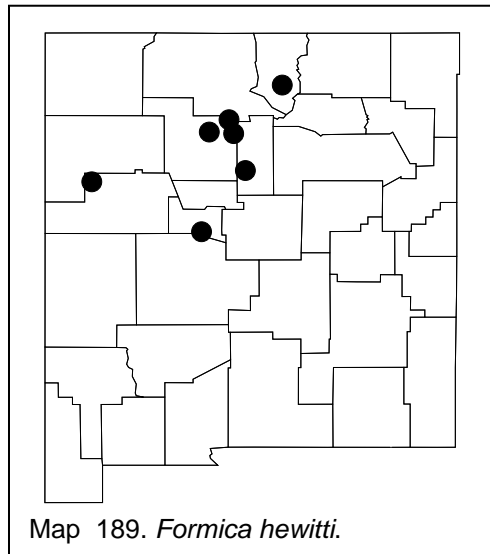
Sierra Blanca, **Otero Co.**, Alamogordo, **Sandoval Co.**, Coronado State Park, **San Miguel Co.**, Las Vegas (Wheeler, 1913), Villanueva State Park, **Santa Fe Co.**, San Ildefonso (Wheeler, 1913), Santa Fe, Tesuque, **San Juan Co.**, Aztec, **Valencia Co.**, Los Valles (Wheeler, 1913); MEXICO: Chihuahua. **Habitat.** Semideserts and shady canyons up to oak forests and pinyon pine forests and rarely to fir forests.

Biology. This ant nests under stones and in the soil without mounds. It feeds from extrafloral nectaries of the cholla (*Opuntia* spp), and forages into cotton wood trees. These ants can be very aggressive when the nest is disturbed, spraying formic acid at the intruder.

Wheeler, 1902, 1913, 1917, Cole, 1934, Mallis, 1941, Gregg, 1963

***Formica hewitti* Wheeler (*fusca* group)**

Discussion. This is a dark brown species with lighter brown appendages. The mesopleural process is poorly developed or absent. The cheek has elongate punctures (difficult to see, try looking obliquely at the surface with the light source coming from the side). The decumbent pubescence on the gaster is sparse, and the gaster is little sculptured, resulting in the surface being smooth and shining. There are several erect hairs on the ventral surface of the head, vertex, mesosoma, apex of petiole and gaster. The propodeum is often without erect hairs.



Distribution. USA: Most of the United States; **NM:** **Bernalillo Co.**, Bosque Forest, **Cibola Co.**, Zuni Mts (southeast of Gallup), **Los Alamos Co.**, Los Alamos, Mortandad Canyon, Camp May, **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, **Santa Fe Co.**, Sangre de Cristo Mts., **Taos Co.**, 20 k S Taos; MEXICO: Chihuahua.

Habitat. Meadows through ponderosa pine-riparian up to aspen forests.

Biology. This species is found in pebble and soil mounds (up to 20 cm high, 50 cm in diameter), often with some thatching;

occasionally nests are simply under a stone or in a log or stump. Brood was found in nests in July and August. This is a common species in northern New Mexico. This species nests with *Camponotus modoc*.

Gregg, 1963

***Formica laeviceps* Creighton (*rufa* group)**

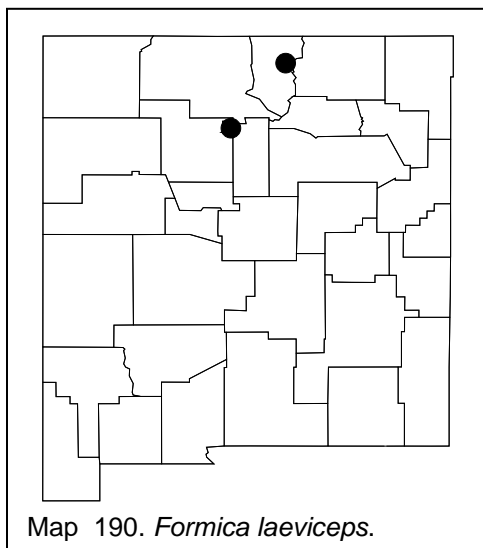
Discussion. Workers of these ants can be recognized as lacking erect hairs on the scape (except at apex) and with few erect hairs on the mid and hind tibiae, except for a double row of bristles, each with up to 10 hairs, which extend the entire length of the tibia. The tentorial pits are very deep and pit-like, making the middle part of the clypeus rise up as a rectangle (Fig.). The species name suggests that the head is smooth, but it

is predominantly rough and only slightly smoother than the average member of the *rufa* group.

Distribution. USA: CO; NM: **Los Alamos Co.**, east Bandelier (species near *laeviceps*?), **Taos Co.**, Taos (Yerba trailhead) (Map).

Habitat. Semiarid sites, grasslands, pinyon-juniper forests.

Biology. This ant nests under stones, and occurs in areas with sandy soils with interspersed stones. Foragers were collected on *Yucca* sp. stalks, tending aphids, on a sunny, east-facing slope.



***Formica lasioides* Emery (*neogagates* group)**

Discussion. This is a very common, small *Formica* which is widely distributed in New Mexico, especially in the northern and eastern parts. It is easily recognized as the pronotum has 10 or more erect hairs and the scape has numerous, short, delicate, white hairs. Most other body parts

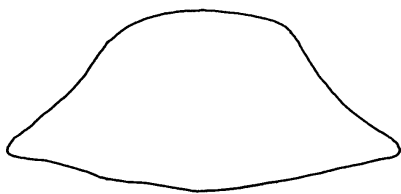
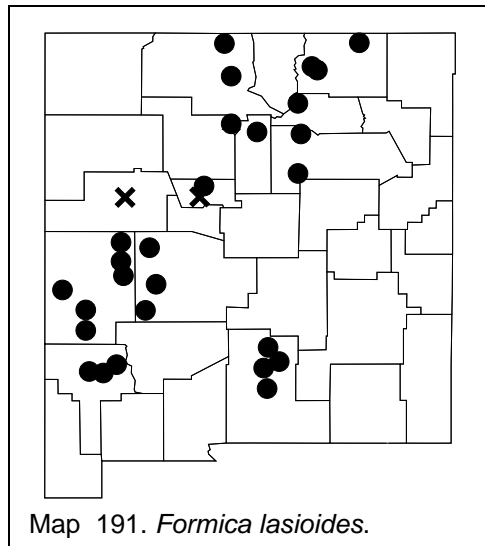


Fig. 415. Clypeus of a worker of *F. lasioides*.

are covered with bristly hairs. The entire surface is smooth and polished. It is unlikely to be confused with any other species of *Formica*, as it is the only small, shiny species with erect hairs on the antennae.



Distribution. USA: Most of North America; NM: **Bernalillo Co.**, without locality, **Catron Co.**, 9 k N Apache Creek, 15 k NW Datil, 14 k W Datil, Mogollon Mts (trail 206), near Snow Lake, Ox Springs Canyon, **Cibola Co.**, without locality, **Colfax Co.**, Cimarron Canyon (Cole 1954), 2 mi S Raton Pass (Cole 1954), Ute Park (Cole 1954), **Grant Co.**, 5 mi N Pinos Altos, Wright's Cabin, **Los Alamos Co.**, Los Alamos, Mortandad Canyon, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Mora Co.**, Coyote Creek State

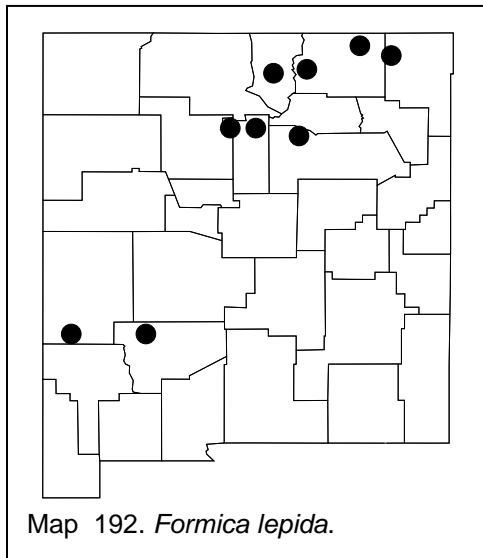
Park, **Otero Co.**, Cloudcroft (Wheeler, 1913), 14 mi S Mescalero (Cole 1954), Sacramento Mts. (Bailey Canyon), 9 k SW Timberon, **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, Rio Rancho, **San Miguel Co.**, Beulah (Wheeler, 1913), Gallinas Canyon (Wheeler, 1913), Sapello Canyon near Beulah (Cole 1954), **Santa Fe Co.**, 12 k NE Santa Fe, **Socorro Co.**, Grassy Lookout, Withington Lookout, **Habitat.** Primarily pine forest, ponderosa pine-riparian, fir forests, spruce and aspen forests, pinyon pine, oak forest, although it occurs in other habitats, including semiarid grasslands.

Biology. This is a common species, which nests in the soil, usually under stones or logs. Brood was collected in nests in July and August. Two dealate females were collected on the soil surface on 6 Aug. 1986. It nests together (possibly enslaved by) with *F. occulta*. One colony was nesting together with *Lasius pallitarsis*, several nests contained nests of *Leptothorax crassipilis*. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa*, *F. rubicunda*, *F. lasioides* and *Myrmica*. These ants are docile, and escape when the nest is excavated.

Cole, 1942, 1966, Wheeler and Wheeler, 1944, 1963, Gregg, 1963, Kincaid, 1963

***Formica lepida* Wheeler (*fusca* group)**

Discussion. Workers may be recognized by the lack of a process on the metasternum, being concolorous yellow to blackish-brown, by lacking elongate punctures on the genae, and in having erect hairs present on the ventral surface of the head, occiput, promesonotum, propodeum and dorsal margin of the petiole. The four faces of the femora have erect hairs, and the petiole is thick as seen in profile with a rounded apex. The



specimens reported by Cole (1954) were collected far from the known distribution of *F. lepida*, and were probably misidentified. It is more likely that they are *F. canadensis*. *Formica lepida* can be separated from *F. canadensis* by the lack of process on the metasternum, and hairs are more tapering than those of *F. canadensis*, the sides are convergent along the length. The hairs on *F. canadensis* are mostly coarse, with the sides parallel along their lengths.

Distribution. USA: CA (northern coastal region); NM:

Catron Co., Mogollon Mnt., Colfax Co., Cimarron Canyon (Cole, 1954), 2 mi S Raton Pass (Cole, 1954), Sandoval Co., Bandelier National Monument, San Miguel Co., Sapello Canyon (Cole, 1954), Santa Fe Co., Tesuque Canyon (Cole, 1954), Sierra Co., Little Willow Creek Canyon, Taos Co., 5 mi E Taos (Cole, 1954), Union Co., Capulin Volcano National Monument (Cole, 1954), (Map).

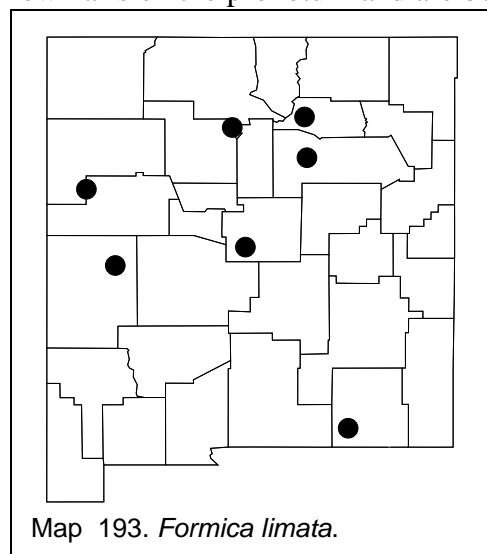
Habitat. Moist meadows and shaded slopes (juniper, pine, fir and aspen forests).

Biology. This species nests under stones.
Cole, 1954, Francoeur, 1973

***Formica limata* Wheeler (*neogagates* group)**

Discussion. This species can be recognized as the pronotum has less than 10 erect hairs (often none), and all surfaces are smooth and glossy. The scape is without erect hairs. It is unlikely that this species

would be confused with any others, except *F. neogagates*. It differs in having fewer erect hairs on the pronotum (rarely more than 10), whereas *F. neogagates* normally has more than 20 erect hairs on the pronotum. This species is more smooth and polished, many surfaces of *F. neogagates* are tessellated, and although shiny, are somewhat roughened. Sometimes a specimen cannot be separated in to one or the other of these two species. It is difficult to separate from *F. oregonensis* as both species generally have few hairs on the pronotum and are both usually shiner than *F. neogagates*.



They can be separated on the basis of distribution, *F. oregonensis* is found only in Oregon, *F. limata* has not been reported from Oregon, and is known only from the mid west, found as far east as Utah.

Distribution. USA: ND, MT south to NM, west to CA; NM: **Catron Co.**, 14 k W Datil, **Eddy Co.**, Hidden Cave, **Los Alamos Co.**, Los Alamos, 2 k NE Los Alamos, Mortandad Canyon, **McKinley Co.**, 4 k E Ramah, **Mora Co.**, 10 k SE Mora, **San Miguel Co.**, Las Vegas (Wheeler,

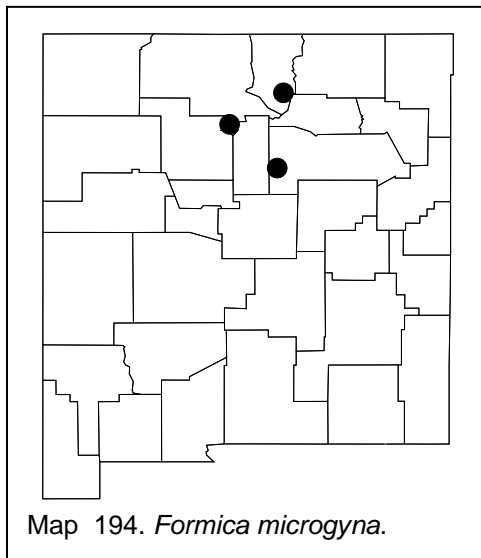
1913), **Torrance Co.**, 24 k S Mountainair.

Habitat. Meadows and grasslands through sagebrush, pinyon-juniper, ponderosa pine-riparian, grassy areas up to the tree line.

Biology. This species nests under stones and logs, usually in exposed areas. Nests are occasionally small mounds in the soil. Nest populations are small, and these ante are timid. Brood was found in nests in August. One nest was found within a cave, 80 ft from the entrance. Workers are attracted to baits (grape jelly, tuna).

Wheeler and Wheeler, 1944, 1963, Gregg, 1946, 1963, Cole, 1966

***Formica microgyna* Wheeler (*microgyna* group)**



Discussion. The workers of this species are robust, large bodied bicolored (head and mesosoma red, gaster black) ants, with numerous blunt, erect hairs on various body parts, especially the pronotum. The tibiae have erect hairs on all surfaces, including the double row on the flexor surfaces. The gaster is dull, except for a band at the end of each tergum, the surface is dull and covered with

dense, decumbent pubescence. The erect hairs are white, silver or pale yellow in color, and are abundant, especially on the pronotum, mesonotum, propodeum and gaster. Those on the gaster vary in length. Most of the hairs on the mesosoma are blunt tipped, or even weakly spatulate.

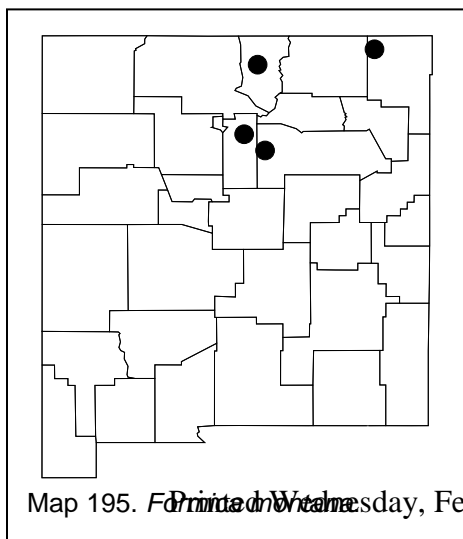
Distribution. USA: WY S to NM, W to UT; NM: Los Alamos Co., Camp May, San Miguel Co., Pecos (Wheeler, 1913), Taos Co., 2 k W Tres Ritos.

Habitat. Meadows and open forests, pine and aspen forests.

Biology. Nests are found under stones and logs, occasionally with thatching. Reproductives were found in nests in August. This species enslaves *F. argentea*, *F. fusca*, *F. lasioides* and *F. neogagates*.

Wheeler, 1913, 1917, Gregg, 1963, Cole, 1966

***Formica montana* Wheeler (*fusca* group)**



Discussion. This is a light brown, hairy species. The metasternal process is well developed and surrounded with erect hairs. There are numerous erect hairs on the ventral surface of the head, the pronotum, propodeum, petiole and gaster. Many (or most) of the hairs are blunt-tipped. There are few hairs along the side of the head, usually extending anteriorly

only to the anterior edge of the eye. The cheek is usually without erect hairs.

Distribution. USA: OH w to ND, s to ND; NM: Santa Fe Co., Santa Fe, San Miguel Co., Pecos, Taos Co., Taos, Union Co., Capulin Mountain National Monument (Cole, 1954) (Map).

Habitat. Prairies and meadows, up to pinyon-juniper and oak-pine forests.

Biology. This ant nests in mounds of soil, occasionally with thatching. Reproductives were found in nests from May to July.

Wheeler, 1902, 1910, 1917, Amstutz, 1943, Gregg, 1948, Cole, 1954, Wheeler and Wheeler, 1963 (as *altipetens*), Gregg, 1963, DuBois and Danoff-Burg, 1994

***Formica mucescens* Wheeler (*rufa* group)**

Discussion. This species can be recognized as there are few hairs on the tibia, where they are restricted to 2 rows on the flexor surface. The gaster is covered with short, bristly hairs, in which the distance between the tips is less than the lengths of the hairs. It is similar to *F. ciliata*, but differs in that the cheek has several erect hairs (usually more than 12 on each), and the female is brown, and without the curved hairs found on the female of *F. ciliata*. It can be separated from *F. comata* (which occurs from Montana south to Colorado) as the hairs on the gaster are longer (0.12 mm vs. 0.06 mm in length in *F. comata*).

Distribution. USA: Colorado and Utah; NM: Not known to occur in the state, but as it is found near the border in Colorado, it would be expected in NM.

Habitat. Found in open prairies up to ponderosa pine forests.

Biology. This species nests under stones banked with detritus or in thatched nests.

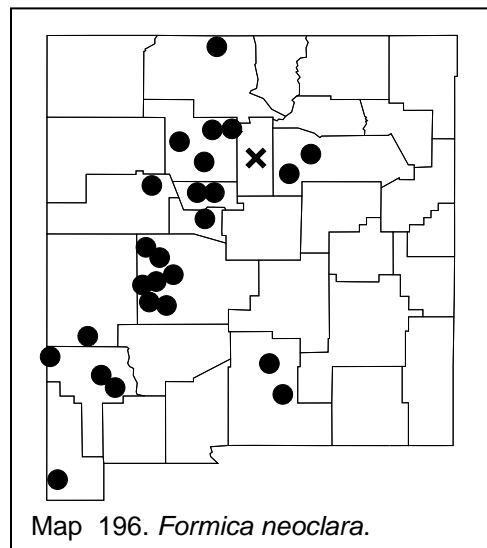
Gregg, 1963

***Formica neoclara* Emery (*fusca* group)**

Discussion. This is one of the few light-colored *Formica* spp. in New Mexico. It is usually a light yellowish brown with a gaster that is only slightly darker. Occasionally workers are red with a black gaster, or even nearly black, with yellowish-brown areas. The pilose lobes on the metasternum are not always well developed (Fig.), but there are always at least a few golden erect hairs at least on the posterior edge (Fig.). It could

be confused with *F. argentea*, but the latter species has few or no golden erect hairs on the metasternal lobes. Additionally, *F. argentea* usually has a few blunt hairs on the pronotum, *F. neoclara* rarely has any pronotal hairs.

Distribution. USA: Western United States; NM: **Bernalillo Co.**, Albuquerque, Rio Grande, **Catron Co.**, Mogollon Mts., **Cibola Co.**, Mt. Taylor (9000 ft), **Grant Co.**, 6 k E Mule Creek, 60 k E Silver City, 9 k E White Signal, **Hidalgo Co.**, Gray Ranch, **Los Alamos Co.**, Los Alamos, **Otero Co.**, 4 mi N Cloudcroft, 13 k N Timberon, 14 k N Timberon, **Rio**



Arriba Co., 4 k N Chama, **Sandoval Co.**, Jémez Springs, without locality, **San Miguel Co.**, Pecos (Wheeler, 1913), Las Vegas (Wheeler, 1913), **Santa Fe Co.**, without locality, **Socorro Co.**, 5 k N Camp Luna, 11 k NW Magdalena (Bear Mt.), 18 k NW Magdalena (Bear Mt.), 17 k S Magdalena, 19 k S Magdalena, 21 k S Magdalena, 23 k S Magdalena, Withington Mt., Intersection roads 330 X 107, **Valencia Co.**, Belen; MEXICO: Chihuahua.

Habitat. Residential areas, grasslands (including arid grasslands) and open deciduous woods, oak forests, pinyon juniper into pine and fir forests.

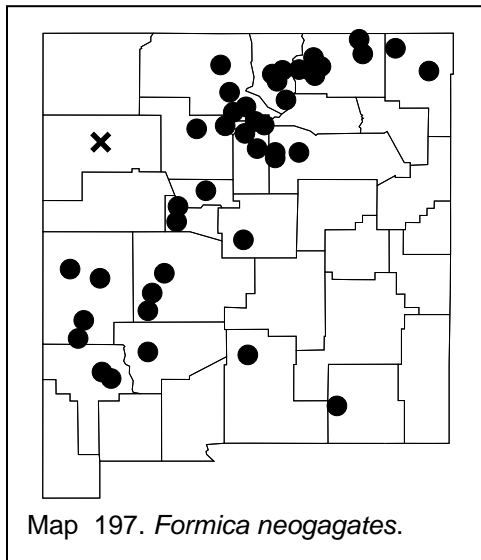
Biology. This species nests in the soil, usually with a mound. Sometimes nests are located at base of plant or under stones or logs, or in stumps, often in sandy soils. Nests can be large, with a circumference over 9 meters in diameter, with over 125 entrances (Gregg 1963). Brood was collected in June to August. Reproductives were found in nests in July and August, dealate females were collected in late June and July. This species may be polygynous, 3 dealate females were found in a single nest. Foragers are often found on cholla (*Opuntia imbricata* var. *arborescens*). Workers may be aggressive when a nest is disturbed, although they usually escape. This species is enslaved by *Polyergus breviceps* and nests with *Camponotus modoc*.

Wheeler, 1910, La Berge, 1952, Wheeler and Wheeler, 1963, Gregg, 1963 (as *F. pruinosa*)

***Formica neogagates* Viereck (*neogagates* group)**

Discussion. *Formica neogagates* usually has abundant erect hairs on the pronotum, as well as the remainder of the body. The antennae are without erect hairs (except at apex). The surfaces are shiny, but more sculptured than most members of the *neogagates* species group. It can be separated from most of the other members by having more than 10 erect hairs on the pronotum (usually more than 20), and having rougher sculpture. These two characters usually separate it from *F. neogagates*. It is very similar to *F. oregonensis*, but can be separated on the basis of distribution (*F. oregonensis* is known only from Oregon, *F. neogagates* occurs throughout North America, but has not been reported from Oregon).

Distribution. CANADA: Que.; USA: Most of North America; NM: **Bernalillo Co.**, Albuquerque (Wheeler, 1913), **Catron Co.**, 37 k N Apache Creek, 14 m W Horse Springs, Mogollon Mt., near Snow Lake, **Colfax Co.**, Cimarron Canyon (Cole, 1954), 16 k E Eagle Nest, 41 k E Eagle Nest, 8 mi W Eagle Nest (Cole, 1954), 2 mi S Raton Pass (Cole, 1954), 16 m E Raton (Cole, 1954), Ute Pass (Cole, 1954), **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.**, Los Alamos, **McKinley Co.**, without locality, **Otero Co.**, Alamogordo (Wheeler, 1913), 41 k NW Sitting Bull Falls, **Rio Arriba Co.**, 7 k S Cebolla, San Juan Pueblo, **Sandoval Co.**, 11 k E Cuba, **San Miguel Co.**, Las Vegas (Wheeler, 1913), Pecos (Wheeler, 1913), Sapello Canyon, (Beulah area), (Cole, 1954), **Santa Fe Co.**, Glorieta (Wheeler, 1913), Santa Fe, Tesuque Canyon near Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, 16 k S Magdalena, Withington Lookout, Intersection roads 330 X 107, **Taos Co.**, 20 k NW Taos, 12 mi E Taos (Cole, 1954), 18 mi S Taos (Cole, 1954), 2 k W Tres Ritos, **Torrance Co.**, 24 k S Mountainair, **Union Co.**, Capulin Mountain National Monument, 3 mi N Greenville, **Valencia Co.**, 22 k E Grants, Los Valles (Wheeler, 1913).



Habitat. Grasslands and highly disturbed urban environments through pinyon-juniper forests up to aspen forests. It is occasionally found in semiarid habitats.

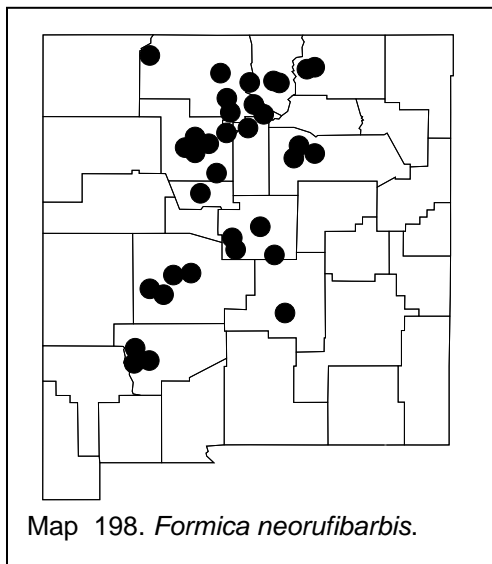
Biology. This species nests in the soil, often under stones or logs. Colonies are small and these ants are timid. *Formica densiventris*, *F. wheeleri* and *F. pergandei* enslave it. It nests

together with *Lasius alienus* and *Myrmica lobifrons*. Reproductives were found in a nest in June, dealate females were found in June and July. Nests have multiple, dealate females.

Wheeler, 1905, Wesson and Wesson, 1940, Wheeler and Wheeler, 1944, 1963, Buren, 1944, Gregg, 1963, Cole, 1966, DuBois and Danoff-Burg, 1994

***Formica neorufibarbis* Emery (*fusca* group)**

Discussion. This species has few erect hairs, the gaster is polished and strongly shining, the surfaces is little hidden by sparse pubescence.



The metasternal process is poorly developed, but is usually surrounded by erect hairs (Fig.). The area between the anterior edge of the eye and the mandible has elongate punctures, which are often difficult to see unless the surface is held obliquely and the light is directed from the side. The shiny gaster usually suggests the *neorufibarbis* species complex, the other characters, especially the lack of hairs on the ventral surface of the head and dorsum of the petiole, together with the elongate punctures on the gena, confirm

the identification.

Distribution. USA: Most of United States; **NM: Bernalillo Co.**, Embudo Canyon, **Colfax Co.**, 2 mi W Cimarron, 15 mi E Eagle Nest, **Lincoln Co.**, 5 mi W Capitan, **Los Alamos Co.**, Los Alamos, Rio Grande, Camp May, **Rio Arriba Co.**, Abiquiu Dam, 37 k N Abiquiu, 2 k N Dixon, 57 k SW Duke, 10 k SW Española, 4 k NW Navajo City, NE Truchas Peak (Wheeler, 1913), **Sandoval Co.**, Bandelier National Monument, 45 k SE Cuba, Jémez Mts., 1 mi S Jémez, Placitas, without locality, **San Miguel Co.**, Las Vegas range (Wheeler, 1913), Sapello Canyon (near Las Vegas), Villanueva State Park, **Santa Fe Co.**, Tesuque Canyon, **Sierra Co.**, 4 k W Hillsborough, 21 k SW Hillsborough, 6 k W Kingston, **Socorro Co.**, Intersection Roads 330 X 107, Water Canyon, 16 mi E Socorro, **Taos Co.**, Ojo Caliente, 12 mi E Taos, 18 mi E Taos, **Torrance Co.**, 5 mi NE Corona, 13 k NW Mountainair, 24 k S Mountainair (Cole, 1954); MEXICO: Chihuahua.

Habitat. Sagebrush, grasslands, pinyon-juniper, up to spruce and aspen, fir, riparian cottonwood forests and ponderosa pine forests.

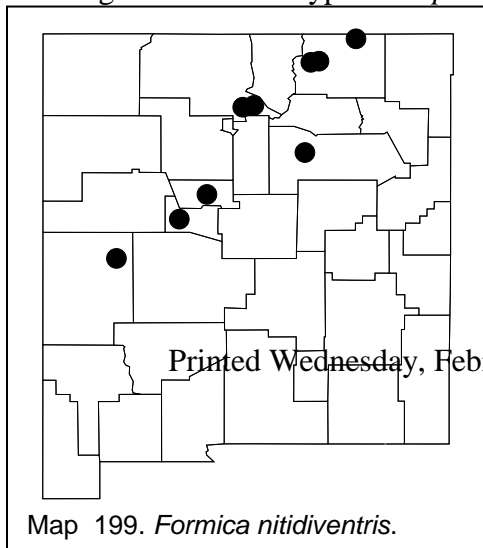
Biology. This is a common, widely distributed species. Nests may be found under stones or logs and in rotten logs and stumps in areas of rocky sand or loam. Brood was found in nests in July and August, reproductives were in nests in August. The diurnal foragers are found in chollas (*Opuntia* sp.). This species is enslaved by other species of *Formica* (*F. adamsi alpina*) and by *Polyergus breviceps*.

Wheeler, 1913 (*F. fusca* var. *gelida*), Cole, 1954, Gregg 1963, DuBois and Danoff-Burg, 1994

***Formica nitidiventris* Emery (*pallidefulva* group)**

Discussion. This is a shiny, elongate ant as other members of the *pallidefulva* species complex. The apex of the petiole is moderately sharp; there are few hairs on the dorsum of the mesosoma. This taxon has a darker gaster than the typical *F. pallidefulva*, a character that seems to be

very consistent. DuBois and Danoff-Burg (1994) concluded that this taxon is probably a valid species as it and *F. pallidefulva* occur together in the same habitats.



Map 199. *Formica nitidiventris*.

Distribution. USA: Northern and eastern United States as far west as CO and NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, 2 mi E Datil (Cole, 1954), **Colfax Co.**, Cimarron Canyon (Cole, 1954), 41 k E Eagle Nest, 2 mi S Raton Pass (Cole, 1954), **Rio Arriba Co.**, Truchas (Cole, 1954), **San Miguel Co.**, Las Vegas (Wheeler, 1913), **Valencia Co.**, Los Valles (Wheeler, 1913, as *F. pallidefulva schaufussi* var. *incerta*).

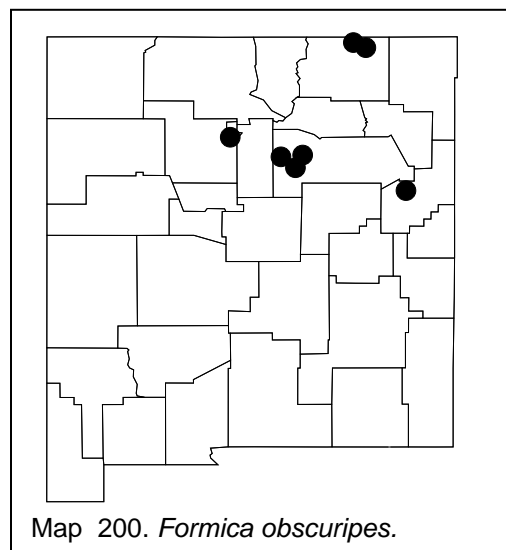
Habitat. Occurs in numerous habitats, ranging from urban environments through grasslands up to pinyon-juniper woodlands and ponderosa pine forests.

Biology. This species usually nests under stones or logs, but may occur in open areas in the soil; reproductives were found in nests from June to October.

Wheeler, 1904, 1917, Rau, 1934, Wesson and Wesson, 1940, Talbot, 1946, Schread and Chapman, 1948, Talbot, 1948, Gregg, 1963, DuBois and Danoff-Burg, 1994

***Formica obscuripes* Forel (*rufa* group)**

Discussion. This species is difficult to separate from *F. obscuriventris*. Characters to separate it from *F. obscuriventris* are in the discussion of that species. It is generally less hairy than *F. obscuriventris*, specifically having fewer than 30 erect hairs on the vertex (usually fewer than 20), whereas *F. obscuriventris* usually has more than 30.



Distribution. USA: Much of North America; NM: **Colfax Co.**, Barela Mesa (Wheeler, 1913), Raton Pass (Cole, 1954), **Los Alamos Co.**, Los Alamos, Mortandad Canyon, **Quay Co.**, Tucumcari, **San Miguel Co.**, Beulah (Wheeler, 1913), Dailey Canyon (Cole, 1954), Pecos (Wheeler, 1913).

Habitat. Prairies, sagebrush, mixed deciduous forest up to pinyon-juniper, ponderosa pine-riparian.

Biology. This species is not common in New Mexico. It

nests in thatched mounds or under logs or stones (usually partially covered with thatch). Workers tend aphids. It is polygynous (multiple queens in the nest). This species does not have typical mating flights; instead small numbers leave the nest throughout the season. Dealate females were collected in late June and early July.

Wheeler, 1913 (*F. rufa aggerans*). Jones, 1929, Cole, 1932, Weber, 1935, Gregg, 1963

***Formica obscuriventris obscuriventris* Mayr (*rufa* group)**

Discussion. This species is difficult to identify as characterization depends on the structure of the clypeus (see couplet 5 of the *rufa* group key). The clypeal fossa is deep, with the surrounding area depressed into a pit-like funnel. In addition, the middle of the clypeus is separated from the sides and is shaped somewhat like a rectangular box. If you pass couplet 4, it will key to *F. obscuripes*, but will differ to some degree in being more hairy. The vertex of the head usually has more than 30 erect hairs, when the top of the head is seen in profile from behind. *Formica obscuripes* usually has fewer than 20 hairs on the vertex, and the clypeal fossa will not be deep and funnel shaped. The middle of the clypeus passes gradually into the sides, not forming a rectangular box.

Distribution. USA: Throughout North America; NM: This subspecies is found in southwestern Colorado and may occur in New Mexico. Mayr 1886 includes NM, see Wheeler 1913:447 ???

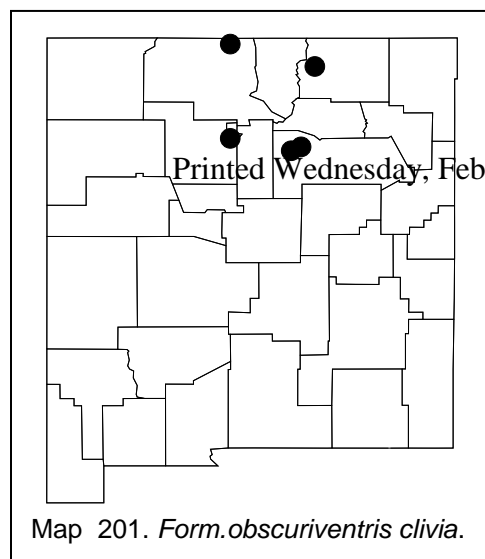
Habitat. Mixed canyon forest, and open woods into pinyon-oak-cedar woodland.

Biology. This species builds nests under logs or stones, usually partially covered with thatch. Females were found in nests in April, it may be polygynous, as several dealate females may be found in nest. It enslaves *F. subsericea* check name???

Wheeler, 1913, Gregg, 1963

***Formica obscuriventris clivia* Creighton (*rufa* group)**

Discussion. This subspecies can be separated from the typical *F. obscuriventris* in that the minors are darker, at least part of the petiole of the majors is somewhat darkened, as compared to workers of *F. obscuriventris*, in which the minors



Map 201. *Form. obscuriventris clivia*.

are yellow-brown in color and the petiole of the majors is clear yellow or red. Obviously the differences in color are of little significance, and this subspecies is probably a synonym.

Distribution. USA: Central North America south to NM: **Colfax Co.**, 13 mi N Eagle Nest (Cole, 1954), **Rio Arriba Co.**, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument (Cole, 1954), **San Miguel Co.**, Dailey Canyon (Cole, 1954), Sapello Canyon (Cole, 1954).

Habitat. Meadows up to oak woodlands, ponderosa pine-riparian and spruce aspen forests.

Biology. This ant constructs thatched domes of pine needles, typical of the *F. rufa* species group, in loam soils. Nests may also be found under stones or logs banked with thatch. Brood was found in nests in June and August, reproductives can be found in nests in August to September; dealate females were also found in August and September. They are very aggressive and attack when the nest is disturbed. Foragers tend aphids on various plants.

Gregg, 1963

***Formica obtusopilosa* Emery (*sanguinea* group)**

Discussion. This species can be recognized as the gaster is evenly

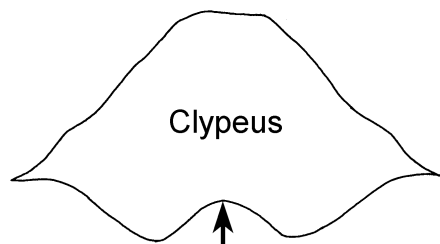
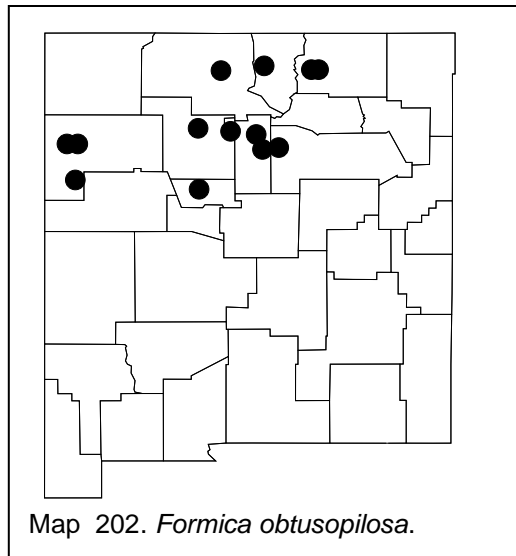


Fig. 416. Clypeus of a worker of *F. obtusopilosa*, showing the deeply notched clypeus.

covered with short (up to 0.14 mm), stout, silver, erect hairs, which are blunt at the tip, and the hairs on other surfaces are less abundant. The mesosoma has only a few erect hairs

(occasionally none), which are finer than those on the gaster, and which



are at most half as long. There is at least a pair of erect hairs on the underside of the head. The notch of the clypeus is well developed (Fig.), but relatively shallow. The scape is longer than the head length; the propodeum is broadly rounded between the faces and the crest of the petiole is blunt in profile.

Formica obtusopilosa is also included in the key to the *neogagates* group as smaller workers may occasionally be confused with members of that group. The species does not belong to the *neogagates* species group and is a member of the *sanguinea* species group.

Distribution. USA: Canada south through MN, NB to NM: **Bernalillo Co.**, Placitas, **Colfax Co.**, 10 mi NE Cimarron (Cole, 1954), Ute Park (Cole, 1954), **Los Alamos Co.**, Los Alamos, Camp May, **McKinley Co.**, Church Rock, 40 mi E Gallup, 4 k E Ramah, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, 11 k E Cuba, **San Miguel Co.**, Old Pecos Pueblo (Wheeler, 1913), **Taos Co.**, 14 k SE Tres Piedras, **Santa Fe Co.**, Glorieta [Canyon?] (Wheeler, 1913), Santa Fe (Audubon Center).

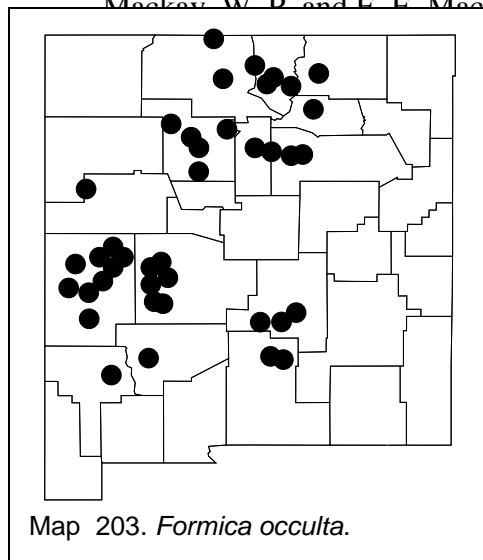
Habitat. Sagebrush scrub through meadows, irrigated plains and pinyon-juniper forests up to aspen forests. Cole (1954) found a nest in dry semidesert.

Biology. Nests are found under stones or in earthen mounds, similar to those of *Myrmecocystus*, in fine sandy or loam soils. These ants are very aggressive. Brood was found in nests in June and August, dealate females were found in July. Colonies are probably small, possibly a few hundred workers. One colony also contained workers of *F. aserva*, *F. argentea*, *F. lasioides* and *Myrmica*.

Wheeler (1913, including *F. munda*), Cole, 1954

***Formica occulta* Francoeur (*fusca* group)**

Discussion. This is a very common species in New Mexico. It is black or nearly black, with abundant decumbent pilosity. The pilose lobes on the metasternum are always developed and surrounded with abundant, erect hairs (Fig.). Callows (immature, lightly pigmented workers) could be easily confused with workers of *F. neoclara*. It is important to collect a good series so that at least some of the workers are dark. Some specimens can be confused with *F. fusca*, when the metasternal lobes are less well developed than normal. Again it is important to collect a good series (10 or more) so several workers can be examined.



Distribution. USA: OR, WY, UT, CO, AZ; **NM: Catron Co.**, 9 K N Apache Creek, 37 k NE Apache Creek, 5 k N Camp Luna, 14 k NW Datil, 15 k NW Datil, Ox Spring Canyon, Sawtooth Mts., near Snow Lake, **Colfax Co.**, 16 k E Eagle Nest, **Grant Co.**, 88 k E Silver City, **Lincoln Co.**, 2 mi W Alto, Bonito Lake, Oak Grove Camp, **Los Alamos Co.**, Los Alamos, 8 k N Los Alamos, 4 k W Los Alamos, Chupaderos Canyon, Camp May, **McKinley Co.**, 4 k E

Ramah, **Mora Co.**, Coyote Creek State Park, **Otero Co.**, Bailey Canyon, Cloudcroft, **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, 4 k W Cuba, 45 k S Cuba, 12 mi NE Jémez Springs, Jémez Canyon, **San Miguel Co.**, Las Vegas, 20 k NW Las Vegas, Pecos, **Santa Fe Co.**, Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, Beartrap Canyon (43 k SE Datil), 5 k N Camp Luna, Grassy Lookout, San Mateo Mts. (10,000'), Water Canyon, Withington Lookout, **Taos Co.**, 6 k SW Tres Piedras, 14 k SE Tres Piedras, 2 k W Tres Ritos, 20 k NW Taos (Map); MEXICO: Chihuahua.

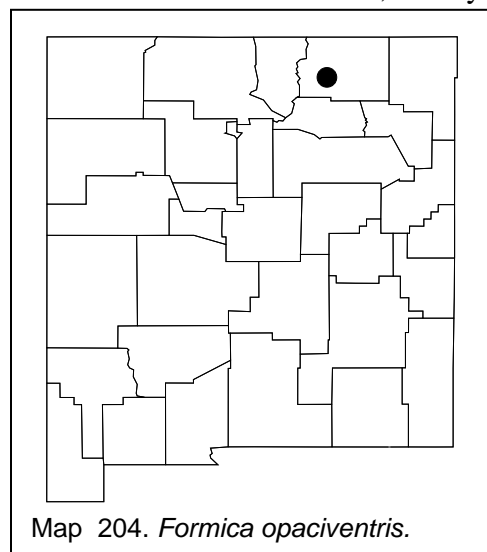
Habitat. Pinyon-juniper, sagebrush communities, oak forest, ponderosa pine-riparian; aspen, fir, spruce, and residential areas.

Biology. Nests are usually found under stones, but may be located under logs, or simply in the soil, in fine sand, loam soils, to rocky loam. Brood was found in nests from June to August, sexuals in late June to July. Dealate females were collected in late June and early July. A mating flight occurred the night of 12-vii-1986, sexuals were attracted to a blacklight trap. Dealate females were found in August, two new females were found nesting together (two separate times, one with brood present). All nests had only a single gyne. They are very fast, and rescue brood when the nest is disturbed. Workers from larger nests are moderately aggressive. One colony was nesting together with *Lasius sitiens*, a second nest was together with *Myrmica hamulata*, another with *Formica lasioides*, a fourth with *Solenopsis salina*. One nest also contained *Acanthomyops latipes*, *Lasius sitiens* and *Myrmica hamulata*. It is a host

of the cricket *Myrmecophila* sp., and is parasitized by *Polyergus breviceps*.

***Formica opaciventris* Emery (*exsecta* group)**

Discussion. Workers can be recognized as the occiput is concave as seen in full-face view (Fig.), and the propodeum is somewhat angulate as seen in profile (Fig.). The pronotum has several spatulate hairs and the mesonotum has a few short, bristly hairs. The dorsum of the gaster has



many scattered, short, bristly hairs and has sparse, silver, decumbent pubescence. This species would be considered a member of the *microgyna* group if the occiput was not concave.

This species can easily be separated from *F. exsectoides* by the numerous erect hairs on the pronotum and gaster (compare Figs.).

Distribution. USA: MT and ND south to NM; NM: Colfax Co., _____, San Miguel Co., Dailey Canyon (Beulah area) (Cole, 1954).

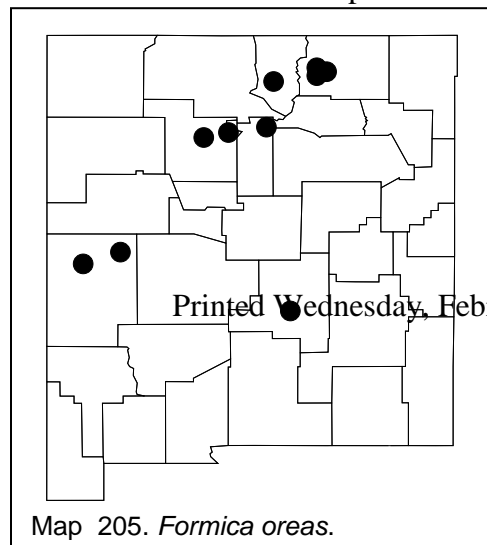
Habitat. Sagebrush scrub, meadows up to the edge of forests.

Biology. This species lives in soil mounds or mounds with some thatching.

Cole, 1954, Scherba 1961, 1963, 1964, Wheeler and Wheeler, 1963, Gregg, 1963, Scherba

***Formica oreas oreas* Wheeler (*rufa* group)**

Discussion. This species can be separated from most others as the



scape is more or less evenly covered with erect hairs, whereas many others have erect hairs only at the tip, with possibly a few others scattered on the scape. It can be separated from others with

many erect hairs on the scapes as it has short dense hairs covering the gaster and the gaster is brownish black instead of black. Specimens with few or no hairs will key to *F. obscuripes*, thus it is important to carefully examine all surfaces of scapes of several workers from a series.

The subspecies *F. oreas comptula* is separated, as the minor workers are darker. It is doubtful that this insignificant difference in color is of any importance.

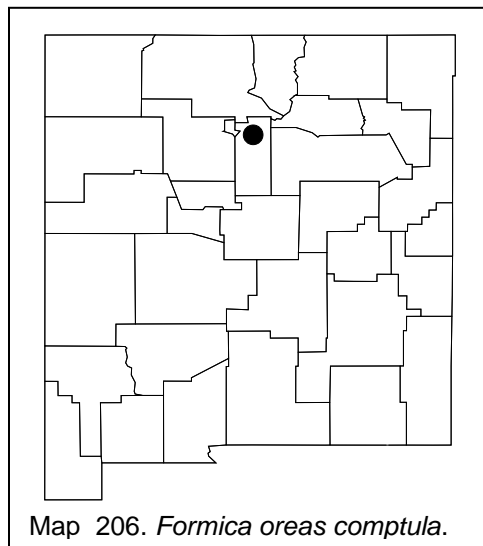
Distribution. USA: MT, ID S to NM: **Catron Co.**, 37 k N Apache Spring, Sawtooth Mts., **Colfax Co.**, (Cole, 1954) Cimarron Canyon, Eagle Nest, Ute Pass, **Lincoln Co.**, 5 mi W Capitan, **Sandoval Co.**, Bandelier National Monument (Cole, 1954), 1 mi S Jémez Springs, **Taos Co.**, 12 mi E Taos (Cole, 1954). Embudo (Wheeler, 1913)

Habitat. Open woods or meadows up to pine and aspen forests.

Biology. This ant nests under stones or logs, usually covered with detritus or thatching, in areas of fine sand to rocky loam. Occasionally this species constructs mounds solely out of thatching. Brood was found in nests in March and August, reproductives occurred in nests June to August. Workers are very aggressive when the nest is disturbed.

Wheeler, 1913, Cole, 1942, Gregg, 1963

***Formica oreas comptula* Wheeler (*rufa* group)**



Discussion. This is another subspecies, which is based on relatively insignificant color differences. The minor workers of this subspecies are partially dark, whereas minor workers of the typical *F. oreas* are generally bicolored (head and mesosoma red, gaster black). It will probably be shown to be a synonym of the typical *F. oreas*.

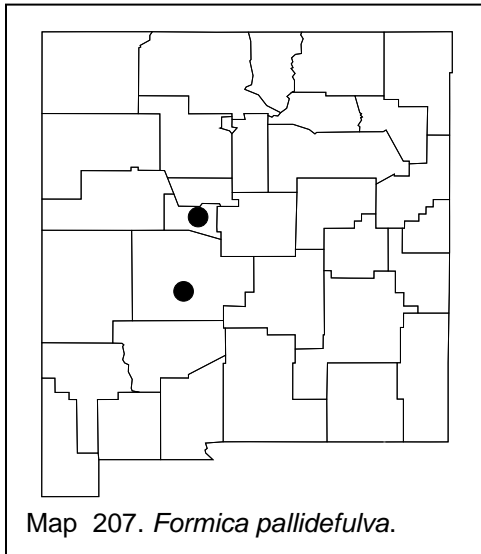
Distribution. USA: Western North America; NM: **Santa Fe Co.**, 12 k NE Santa Fe (Map).

Habitat. Woodlands and grasslands.

Biology. Nest are found under stones or logs covered with thatching.

Cole 1934:227, Wheeler and Wheeler 1963.

***Formica pallidefulva* Latreille (*pallidefulva* group)**



Discussion. This species is large, elongate, and most surfaces are shiny. It is usually light brown in color, but may be nearly orange or even yellow, especially when seen in the field. The gaster is about the same color as the mesosoma, which differentiates it from *F. nitidiventris*. There are few (or none) erect hairs on the dorsum of the mesosoma. See discussion of *F. pallidefulva nitidiventris* for more details.

Distribution. USA:

Eastern United States as far west as CO (central); NM: Socorro Co., Bosque del Apache, Valencia Co., Belen..

Habitat. Brushy areas, deciduous forests up to birch forests, colonies may also be found in open prairie.

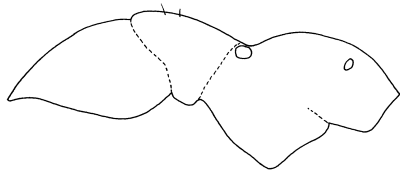


Fig. 417. Mesosoma of a worker of *F. pallidefulva*.

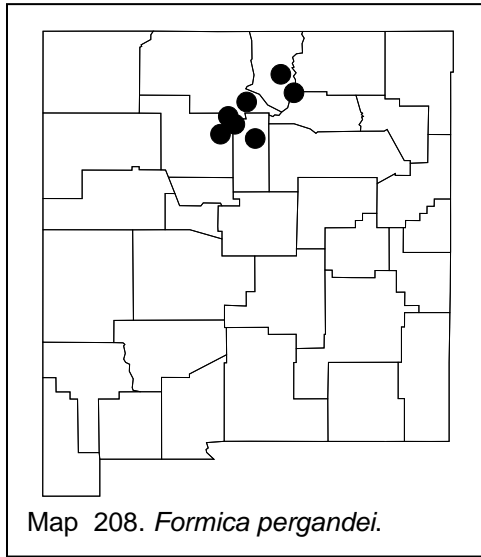
Biology. This species nests under stones in areas of sandy or pebbly soils. Nests may be small mounds 5 - 10 cms in diameter. Reproductives were found in nests from May to September.

Wheeler, 1913, Dennis, 1938, Cole, 1940, Schneirla, 1944, Gregg, 1963, DuBois and Danoff-

Burg, 1994

***Formica pergandei* Emery (*sanguinea* group)**

Discussion. The mesopropodeal impression of this species is



Map 208. *Formica pergandei*.

deep, the head is usually broader than long, the eyes of the majors fail to reach the sides of the head, and there are usually 1 - 4 hairs on the underside of the head. The hairs on the gaster are abundant, but are approximately as abundant (and of the same length) as the hairs on the pronotum. The scape is less than or equal to the length of the head.

Distribution. CANADA: Quebec; USA: Eastern North America W to ND S to NM: **Los Alamos Co.**, Los Alamos, Camp May, **Rio Arriba Co.**, Truchas,

Sandoval Co., Bandelier National Monument, **Santa Fe Co.**, Santa Fe, **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos.

Habitat. Aspen forests, disturbed areas.

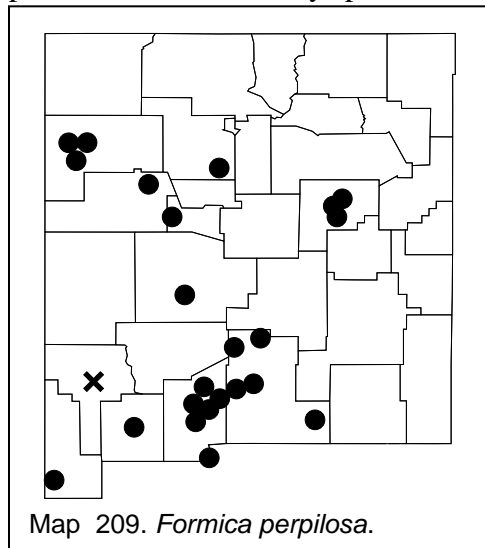
Biology. This species nests in the soil, and enslaves other *Formica* spp. (*F. fusca* and *F. pallidefulva*). Reproductives were found in a nest in August.

Wheeler, 1901, Gregg, 1946, Wheeler and Wheeler, 1963, Gregg, 1963, Hung, 1973, Finnegan 1973 (as *F. sublucida*)

***Formica perpilosa* Wheeler (*neogagates* group)**

Discussion. This is one of the few species of *Formica*, which occurs in the Chihuahuan Desert, especially in sandy soils. It is also common in lawns in urban environments. It can be distinguished from others in such habitats as the clypeus is usually concave or notched and it is abundantly hairy black (gaster) and red (head and mesosoma) ant. Most surfaces are moderately shining, including the gaster. It is difficult to relate this species to any others in the genus. It is presently considered a member of the *neogagates* group, but it doesn't seem to be closely related to the others in the complex. It was previously considered to be a member of the *sanguinea* group, based on the notched clypeus. The clypeus is not

as notched as it is in the other members of the *sanguinea* group. It is possible that it is a shiny species of the *fusca* complex.



Distribution. USA: WY S to TX, W to CA; NM: NM, **Cibola Co.**, Paraje (Wheeler, 1913), **Doña Ana Co.**, 2 mi SW Haldeman Air Force Base, La Mesa, 5 mi N Las Cruces, 10 mi NE Las Cruces, 45 K NE Las Cruces (Jornada Long Term Ecological Research Site), **Grant Co.**, without locality, **Guadalupe Co.**, Park Lake (Santa Rosa), Pecos River at Highway 91 (N of Puerto de Luna), Perch Lake (1.5 mi SE Santa Rosa), **Hidalgo Co.**, Guadalupe Canyon, **Luna Co.**,

Deming, **McKinley Co.**, Gallup, Church Rock, Zuni Mts (southeast of Gallup), **Otero Co.**, Alamogordo (Wheeler, 1913), Lake Lucero, 41 k NW Sitting Bull Falls (Bate's Park (32°26'08"N 105°04'37"W), 8 mi NE Tularosa, White Sands National Monument, **Sandoval Co.**, Coronado State Park, **Socorro Co.**, Bosque del Apache **Valencia Co.**, Los Valles (Wheeler, 1913), ; MEXICO: Chihuahua, Coahuila.

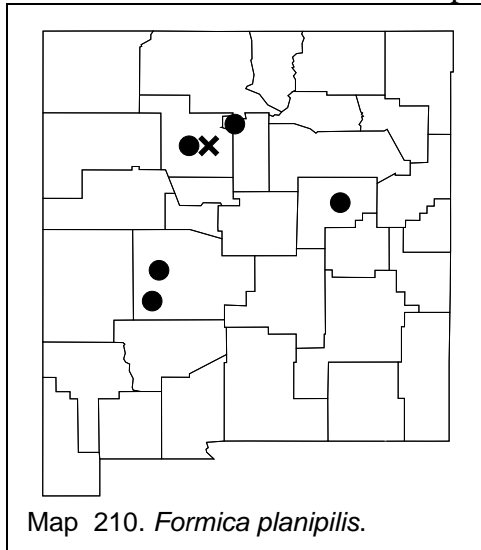
Habitat. Chihuahuan Desert (Mesquite, Playa,), especially common in loose sand, up to foothill meadows and low elevation forests (pinyon-juniper) (below 1850 meters), riparian (cottonwoods, sycamore forests).

Biology. Nests are found in the soil, with the entrance surrounded by a small mound. It also nests at the base of desert plants, especially grass clumps, in areas of fine sand to loam. It occasionally nests under stones or pieces of wood. Reproductives were found in nests in July, flights occurred in July, dealate females were found during July. Workers forage on the flowers of *Yucca elata*. This species does not enslave other species of *Formica*. It is the host of the cricket *Myrmecophila* sp. It may be an important predator of the boll weevil. This species shows division of labor, and the workers undertake 38 different behavioral acts.

Wheeler, 1913, 1917, Cole, 1934, Mallis, 1941, LaBerge, 1952, Gregg, 1963, Brandão, 1978, DuBois and Danoff-Burg, 1994

***Formica planipilis* Creighton (*rufa* group)**

Discussion. The tentorial pit of this species is shallow and little



pit-like. The middle and hind tibiae have a double row of bristles on the flexor surface, but each is with few hairs (less than 10 hairs in each row). There are a few scattered hairs on the other surfaces of the tibiae. The head of the major are longer than broad; the erect hairs on the mesosoma are short and of about equal length. The hairs on the head are longer and sparser than those on the mesosoma. This species differs from the closely related *F. coloradensis* in that the smaller

workers are partially brown, and the legs of workers of all sizes are brownish black. The minor workers of *F. coloradensis* are clear red with a black gaster. The legs of workers of all sizes are not much darker than the mesosoma.

Distribution. USA: ND, UT, CO, KS, UT, NV; NM: **Guadalupe Co.**, Park Lake (Santa Rosa), **Los Alamos Co.**, Los Alamos, **Sandoval Co.**, Jémez Mts., without locality, **Socorro Co.**, Grassy Lookout, San Mateo Mts. (Map).

Habitat. Grasslands, open forests, ponderosa pine-riparian, often found in riparian areas, popular-spruce forests, up to about 3000 meters elevation.

Biology. These ants nest in the soil, usually with some thatching of pine needles, but may also be found nesting in rotten logs and stumps in rocky and gravelly soils. Brood and reproductives were found in nests from late June to mid August. Workers forage up into the canopy of pine trees.

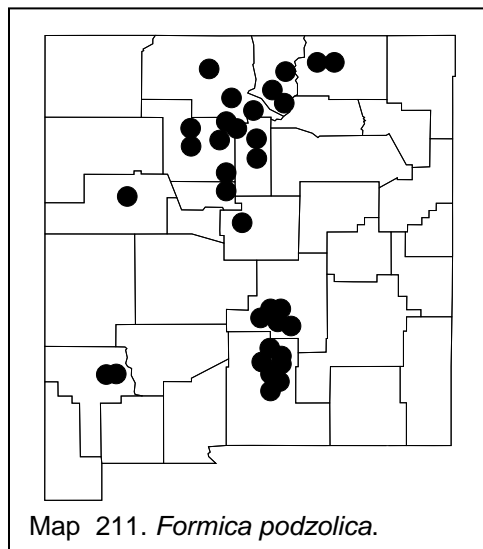
Gregg, 1963, Wheeler and Wheeler, 1963, Cole, 1966, DuBois and Danoff-Burg, 1994

***Formica podzolica* Francoeur (*fusca* group)**

Discussion. This species is closely related to a number of others, including *F. occulta*. It differs in that the area around the metasternal

cavity is essentially flat, and has only a few hairs surrounding the cavity. It differs from *F. fusca* in that erect hairs are absent on the area surrounding the metasternal cavity, or are present only on the posterior edge. It also has 10 or more coarse, erect hairs on the first gastral tergite (excluding the hairs on the posterior edge). It is extremely difficult to distinguish this species from *F. argentea*. It is usually darker, black, whereas *F. argentea* is usually dark brownish yellow. The underside of the head of *F. podzolica* has scattered silver, decumbent pubescence whereas the pubescence in the similar area of *F. argentea* is more dense and silky, producing more of a luster when seen with the gena in profile. It may be impossible to identify this pair of species without access to specimens of the two species. *Formica podzolica* is much more common in New Mexico than is *F. argentea*.

Distribution. USA: Most of North America; NM: **Bernalillo Co.**,



Map 211. *Formica podzolica*.

Sandia Mts., **Cibola Co.**, Baca Ranch, **Colfax Co.**, 16 k E Eagle Nest, 41 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, 2 mi SE Alto, 2 mi W Alto, Bonito Lake, Sierra Blanca, **Los Alamos Co.**, Los Alamos, Camp May, **Otero Co.**, Bailey Canyon, Cloudcroft, Cox Canyon, Haynes' Canyon, James Canyon, Sacramento Mts. (Osha Trail), 13 k N Timberon, **Rio Arriba Co.**, Abiquiu Dam, 7 k S Cebolla, Truchas, **Sandoval Co.**, Bandelier National Monument, 11

k E Cuba, 45 k SE Cuba, Jémez Canyon, Placitas, **Santa Fe Co.**, Santa Fe, 12 k NE Santa Fe, **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos, **Torrance Co.**, Tajique; MEXICO: Chihuahua.

Habitat. Urban areas, meadows, pinyon-juniper, up to ponderosa pine-riparian, fir, aspen, sand spruce forests.

Biology. Nests are found under stones or logs, or in soil with small mounds (up to 50 cm diameter), sometimes with a covering of pebbles or thatching, in rocky loam soils. Brood was present in July and August, sexuals in August, and dealate females were collected in July and August (with first brood). This species is the host of *Polyergus breviceps*. These

ants nest together with *Lasius*, with the brood of the 2 genera mixed. One mixed nest included *F. argentea*, *F. aserva*, *F. obtusopilosa* *F. lasioides* and *Myrmica*, another contained *Camponotus pennsylvanicus*, two nests were together with *Myrmica*. It is enslaved by *Formica aserva*.

Gregg, 1963

***Formica propinqua* Creighton (*rufa* group)**

Discussion. Workers can be recognized by the distribution of erect hairs. The occipital corners and scapes have none (except at apex of scape), the dorsal and ventral surfaces of the head have several (at least 12 on ventral surface of head), the dorsum of the mesosoma has several short, fine erect hairs (most < 0.1 mm in length), the petiole has several similar hairs, and the dorsum of the gaster has several erect hairs which are slightly longer and slightly coarse than those on the pronotum. Most surfaces, including the clypeus, underside of the head and the gena, are dull or only weakly shining. The mid and hind tibiae have a few erect bristles (about 5 on each of the 2 parallel rows), but they extend the entire length of the tibiae. The dull surfaces separate it from *F. subnitens*, and the

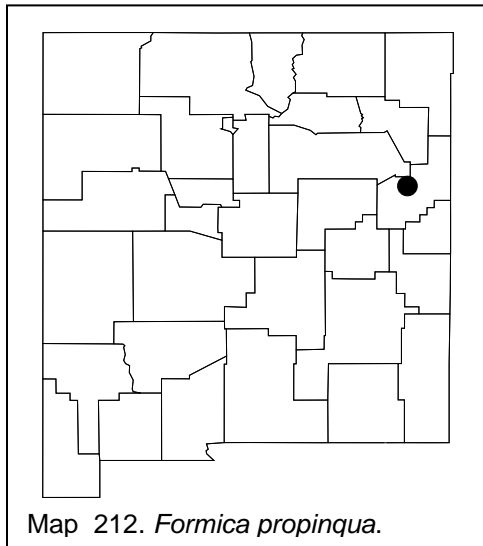
lack of occipital hairs separates it from *F. coloradensis*, and from *F. integroides* (which is only found on the West Coast). This species was previously referred to as *F. integroides propinqua*.

Distribution. USA, NM: Quay Co., Tucumcari. This is the first record from the state.

Habitat. Forests.

Biology. This species nests next to logs and stumps, in thatched nests.

Gregg, 1963

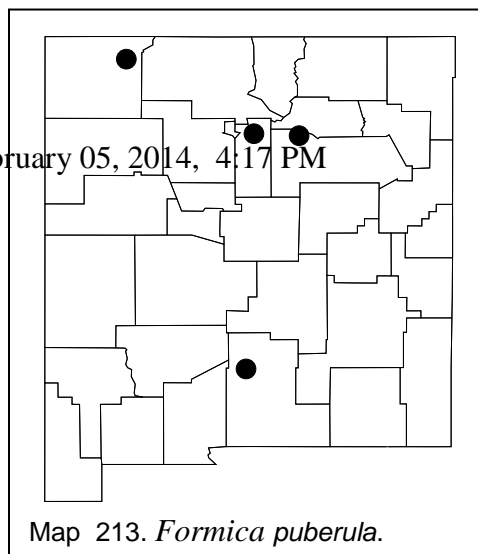


Map 212. *Formica propinqua*.

***Formica puberula* Emery (*sanguinea* group)**

Discussion. The scape of this species has decumbent to suberect, relatively coarse hairs,

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Map 213. *Formica puberula*.

giving it a slight bristly appearance. The underside of the head has at least a pair of hairs. The erect hairs on the gaster are about 0.1 mm long, and are of about the same form as the hairs on the length, form and density as those on the pronotum. Most hairs have sharp tips.

Distribution. USA: Western North America east to TX; NM: **Otero Co.**, Alamogordo (Wheeler, 1913), Cole (1954) found 2 nests at **Santa Fe Co.**, Tesuque Canyon, at 2600 m elevation (Cole, 1954), **San Juan Co.**, Manzanares (Wheeler, 1913), **San Miguel Co.**, Gallinas Canyon (Wheeler, 1913).

Habitat. Sagebrush scrub and grasslands through mixed forests into ponderosa pine and aspen forests. This species also occurs in urban habitats.

Biology. This species nests under stones and logs. It enslaves *F. altipetens*, *F. bradleyi*, *F. densiventris*, *F. fusca*, *F. hewitti*, *F. lasioides*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neorufibarbis*, *F. pallidefulva nitidiventris* and *F. subpolita*.

Wheeler, 1910, Wheeler and Wheeler, 1963, Gregg, 1963, Snelling, 1969

***Formica ravida* Creighton (*rufa* group)**

occurs in s Colorado see Gregg 554. ?? see Gregg 1963:579

Discussion. The tentorial pits of this species are shallow. The erect bristles on the tibia are restricted to two rows on the flexor surface, which extend nearly the entire length of the tibiae. The erect hairs on the gaster are scattered, and do not form an even vestiture when viewed in profile (Fig.), although the gaster is covered with dense, gray, decumbent pubescence. The petiole is narrow in profile with a moderately sharp apex. This species was previously referred to as *F. haemorrhoidalis*.

Distribution. USA: Western North America; NM: although this species commonly occurs in western and southwestern Colorado, we have no records from New Mexico. It would be expected to be found in northwestern New Mexico.

Habitat. Prairies up to pine forests.

Biology. Nests are usually in the form of thatched mounds on the sides of logs and stumps. Incipient nests may be found under stones or logs, but usually some thatching is present. These ants are extremely aggressive. Workers fold the gaster under the body and squirt a stream of

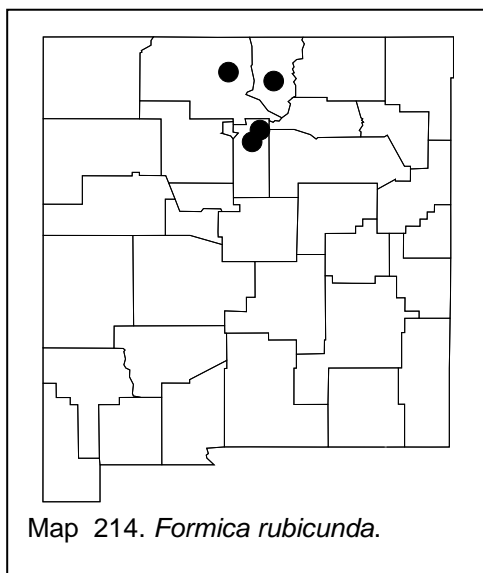
formic acid several centimeters. This acid is strong enough to cause blistered skin, after repeated contact with these ants.

Gregg, 1963

***Formica rubicunda* Emery (*sanguinea* group)**

Discussion. The apex of the petiole, as seen in profile, is sharp. The dorsum of the first tergum of the gaster has abundant hairs, slightly over 0.1 mm in length. The hairs are coarse and thick, but most are abruptly tapering to sharp tips. These hairs are slightly longer and more abundant than those on the pronotum, which tend to be more blunt tipped. The underside of the head usually has four hairs.

Distribution. USA: Much of North America; NM: **Rio Arriba Co.**, 7 k S Cebolla, **Santa Fe Co.**, 12 mi S Santa Fe, Tesuque Canyon (Cole, 1954), **Taos Co.**, 12 mi E Taos.



Map 214. *Formica rubicunda*.

Habitat. Prairies and open woodlands up to pinyon-juniper and ponderosa pine and aspen forests.

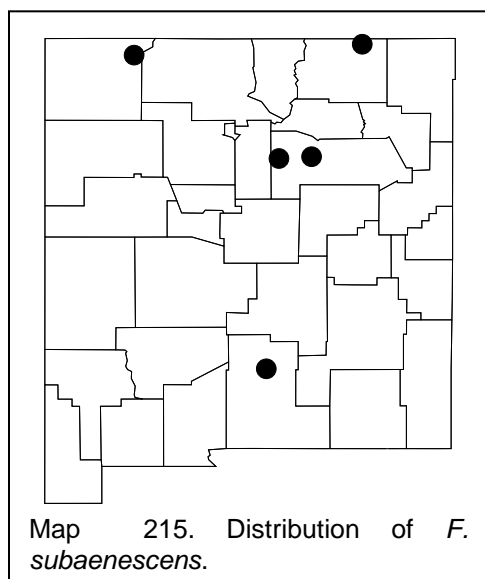
Biology. This species nests under stones and logs and may occasionally construct thatched nests or earthen mounds. *Formica rubicunda* enslaves *F. altipetens*, *F. bradleyi*, *F. fossiceps*, *F. fusca*, *F. lasioides*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neogagates*, *F. neorufibarbis*, *F. obscuriventris clivia*, *F. nitidiventris*, and *F. schaufussi*. One mixed nest included *F. argentea*, *F. aserva*, *F.*

obtusopilosa *F. lasioides* and *Myrmica*.

Wheeler 1910:458-470, 1913, Smith 1928:327, Talbot 1934:421, 430-343, King and Sallee 1959:472, Wheeler and Wheeler 1963, Gregg 1963

***Formica subaenescens* Emery (*fusca* group)**

add to key, see Francoeur, 1977:208



Discussion. ### ???

Distribution. USA:

western states; **NM: Colfax Co.**, Barela Mesa (Wheeler, 1913), **Otero Co.**, Cloudcroft (Wheeler, 1913), **San Juan Co.**, Manzanares (Wheeler, 1913), **San Miguel Co.**, Old Pecos Pueblo (Wheeler, 1913), Top of Las Vegas Range (Wheeler, 1913).

Habitat. ^^^ ???

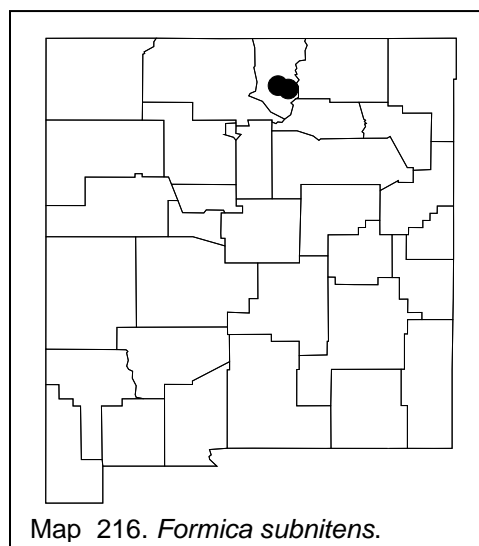
Biology. This ant nests under stones in cool, shady woods (Wheeler, 1913).

Formica subnitens

Creighton (*rufa* group)

Discussion. The middle and hind tibiae of this species have erect hairs in two rows (usually fewer than ten hairs in both rows combined), but do not have erect hairs scattered over the remainder of the surface. The erect hairs extend over nearly the entire length of the tibia. The gaster has few erect hairs on the first tergum (fewer than 10, excluding those along posterior edge of tergum), and this characteristic separates it from the closely related *F. ravida* which has more than 10 hairs on the same surface. The clypeus, cheeks and malar area are often shiny.

Distribution. USA: Western United States; **NM: Taos Co.**, 5 mi E Taos (Cole, 1954), 12 mi E Taos (Cole, 1954).



Habitat. Grasslands to pinyon cedar forests, willows, cedar and grasslands.

Biology. This species nests in thatched mounds, occasionally under stones or logs, usually with some surrounding thatch. They are occasionally found in earthen domes (Cole, 1954).

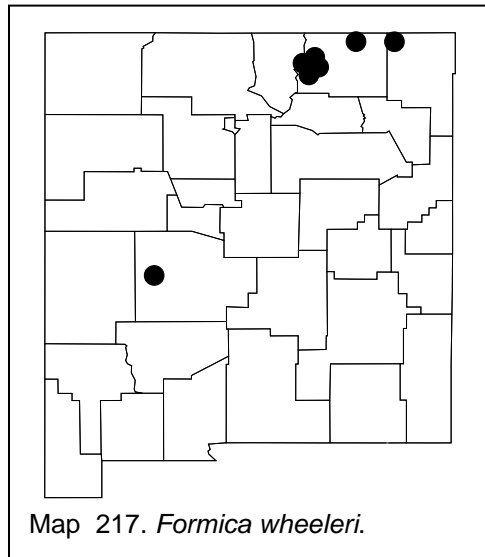
Cole, 1954, Ayre, 1957, 1958, 1958, 1959, Wheeler and Wheeler, 1963, Gregg, 1963

***Formica wheeleri* Creighton (*sanguinea* group)**

Discussion. The petiole of this species has a blunt apex (Fig.), and is wide as seen from the front. It usually has a medial notch (Fig.). The head is often darker than the mesosoma. The underside of the head usually has a pair of erect hairs. The hairs on the gaster are about 0.1 mm long, and are moderately fine mostly sharp-tipped. Those on the pronotum are shorter, thicker and at least



Fig. 418. Petiole of a cotype worker of *F. wheeleri*, as seen from the front (left) and seen from the side (right).



Map 217. *Formica wheeleri*.

a few are blunt-tipped. The eyes are large, extending past the sides of the head in most workers (Fig.).

Distribution. USA: ND S to NM W to AZ; NM: Colfax Co., (Cole, 1954) Cimarron Canyon (Cole, 1954), Dailey Canyon (Cole, 1954), 13 mi N Eagle Nest (Cole, 1954), 11 mi E Eagle Nest (Cole, 1954), 2 mi S Raton Pass (Cole, 1954), Sapello Canyon (Cole, 1954), Socorro Co., Grassy Lookout, Union Co., Capulin Mountain National Monument (Cole, 1954).

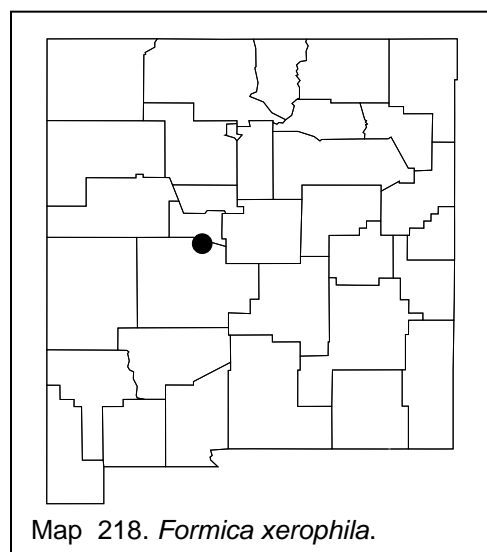
Habitat. Sagebrush scrub, grasslands up to ponderosa pine and aspen-spruce forests.

Biology. This species usually nests under stones, but may construct earthen mounds or even thatched domes in rocky loam soils.

Reproductives were found in nests in July, dealate females also in July. This species enslaves *F. altipetens*, *F. bradleyi*, *F. fusca*, *F. lasioides*, *F. lepida*, *F. neogagates*, and *F. neorufibarbis*.

Cole, 1942, 1954, Wilson, 1955, Wheeler and Wheeler, 1963, Gregg, 1963, Halverson et al., 1976

***Formica xerophila* M. Smith (*fusca* group)**



Discussion. This species can be easily recognized by the thick petiole with a blunt apex, as seen in profile. Additionally it is pale brown with a slightly darker gaster. The propodeum is low, about the same level as the lowest point (posterior edge) of the mesonotum. The region between the two faces is broadly rounded. The metasternal process is poorly developed; there are few erect hairs, which are restricted to the clypeus, dorsum of the head and dorsum of the gaster.

Distribution. USA: WA, CA, UT, AZ; NM. **Bernalillo Co.**, Bosque forest (first record from New Mexico).

Habitat. This species occurs in arid and semi arid sites, in transition zones to pines.

Biology. Nests are found in the soil.
Francoeur 1973

Genus *Lasius*

(Key: Wilson, 1955)

Workers in this genus can be recognized by the shape of the mesosoma, in which the propodeum is rounded and separated from the remainder of the mesosoma (Fig.). The antennal fossa either touches the posterior edge of the clypeus or nearly touches it. The eyes may be large (length more than 1/2 the length of the head) to very tiny, consisting

of a few ommatidia. The antennal scape extends past the posterior edge of the head by only a slight amount. The maxillary palp is always seen and consists of 6 segments. This genus is easily confused with *Acanthomyops*, but differs as *Acanthomyops* has a three segmented maxillary palp, which is difficult to see. Identification to species is difficult, hopefully the following key will be useful.

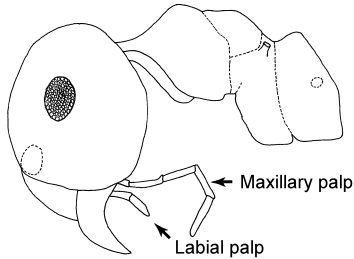


Fig. 419. The head and mesosoma of a worker of *L. pallitarsus*, showing the labial and maxillary palps.

This is a common genus in the state. They normally nest under stones in mesic woodlands and meadows, although nests are found simply in the soil or in and under wood. One species (*L. xerophilus*) is found in arid sites. Workers feed on secretions from Homoptera and feed on small arthropods. Some

species are pests as they tend plant lice on the roots of plants, especially corn. They may be so common in cornfields that they are commonly called cornfield ants. They may also be house pests.

Key to *Lasius* workers

(see Wilson, 1955)

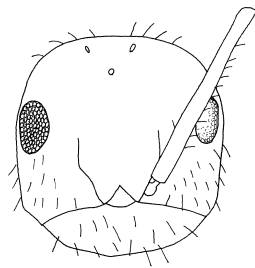


Fig. 420. Head of a worker of *L. neoniger*, showing a relatively large eye.

1. Eye relatively large, maximum worker eye length 0.20 times the head width or more, at least 10 ommatidia at the maximum diameter of the eye (usually more than 12): maxillary palp long, extending nearly to foramen magnum; usually dark colored **2**

- Eye relatively small, maximum worker eye length 0.17 times the head width or less; fewer than 12 ommatidia at the

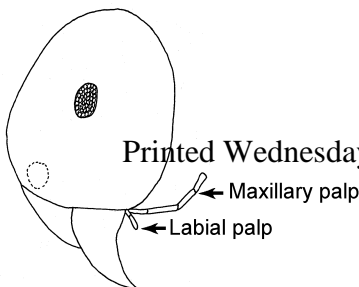


Fig. 421. Head of the worker of *L. umbratus*, as seen from the side, showing a relatively small eye.

maximum diameter of the eye; maxillary palp shorter, extending about $\frac{1}{2}$ distance to foramen magnum; often light yellow or pale brown **8**

2(1). Scape without erect hairs (1 or 2 may be present, also hairs are present at apex, which are parallel to axis of scape) **3**

Fig. 422. Scape of a worker of *L.*
 - Scape with more than 5 erect and suberect hairs (Fig.) **5**

3(2). Maximum eye length usually less than 0.25 times the head width, usually with 11 ommatidia (10 - 12) in the maximum eye diameter; color always yellowish-brown; scapes always lacking standing hairs

..... *sitiens* Wilson

- Maximum eye length exceeding 0.25 times the head width, even if only slightly, usually 12-14 ommatidia in the maximum diameter of eye; color usually dark brown; scapes may have 1 or 2 erect or suberect hairs **4**

Fig. 424. Head of *L. sitiens*, showing the moderately sized eye. don't need

Fig. 423. Head of *L.xx*, showing the large eye. don't need

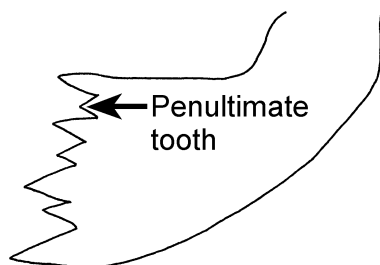


Fig. 426. Left mandible of a worker of *L. neoniger*, showing the reduced penultimate basal tooth.

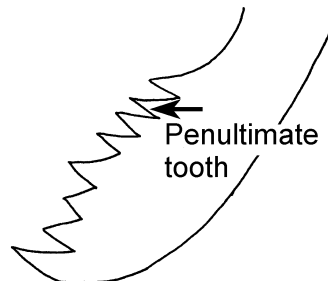


Fig. 425. Left mandible of a worker of *L. alienus*, showing the normal sized penultimate tooth (arrow).

4(3). In one or both mandibles of the nest series, either the penultimate basal tooth is markedly reduced in size relative to the two flanking teeth, or the gap between the penultimate

and terminal basal teeth tends to be larger in area than the terminal basal tooth and variable in shape ***crypticus* Wilson**

- In all of the workers of a nest series, the penultimate and terminal basal teeth are subequal in size, the gap between them has about the same area as the terminal tooth and is constant in shape ***alienus* (Foerster)**

5(2). Extensor surface of anterior tibia with at least 6 erect hairs (usually more than 10, see Fig.) **6**

- Extensor surface of anterior tibia with fewer than 6 erect hairs (often 1 or none, see Fig.) ***neoniger* Emery**

6(5). Antennal scape with fewer than 30 erect and suberect hairs; in a given nest series all larger workers and most smaller workers with one or more offset teeth at the basal angle of the mandible ***pallitarsis* (Provancher)**

- Antennal scape with more than 30 erect and suberect hairs; workers of all sizes with the posterior basal tooth aligned with the adjacent teeth of the masticatory border **7**

7(6). Medium to dark brown; penultimate and terminal basal teeth of worker subequal in size (Fig.), gap

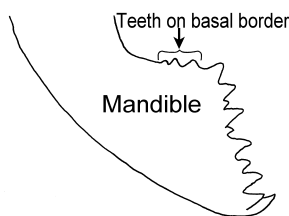


Fig. 428. Right mandible of a worker of *L. pallitarsis*, showing the teeth on the basal border.

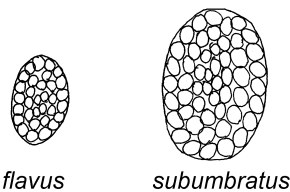


Fig. 427. Eyes of workers of *L. flavus* and *L. subumbratus*.

mesic sites ***niger* (Linnaeus)**

- Yellow or yellowish brown; penultimate basal tooth of worker markedly reduced in size relative to 2 flanking teeth, or gap between penultimate and terminal basal teeth larger in area than terminal basal tooth, variable in shape; occurring in arid and semiarid habitats ***xerophilus* Mackay and Mackay**

8(1). Dorsal crest of petiole as seen in frontal view strongly convex and non-emarginate ***humilis* Wheeler**

- Dorsal crest of petiole at most feebly convex and often emarginate **9**
- 9(8). Eyes with fewer than 35 ommatidia **10**
- Eyes with more than 35 ommatidia **12**



Fig. 430. Petioles of workers of *L. humilis* and *L. fallax*, as seen from behind.

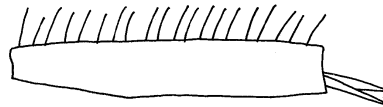


Fig. 429. Hind tibia of a worker of *L. fallax*. used in both keys

- 10(9). Outer surfaces of each tibia with numerous standing hairs prominent above the ground pubescence ***fallax* Wilson**
- Outer surfaces of each tibia with at most one or two standing hairs **11**
- 11(10). Terminal segment of the maxillary palp longer than the penultimate segment, at least in a majority of nest series ***nearcticus* Wheeler +++**



Fig. 431. Last 3 segments of the maxillary palp of *L. nearcticus*. redo this to match text???



Fig. 432. Maxillary palp of a worker of *L. flavus*.

- Terminal segment of the maxillary palp at most as long as the penultimate segment ***flavus* (Fabricius) +++**
- 12(9). Longest hairs of the posterior half of first gastral tergite, exclusive of the extreme posterior strip, not exceeding in length 0.50 times the maximum width of the hind tibia at its midlength; eye with more than 65 ommatidia; brownish yellow ***umbratus* (Nylander)**
- Longest hairs of the posterior half of first gastral tergite, exclusive of the extreme posterior strip, at least 0.60 times as long as the maximum width of the hind tibia at its midlength; eye with less than 65 ommatidia; yellow ***subumbratus* Viereck**

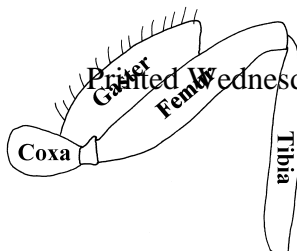
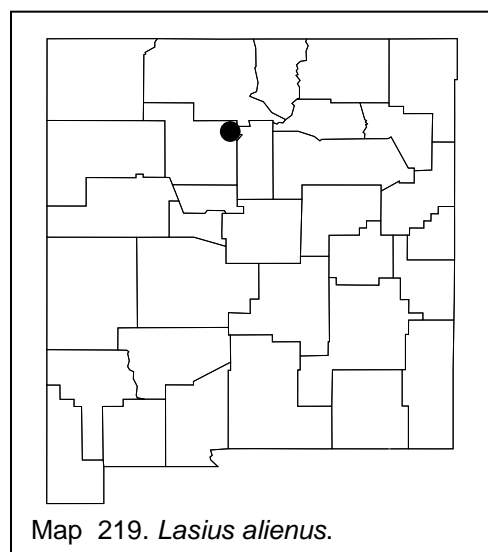


Fig. 433. Gaster, coxa, posterior femur and tibia of a worker of *L. umbratus*.

Fig. 434. Posterior leg and first gastral tergite of *L. subumbratus*.
Need figure

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***Lasius alienus* (Foerster)**



Discussion. This is a small, dark brown or black species with relatively large eyes (12-14 ommatidia in maximum diameter). The scape has few (less than 5) or no erect hairs (except at apex). The penultimate tooth is about the same size as the adjacent teeth (other 2 basal teeth). It is not common in New Mexico, and has been reported from a single site (Mackay, 1988).

Distribution. USA: Most of North America; NM: **Los Alamos Co.**, Los Alamos, Mortandad Canyon; MEXICO: Chihuahua.

Habitat. Common in many habitats ranging from grasslands to well shaded woodlands, Pinyon-pine (especially riparian habitats), ponderosa pine.

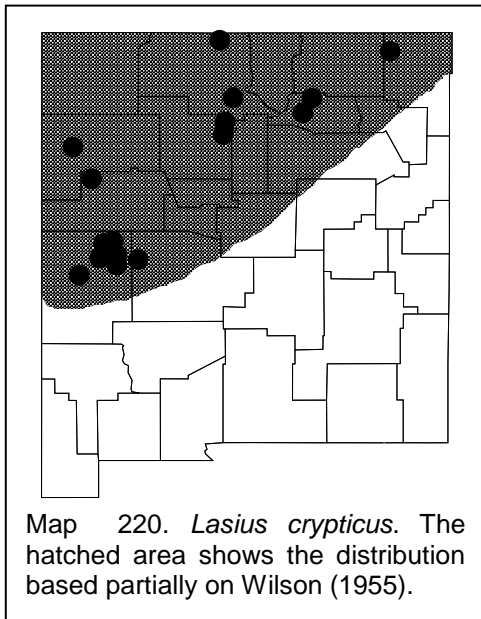
Biology. Nests are found under stones or logs or in stumps, or simply in the soil. Workers feed on living and dead insects and tend Homoptera, especially aphids. This species can be a pest in houses. Brood occurred in nests from May to August; reproductives were found in nests from June to September.

Wilson, 1955, Benjamin, 1958, Kanno, 1959, Wheeler and Wheeler, 1963, 1973, Gregg, 1963, Burns, 1964, Smith, 1965, DuBois and Danoff-Burg, 1994

***Lasius crypticus* Wilson**

Discussion. This species is easily recognized as all of the hairs on the scapes are appressed (except at apex). The eye is relatively large with 12 - 14 ommatidia in maximum diameter. The penultimate basal tooth is

greatly reduced in size as compared to the adjacent basal teeth, and is



often absent. This results in a wide gap between the other two basal teeth. It is advisable to look at a large series, as the small tooth differs greatly in size within a nest series, and sometimes between the two mandibles of a single individual. It is often difficult to separate this species from *L. alienus*, unless a large series is available.

Distribution. USA: Western North America; NM: **Catron Co.**, 32 k NE Apache Creek, Beartrap Canyon (43 k NE Datil), 12 k W Datil, 14 k W Datil, Ox Spring Canyon, Sawtooth Mts., **Cibola Co.**, Zuni Mts (southeast of Gallup), **Los Alamos Co.**, Chupaderos Canyon, 4

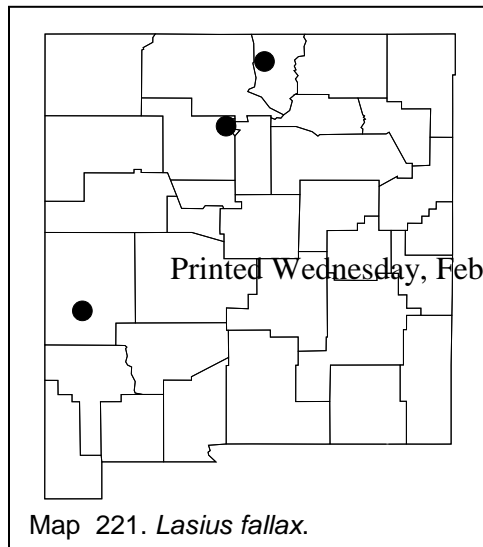
K N Los Alamos, 4 K W Los Alamos, **McKinley Co.**, Red Rock State Park, **Mora Co.**, Coyote Creek State Park, 10 k SE Mora, **Rio Arriba Co.**, 37 k N Abiquiu, 4 k N Chama, **Socorro Co.**, Bandelier National Monument, 43 k SE Datil, **Union Co.**, Capulin National Monument.

Habitat. Sagebrush, grasslands, pinyon-juniper, oaks woodlands, meadows, ponderosa pine-riparian, Douglas fir.

Biology. This species nests under stones in sandy soils to rocky loam soils. One nest was in a log. Brood was found in nests from March to August. A dealate female was collected on 5-viii-1994, under a stone. We collected foragers feeding on a dead beetle. *Monomorium minimum* lives in the nest.

Wheeler and Wheeler, 1963

***Lasius fallax* Wilson**



Discussion. This ant is pale yellow or light brown and has a very small eye (fewer than 35 ommatidia, usually about 20). The apex of the petiole is weakly

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convex, flat or even slightly concave (Fig.). Tibiae have erect or semierect hairs on all surfaces. The scape has numerous appressed hairs, as well as several erect and suberect hairs.

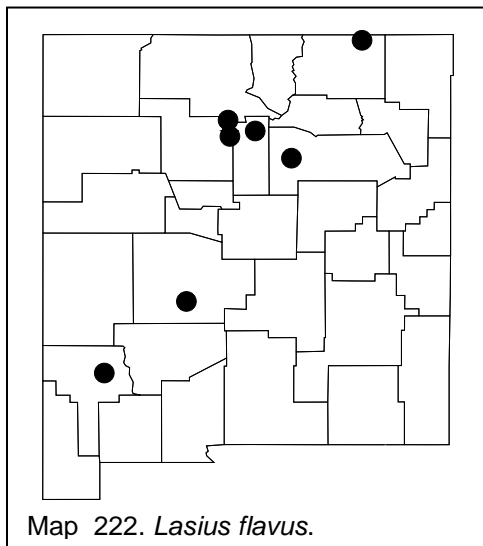
Distribution. USA: Western United States; NM: **Catron Co.**, Catwalk, **Los Alamos Co.**, Los Alamos, Camp May, **Taos Co.**, 6 k SW Tres Piedras.

Habitat. Forested areas (pinyon-juniper, ponderosa pine), especially riparian habitats.

Biology. This species nests under stones in rocky sands or loam soils.

Wilson, 1955

***Lasius flavus* (Fabricius)**



Discussion. This is a yellow or pale brown species, with a small eye (fewer than 35 ommatidia). The apex of the petiole is either straight or slightly concave. The hairs on the scapes and tibiae are decumbent or appressed (possibly 1 or 2 suberect hairs). The last segment of the maxillary palp is about as long (or shorter) than the penultimate segment. These ants are often impossible to separate from *L. nearcticus*.

Distribution. USA: North America; NM: **Colfax Co.**, between Raton Pass and Raton (Wilson, 1955), **Grant Co.**, 77 k E Silver City, **Los Alamos Co.**, 4 k N Los Alamos, Chupaderos Canyon, **Sandoval Co.**, Bandelier National Monument, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.), **San Miguel Co.**, San Geronimo (Wilson, 1955).

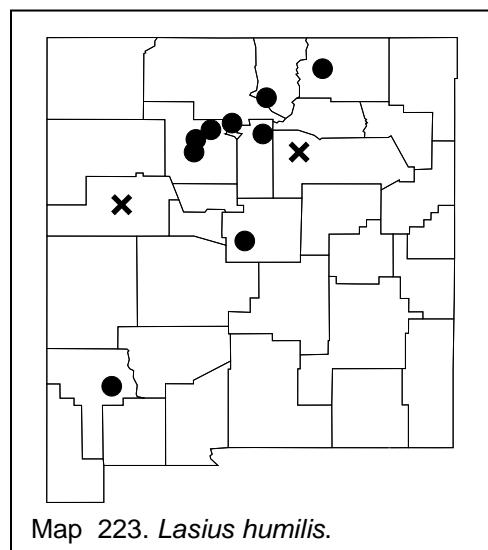
Habitat. Grasslands to mixed deciduous forest to ponderosa pine-riparian.

Biology. This species nests under stones, and reproductives were found in the nest in mid August. It tends aphids, especially on the roots of grasses.

Wheeler, 1905, Wesson and Wesson, 1940, Cole, 1942, Wheeler and Wheeler, 1944, 1963, 1973, Wilson, 1955, Gregg, 1963 (*L. brevicornis*), Waloff, 1957, Marikovsky, 1965, DuBois and Danoff-Burg, 1994

***Lasius humilis* Wheeler**

Discussion. This ant is easily recognized as the apex of the petiole is convex and broadly rounded. It is a yellow ant with a small eye (ommatidia difficult to count, as are poorly defined, diameter about 0.07 mm). It could be confused with other yellow species with small eyes, such as *L. fallax*, *L. nearcticus* and *L. flavus*. It can be separated from the first



species by the shape of the apex of the petiole (usually convex in *L. flavus*), and the eyes are smaller than those of the other two species.

Distribution. USA: NV, CO; NM: **Cibola Co.**, without locality, **Colfax Co.**, 4 mi W Eagle Nest, **Grant Co.**, 77 E Silver City, **Los Alamos Co.**, Los Alamos, Rio Grande, **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.**, 26 k S Cuba, 100 E Cuba, Jémez Mts., **San Miguel Co.**, without locality, **Santa Fe Co.**, Tesuque Canyon (Hyde Park near Santa Fe) (Wilson, 1955), **Taos Co.**, 5 mi SE

Dixon, **Torrance Co.**, 24 k S Mountainair.

Habitat. Sagebrush, pinyon-juniper, mountain meadows, pine aspen woods, ponderosa pine forests.

Biology. This species nests under stones. Reproductives were found in nests in early July, flights occur at night in mid July (blacklight traps), and a loose gynes were collected in pitfall traps from early July to mid August.

Gregg, 1963

***Lasius nearcticus* Wheeler**

Discussion. This species is yellow or pale brown, and has small eyes (fewer than 35 ommatidia, usually about 20, diameter about 0.09 mm). The apex of the petiole is concave, the terminal segment of the maxillary palp is usually longer than the penultimate segment. The workers of this species are nearly impossible to separate from *L. flavus*. The females and males are of little use in distinguishing the 2 species.

Distribution. USA: North America, including CO; NM: we have no records, but would expect it to occur in the northern part of the state.

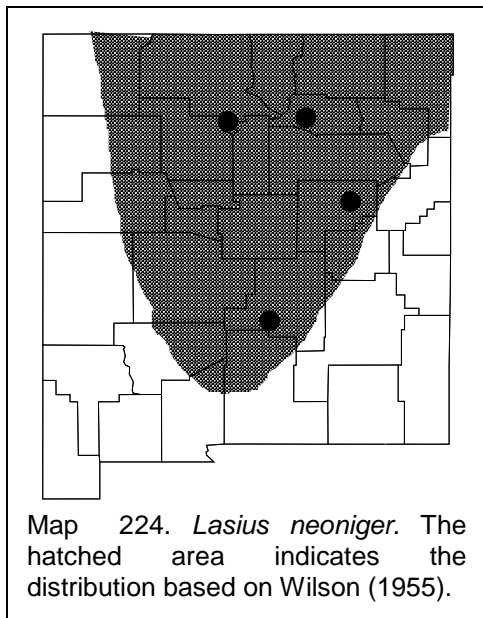
Habitat. Found in dense, damp woodlands, especially pines, but also cedar and pinyon woodlands.

Biology. This ant nests under logs and stones; it is predominantly subterranean.

Wesson and Wesson, 1940, Headley, 1943, Hicks, 1947, Wilson 1955, Gregg, 1963.

***Lasius neoniger* Emery**

Discussion. Workers of this species are usually dark brown in color, and have relatively large eyes (at least 12 ommatidia in greatest diameter). The scape has several erect hairs, but the extensor surface of the anterior tibia has fewer than 6 erect hairs. The penultimate basal tooth is smaller than the 2 adjacent teeth, and may even be absent, leaving a gap between the other basal teeth.



Distribution. USA: Throughout North America; NM: Bernalillo Co., Albuquerque ATM, Guadalupe Co., Park Lake, Lincoln Co., Sacramento Mts. (2 mi W Alto), Los Alamos Co., Mortandad Canyon, Mora Co., 10 k SE Mora.

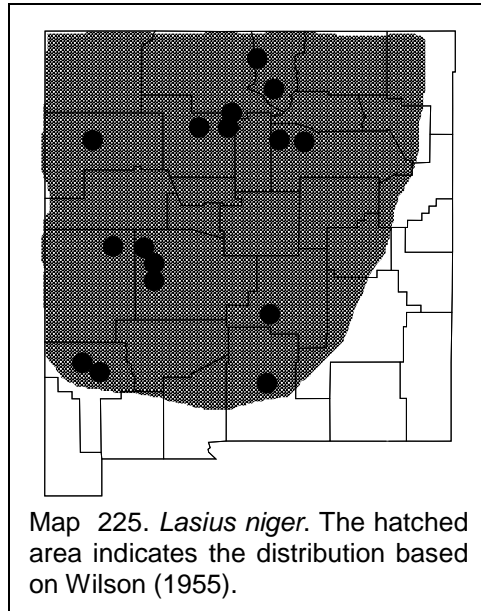
Habitat. Found along roadsides or in disturbed urban environments, grasslands, up to ponderosa pine-riparian. This species is usually found in mesic habitats.

Biology. This species is uncommon in the state, and nests

under stones or in the soil. Brood was found in nests in early July, reproductives in early July to October. It feeds on secretions of Homoptera.

Tanquary, 1913, Metcalf and Flint, 1939, Talbot, 1945, 1946, 1953, Schread and Chapman, 1948, Wilson, 1955, Ayre, 1962, Wheeler and Wheeler, 1963, Gregg, 1963, Smith, 1965, DuBois and Danoff-Burg, 1994

***Lasius niger* (Linnaeus)**



Discussion. These are medium to dark brown ants with large eyes, which have abundant erect and suberect hairs on the scapes (more than 30) and the extensor surface of the anterior tibia (more than 6). The three basal teeth are about equal in size (the teeth adjacent to the penultimate tooth may be smaller in size). It could be confused with *L. xerophilus*, but differs in being darker in color, having three equal sized basal teeth, and in occurring in more mesic sites.

Distribution. EUROPE; USA: Western United States; NM:

Catron Co., 15 k NW Datil, Mogollon Mts., **Grant Co.**, 5 mi N Pinos Altos, 77 k E Silver City, **Lincoln Co.**, Bonito Lake, **Los Alamos Co.**, Chupaderos Canyon, Los Alamos, 4k W Los Alamos, 8 k N Los Alamos, **McKinley Co.** (without locality), **Otero Co.**, 9 k NE Timberon, 9 k SW Timberon, Jim Lewis Spring, **Sandoval Co.**, Bandelier National Monument, 12 m NE Jémez Springs, **San Miguel Co.**, 20 k NW Las Vegas, Terrero, **Socorro Co.**, Beartrap Canyon, 43 k SE Datil, Grassy Lookout, **Taos Co.**, 20 k S Taos, 6 k S Tres Piedras.

Habitat. Ponderosa pine-riparian, oak forests, deciduous forest, fir forests mixed forests residential.

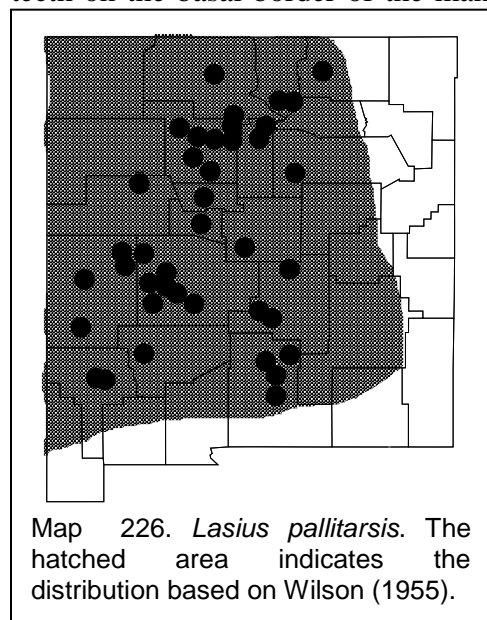
Biology. This species is uncommon in the state, and nests under stones or logs, or earthen mounds, in rocky loam soils. Reproductives

were found in a nest in late August. Workers are primarily nocturnal and feed on insect fragments, nectar and honeydew. It actually moves aphids in and out of its nest and places them on plants, depending on the environmental conditions. Workers guard the aphids when they are on plants. This species also collects seeds, although it is unknown if the seeds are consumed. It occasionally enters houses.

Wilson, 1955, Wheeler and Wheeler, 1973

***Lasius pallitarsis* (Provancher)**

Discussion. This is the most common species in New Mexico. The teeth on the basal border of the mandibles (Fig.) distinguish this species



from all others in the genus *Lasius*. Unfortunately the mandibles must be removed from most specimens to see this character, which partially destroys the specimen. It is usually easiest to remove the head, trap it in a soft bottomed box with one insect pin, and pry the mandibles open with a second pin, or separate them from the head. Later the pieces are glued to the point in a position, which allows them to be easily examined. It is also possible to crush the head of one or more specimens of a series with a pair of forceps, so that the mandibles are splayed outwards,

before the specimen is mounted. Rarely will you be lucky enough to have a specimen with the mandibles open. Unfortunately any medium brown specimen with large eyes may be *L. pallitarsis*. This species was referred to as *L. sitkaensis* in the past.

Distribution. USA: Most of States; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 25 k NE Apache Creek, Beartrap Canyon, 15 k NW Datil, Ox Spring Canyon, near Snow Lake, **Cibola Co.**, Mt. Taylor, **Colfax Co.**, 4 mi W Eagle Nest, **Grant Co.**, Gila Mts. (Iron Creek, Wright's Cabin), Mimbres, TWC-Mimbres Preserve, Mogollon Mts. (Trail 206), 77 k E Silver City, 88 k E Silver City, **Lincoln Co.**, Bonito

Lake, Cibola National Forest, Sierra Blanca, **Los Alamos Co.**, Camp May, Los Alamos, 8 k N Los Alamos, Mortandad Canyon, **Otero Co.**, Camp Sleepy Grass, 4 mi N Cloudcroft, Sacramento Mts. (Bailey Canyon) 9 k N Timberon (Agua Chiquita), 13 k N Timberon (Agua Chiquita), 14 k N Timberon (Spring Canyon), 9 k NE Timberon (Jim Lewis Spring), **Rio Arriba Co.**, 7 k S Cebolla, **Sandoval Co.** Bandelier National Monument, Coronado State Park, 4 k W Cuba, 45 k SE Cuba, 100 k E Cuba, Jémez Mts., 12 mi NE Jémez Springs, **San Miguel Co.**, Villanueva State Park, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.), 12 k NE Santa Fe, **Sierra Co.**, Black Range, **Socorro Co.**, Bosque del Apache, 43 k SE Datil, Grassy Lookout, Magdalena Mts. (Water Canyon), San Mateo Mts., Withington Lookout, **Taos Co.**, 20 k S Taos, 2 k W Tres Ritos, **Torrance Co.**, 24 k S Mountainair, **Valencia Co.**, Belen; MEXICO: Chihuahua.

Habitat. Grasslands to tundra, pinyon-juniper, especially common in ponderosa pine, ponderosa pine-riparian, pine aspen, fir forests, and Douglas fir, up to 2700 meters elevation.

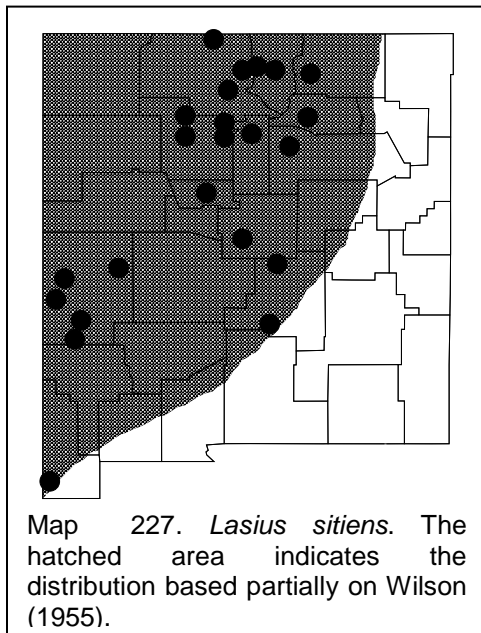
Biology. Nests are located under stones or under logs, under cow manure, in sandy or rocky loam soils. One colony was inside and under the bark of a rotten log, another in a stump and under the bark. Brood were present in nests from May to September, reproductives were found in nests from late July to late August. Flights occurred at night on 12-vii-1986 (black light trap) and between 8:00 and 9:00 and again between 18:00 and 19:00 on 6-viii-1982 at a single site (12 mi NE Jémez Springs). This species is the host of *Lasius subumbratus*, of *Solenopsis truncorum* and of the syrphid fly genus *Microdon*. One colony was nesting together with *Crematogaster punctulata*, one each with *Formica lasioides*, and *F. argentea*, another with *Tapinoma sessile*, two with *Myrmica hamulata*, and three colonies were with *Myrmica fracticornis*. It is a host of the cricket, *Myrmecophila* sp. This is also a house infesting species. It is a very common ant in New Mexico, especially abundant near Bonito Lake.

Wheeler, 1915, Wilson, 1955, Medler, 1958, Wheeler and Wheeler, 1963, Gregg, 1963 (*L. niger sitkaensis*), Corbet and Ayre, 1968, 1969, Kanno, 1969, Akre and Hill, 1973

***Lasius sitiens* Wilson**

Discussion. This species can be recognized by the lack of erect hairs on the scapes (there are numerous decumbent hairs, and erect hairs at the apex), the medium sized eyes with about 11 ommatidia in greatest

diameter, and the yellowish-brown color. The tibiae are also without erect hairs (decumbent hairs present).



Distribution. USA: NV, CO, AZ; NM: **Bernalillo Co.**, NW Albuquerque, **Catron Co.**, 37 k N Apache Creek, Mogollon Mts., Sawtooth Mts., near Snow Lake, **Colfax Co.**, 41 k E Eagle Nest, **Hidalgo Co.**, Clanton Draw, **Lincoln Co.**, Cibola National Forest, 2 mi W Alto, **Los Alamos Co.**, Los Alamos, 4 k W Los Alamos, 4 k N Los Alamos, Rio Grande, **Mora Co.**, 10 k SE Mora, **Rio Arriba Co.**, 7 k S Cebolla, 4 k N Chama, **Sandoval Co.**, Bandelier National Monument, 4 k W Cuba, 26 k S Cuba, **San Miguel Co.**, 20 k NW Las Vegas, **Santa Fe Co.**, Santa Fe, **Socorro Co.**, 5 k

N Camp Luna, **Taos Co.**, 5 mi SE Dixon, 20 k NW Taos, 6 k SW Tres Piedras, **Torrance Co.**, 24 k S Mountainair; MEXICO: Chihuahua.

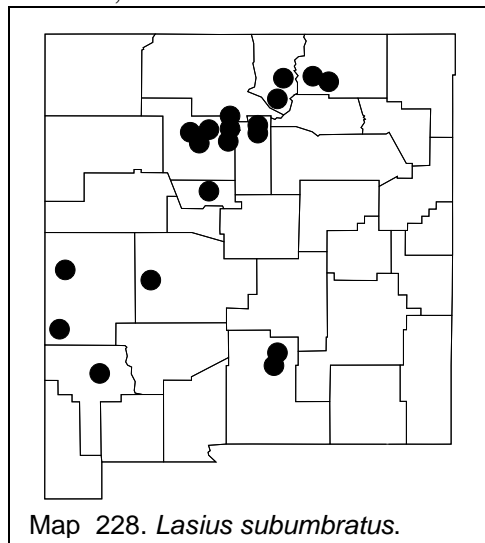
Habitat. Residential areas, disturbed sites, grasslands, juniper, pinyon-juniper, ponderosa pine, aspen-spruce forests.

Biology. This is a common species, which nests under stones in sandy soils, loam and rocky soils. One nest was in a rotten log. Brood was present in nests from March to August, reproductives were captured in nests from late June to early August. This species occasionally nests together with other *Lasius*, *Formica argentea*, and *F. occulta*, as well as with *Monomorium minimum*, *Camponotus* and *Solenopsis molesta*. In other instances, this species was nesting together under a rock with *Crematogaster punctulata*, *Solenopsis molesta*, *Formica argentea*, and *Monomorium minimum*, in a second case, with *Acanthomyops latipes*, *Myrmica hamulata* and *Formica occulta*. It is the host of the cricket *Myrmecophila* sp.

Cole, 1966

***Lasius subumbratus* Viereck**

Discussion. These ants are yellow or pale brown, with small eyes (about 0.13 - 0.15 mm in greatest diameter, with about 50 ommatidia). The longest hairs on the posterior half of the first gastral tergite are at least 0.60 times as long as the maximum width of the posterior tibia at midlength. The erect hairs are dense enough that their length is less than the distance between their tips. The apex of the petiole is flat or slightly concave, as seen from the front.



Distribution. USA: Most of North America; NM: **Bernalillo Co.**, Albuquerque, **Catron Co.**, 29 k N Apache Creek, Catwalk, **Colfax Co.**, 5 mi E Eagle Nest (Wilson, 1955), 16 k E Eagle Nest, **Grant Co.**, 77 k E Silver City, 88 k E Silver City, **Los Alamos Co.**, Camp May, Los Alamos, Mortandad Canyon, Chupaderos Canyon, **Otero Co.**, Cloudcroft (Wheeler, 1917), 14 mi S Mescalero (Wilson, 1955), **Sandoval Co.**, Bandelier National Monument, 26 k S Cuba, 100 k E

Cuba, 12 mi NE Jémez Springs, **Santa Fe Co.**, Tesuque Canyon (Wilson, 1955), Little Tesuque Canyon (Wilson, 1955), **Socorro Co.**, Washington Lookout, **Taos Co.**, 18 mi E Taos (Wilson, 1955), 20 k S Taos; MEXICO: Chihuahua.

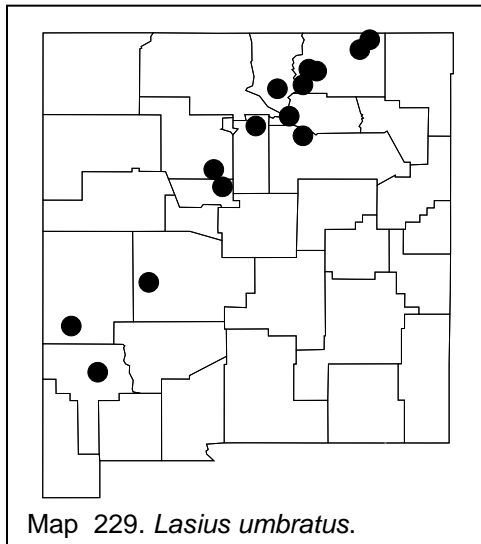
Habitat. Ranging from meadows and dry open slopes through mixed forest into ponderosa pine - riparian up to spruce forests.

Biology. This species nests under stones or logs in loam soils with rocks. It is a temporary social parasite of *L. pallitarsis*. Two dealate females were found in one nest, suggesting that this species may be polygynous. Brood was found in nests in March and August, reproductives were found in nests in July and August. Dealate females were collected in July and August. It tends mealybugs.

Wheeler, 1917, Wilson, 1955, Wheeler and Wheeler, 1963, Gregg, 1963, check Cole

***Lasius umbratus* (Nylander)**

Discussion. The workers of this species are yellow or pale brown ants, which have small eyes (35 - 65 ommatidia). The length of the longest hairs on the posterior half of the first gastral tergum (excluding those along the posterior strip) are less than $\frac{1}{2}$ the maximum width of the posterior tibia at midlength (Fig.). The hairs on the first gastral tergum are spaced far enough apart that the distances between the tips of most or all hairs are greater than their lengths.



Distribution. USA: North America; NM: **Bernalillo Co.**, Sandia Mts. (Wilson, 1955), **Catron Co.**, Mogollon Mts. (Wilson, 1955), **Colfax Co.**, Cimarron Canyon (Wilson, 1955), 15 mi N Cimarron (Wilson, 1955), 4 mi W Eagle Nest, Raton (Wilson, 1955), Ute Park (Wilson, 1955), **Grant Co.**, 77 k E Silver City, **Sandoval Co.**, Sandia Mt., **San Miguel Co.**, Sapello Canyon (Wilson, 1955), **Mora Co.**, Sangre de Cristo, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.) , **Socorro Co.**, Grassy Lookout,

Taos Co., 20 k S Taos.

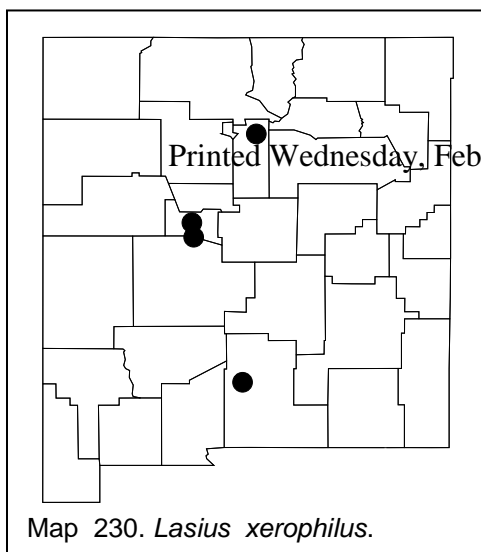
Habitat. Moist areas, ranging from pastures to mixed forests and pine forests.

Biology. This species nests under stones and logs, tends Homoptera, and is a temporary social parasite of *L. alienus*, *L. niger* and *L. neoniger*. Reproductives were found in nests July and September, dealate females were found in September. It may form a plesiobiotic relationship with *Leptothorax rugatulus*.

Wheeler, 1905, Smith, 1928, Wesson and Wesson, 1940, Wilson, 1955, Kanno, 1959, Wheeler and Wheeler, 1963, Gregg, 1963, Smith, 1965, DuBois and Danoff-Burg, 1994

Lasius xerophilus Mackay & Mackay

Discussion. This species is similar to *L. neoniger*, and would



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key to this species in Wilson (1955). It differs in that the worker is covered with short, bristly hairs. The extensor surface of the front tibia has at least 6, usually over 10 such hairs (usually 1 or none in *L. neoniger*), the same surface of the mid tibia has up to 14 such hairs (usually fewer than 10 in *L. neoniger*) and the same surface of the posterior tibia has more than 15 (less than 15 in *L. neoniger*). The females are also much more hairy, with more than 20 hairs on the extensor surface of the mid tibia and hind tibia (fewer than 6 on these surfaces in *L. neoniger*). The extensor surface of the mid tibia of the male has more than 5 erect hairs (1 or none in *L. neoniger*), the hind tibia has more than 10 erect hairs (0 - 2 in *L. neoniger*).

Distribution. USA: NM: **Bernalillo Co.**, NW Albuquerque, Bosque Forest, **Otero Co.**, White Sands National Monument, **Santa Fe Co.**, Hyde Park (Sangre de Cristo Mts.).

Habitat. Arid and semi arid Chihuahuan Desert.

Biology. Nests are found in the soil, usually in sandy sites. The nest entrance is small, inconspicuous, and surrounded by a small mound. Foraging activity is nocturnal or crepuscular, except on cloudy, cool days, when it continues throughout the day. Nests contain about 100 workers. Flights occur at night in July.

Mackay and Mackay, 1993

Genus *Myrmecocystus*

(Key: Snelling, 1976)

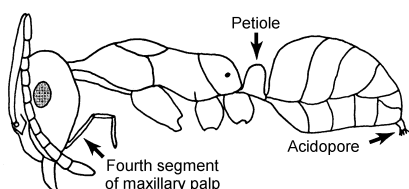


Fig. 435. Side view of a worker of *M. depilis*.

This is a common, easily recognized genus in New Mexico. One character is sufficient to distinguish it from all others: the long maxillary palps in which the fourth segment is especially long. It could be confused with *Formica*, but the fourth segment of the maxillary palp of *Formica* is not elongate. The maxillary palp is

similar to that of *Dorymyrmex*, but this dolichoderine has a pyramid on the propodeum, which is very different than the type of propodeum in

Myrmecocystus. All of the species have a psammophore or basket of long hairs on the underside of the head.



Fig. 436. Nest of *Myrmecocystus* sp., showing the large entrance hole.

This is the genus or “honey pot” ants in which repletes fill their crops with liquids and hang inside the nests, serving as storage structures. These “honey pots” are consumed in Mexico. This genus is common in New Mexico, especially in arid and semiarid regions. These ants nest in the soil and often have a well developed mound (5-20 cms dia.) with a

surprisingly large (up to 2 - 3 cm diameter) entrance hole which allows rapid escape when the nest is attacked by army ants. The genus is distributed in the southwestern section of the United States and in northern Mexico. Cole (1954c) discusses the genus in New Mexico. Identification to species is difficult unless a series has a good representation of major workers.

Key to *Myrmecocystus* workers (Modified from Snelling, 1976)

1. Mandible with 8 - 10 teeth (Fig. 444, left); light yellow or brownish-yellow, entire ant basically same color; primarily nocturnal (**Subgenus *Myrmecocystus***) **2**



Fig. 438. Mandibles of workers of *M. navajoa* (left) and *M. depilis* (right).

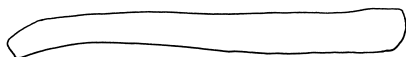


Fig. 437. Mid tibia of a worker of *M. navajoa*, as seen from the front.

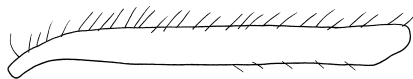


Fig. 439. Mid tibia of a worker of *M. mexicanus*, as seen from the front.

- Mandible with 6 or 7 teeth (Fig. 444, right); workers are either 1) bicolored, head brownish-red, mesosoma and gaster blackish; or 2) uniformly black or dark brown, anterior part of head may be lighter; primarily diurnal; **3**

- 2(1). Head, pronotum and gaster shining, with little or no appressed pubescence; mid and hind tibiae with not more than three or four erect hairs beyond basal third of

outer face, usually none **navajo** Wheeler

- Head, pronotum and gaster with abundant appressed pubescence; mid and hind tibiae usually with numerous erect hairs along the apical half of outer face

..... **mexicanus** Wesmael

3(1). Bicolored, head reddish, mesosoma dark, often mixed with red, gaster black; common (subgenus **Endiodictes**) **4**

- Essentially entire ant dark brown or black;

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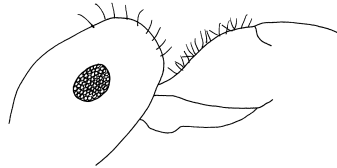
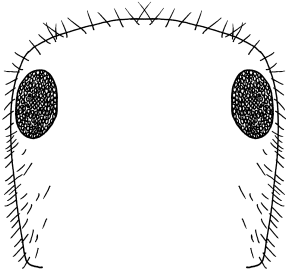


Fig. 441. Head and pronotum of a worker of *M. placodops*, as seen from the side.

nus Eremnocystus)*

4(3). Twenty or more hairs on malar area in full face view; first 3 (usually 4) terga (upper surfaces of segments of gaster) with dense pubescence **5**

- Fewer than 20 erect hairs on malar area; usually fewer than 6; third tergum often with sparse or no pubescence **7**

5(4). Longest occipital and pronotal hairs usually shorter than eye length (EL), longest discal hairs on second tergum less than EL **6**

- Longest occipital, pronotal and discal hairs exceeding length of eye; not recorded from New Mexico (TX, SO, CH) **melliger** Forel

6(5). Longest hairs on pronotal dorsum (Fig.) and disc of second tergum no more than half minimum eye diameter **placodops** Forel

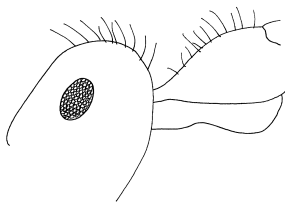


Fig. 444. Head and pronotum of a worker of *M. mendax*, as seen from the side.

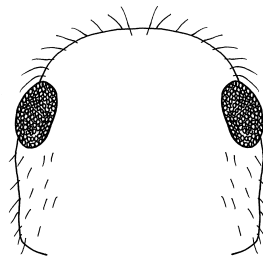


Fig. 442. Outline of the head of a worker of *M. romainei*.

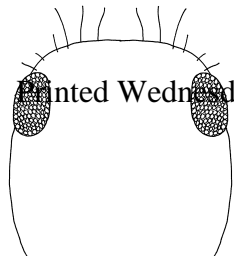


Fig. 443. Outline of the head of a worker of *M. depilis*.

7(4). Malar area with 6 or more (usually 12 - 16) erect hairs evenly distributed between eye and base of mandible; third tergum with dense pubescence, not differing from second tergum ***romainei* Snelling**

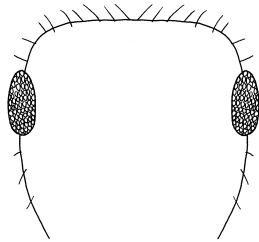


Fig. 445. Outline of the malar area of a worker of *M. mimicus*.

- Malar area usually with not more than four erect hairs, these confined to lower half, near base of mandible; third tergum with less pubescence than second tergum **8**
8(7). Longest occipital hairs at least equal to minimum eye diameter in majors

***depilis* Forel**

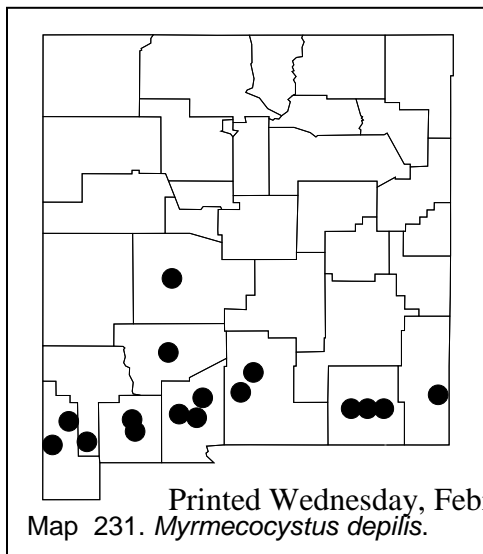
- Longest occipital hairs no more than 0.6 X minimum eye diameter, usually about 0.5 X minimum diameter of eye

***mimicus* Wheeler**

***Myrmecocystus depilis* Forel**

Discussion. This species can usually be distinguished from the others in the genus as the malar area has few or no erect hairs (frontal view), the gaster is blackish, the head and mesosoma are extensively infuscated and some of the pronotal hairs are longer than the length of the eye in the large workers. Larger workers have abundant pubescence on the disc of the third tergum, medias and minor workers have scattered pubescence on the same surface. The smaller workers of this species are easily confused with similar workers of *M. mimicus*. They may be separated as the minor workers of *M. depilis* possess hairs of variable

length on the pronotal dorsum, a few of which are as long as three times that of the shortest hairs, those of *M. mimicus* are uniform in length. The majors and media workers of *M. depilis* always possess long, slender, flexuous hairs on the pronotum, some of which equal or exceed the length of the eye. In addition, the third gastral tergum usually has



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Map 231. *Myrmecocystus depilis*.

conspicuous appressed pubescence, except in the smallest workers.

Distribution. USA: NV, AZ, TX; NM: **Doña Ana Co.**, Aden (Snelling, 1976), Jornada Experimental Range (Snelling, 1976), Mesilla, **Eddy Co.**, Carlsbad Caverns, 32°22.2'N 103°51.4'W, **Grant Co.**, Hachita, Lordsburg (Snelling, 1976), **Hidalgo Co.**, Rodeo (Snelling, 1976), 22 mi N Rodeo (Snelling, 1976), **Lea Co.**, 20 mi WSW Hobbs, **Luna Co.**, Deming (Snelling, 1976), 23 mi S Deming (Snelling, 1976), **Otero Co.**, Alamogordo (Snelling, 1976), White Sands National Monument (Snelling, 1976), **Sierra Co.**, Truth or Consequences (Snelling, 1976), **Socorro Co.**, Water Canyon; MEXICO: Sonora, Chihuahua, Coahuila, Nuevo León, Durango, Zacatecas, San Luís Potosí, Jalisco.

Habitat. In most arid habitats, except grasslands.

Biology. Nests are found in sandy soil. It tends aphids and coccids and collects dead insects as well as preys on living arthropods, and collects nectar from flowers of *Opuntia rastrera*, *Parthenium incanum* and *Euphorbia albomarginata*. This species forages individually or in groups. The scarabaeid beetles *Cremastocheilus stathamae* and *C. constricticollis* are found in the nests.

Snelling, 1976, Rojas and Fragoso, 1994, 2000

***Myrmecocystus melliger* Forel**

Discussion. The worker has numerous erect hairs on the malar area (between the base of the mandible and the eye), the longest hairs on the occiput, pronotum and dorsum of second gastral tergum exceed the eye length; the longest pronotal hairs are flexuous and somewhat curled at the tip. The longhaired *Myrmecocystus* from New Mexico are apparently all *M. mendax* to which it is closely related (Snelling 1976). The largest workers of *M. mendax* have a head width less than 1.5 mm and the hairs on the pronotal hairs are usually evenly curved along their lengths. This species has been referred to as *M. comatus*.

Distribution. USA: TX, NM: not reported from New Mexico (Snelling 1976), but as it occurs in west Texas and Chihuahua, it would be expected to occur in the southern part of the state; MEXICO: Throughout the northern half.

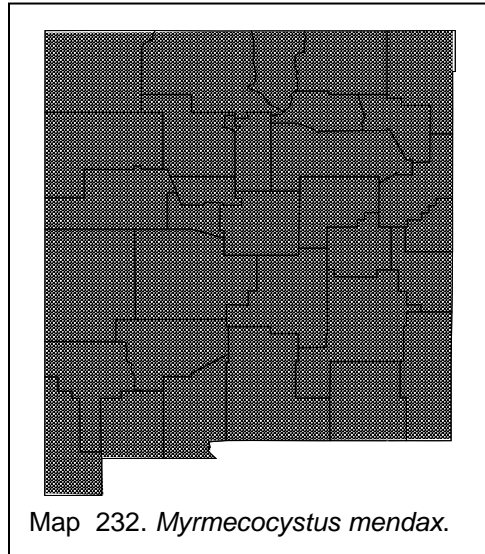
Habitat. Semi arid mountain habitats, oak juniper, pinyon juniper woodlands.

Biology. This species nests in the soil and is apparently predaceous.

Snelling, 1976

***Myrmecocystus mendax* Wheeler**

Discussion. This ant can be recognized by the numerous hairs on the malar area; the long hairs on pronotum and dorsum of second tergum of large workers are at least 60% of the length of the longest diameter of the eye; the longest hairs on pronotum are evenly curled and not simply curled at the tip.



Map 232. *Myrmecocystus mendax*.

Distribution. USA: NV, CA, AZ, CO, TX; NM: **Bernalillo Co.**, Cibola National Forest, Embudo Canyon, Petroglyph Park, **Catron Co.**, Cruzville, Datil (Snelling, 1976), 20 mi E Alma (Snelling, 1976), **Colfax Co.**, 5 mi. S Raton Pass (Snelling, 1976), 16 mi E Raton (Snelling, 1976), 20 mi W Raton (Snelling, 1976), Cimarron Canyon (Snelling, 1976), **Doña Ana Co.**, near Aguirre Springs Recreational Area

(Snelling, 1976), Las Cruces (Snelling, 1976), **Grant Co.**, 4 k SE Mule Creek, 26.5 mi S Silver City (Snelling, 1976), 23 mi SW Silver City (Snelling, 1976), 20 mi N Silver City (Snelling, 1976), 70 mi N Silver City (Snelling, 1976), 15 mi E Silver City (Snelling, 1976), 80 k E Silver City, 9 k E White Signal, 14 k NE White Signal, **Guadalupe Co.**, 0.6 m N Dilia (Snelling, 1976), Santa Rosa (Snelling, 1976), **Lea Co.**, Hobbs (Snelling, 1976), state line (Snelling, 1976), **Lincoln Co.**, 5 mi W Capitan, near Carrizozo, Malpais Lava Bed (Snelling, 1976), **Los Alamos Co.**, Los Alamos, Rio Grande, **Luna Co.**, 6 mi NW Deming (Snelling, 1976), **McKinley Co.**, near Gallup (Snelling, 1976), 25 m E Gallup (Snelling, 1976), Zuni Mts (southeast of Gallup), **Otero Co.**, Alamogordo (Snelling, 1976), White Sands National Monument (Snelling, 1976), **Quay Co.**, 9 m W Glenrio (Snelling, 1976), 3 m W Tucumcari (Snelling, 1976), **Rio Arriba Co.**, 4 k NW Navajo City, **Sandoval Co.**, Bandelier National Monument, Cimarron Canyon, Tunnel Springs, **San Juan Co.**, 4 k E Aztec, **San Miguel Co.**, 25 m S Las Vegas (Snelling, 1976), **Santa Fe**

Co., Santa Fe (Snelling, 1976), 24 k NE Santa Fe, 10 m S Santa Fe (Snelling, 1976), 1 m S golden (Snelling, 1976), **Socorro Co.**, Water Canyon (Snelling, 1976), 16 m W Socorro (Snelling, 1976), 25 m E Socorro (Snelling, 1976), 25 m N Bernardo (Snelling, 1976), **Torrance Co.**, Gran Quivira, 9 m E Mountainair (Snelling, 1976), 24 k S Mountainair, **Union Co.**, 6 mi E Clayton, **Valencia Co.**, 22 k S Fence Lake; MEXICO: Sonora, Chihuahua.

Habitat. Arid grasslands and desert shrublands up to pinyon juniper woodlands.

Biology. Nests are found in the soil or under stones. Flights occur in the afternoon after a rain. This species is carnivorous (insects) and feeds on dead insects. Workers also collect honeydew and nectar. Foraging occurs during the day. The ant cricket *Myrmecophila nebrascensis* occurs within the nest.

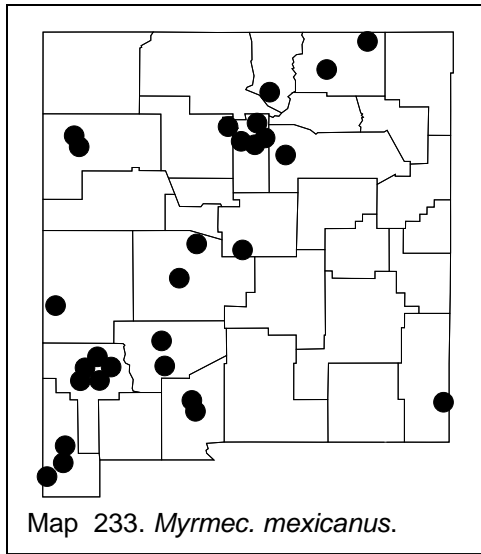
Wheeler, 1910, Cole, 1942, 1954, Gregg, 1963 (as *M. comatus*), Snelling, 1976

***Myrmecocystus mexicanus* Wesmael**

Discussion. The head length of the largest workers exceeding 1.3 mm, the eyes have few or no short, erect hairs, the propodeal dorsum is evenly convex and abundantly hairy and the metanotal suture is usually distinctly impressed. This species can be easily confused with *M. navajo*, see discussion of the latter species.

Distribution. USA: NV, CA, UT, CO, AZ, TX; NM: **Catron Co.**, 21 k N Glenwood, **Colfax Co.**, 2 mi S Raton Pass (Snelling, 1976), Cimarron Canyon (Snelling, 1976), **Doña Ana Co.**, 28 m N Las Cruces (Snelling, 1976), Las Cruces (Snelling, 1976), **Grant Co.**, 15 m E Silver City (Snelling, 1976), 20 m N Silver City (Snelling, 1976), 13 mi N Silver City (Snelling, 1976) 14 mi N Silver City (Snelling, 1976), McMillan Camp (Snelling, 1976), Cherry Creek Camp (Snelling, 1976), 14 m N Silver City, **Hidalgo Co.**, Granite Pass (Snelling, 1976), 12 m E Animas (Snelling, 1976), 15 m N Rodeo (Snelling, 1976), **Lea Co.**, 2 m E Hobbs (Snelling, 1976), **Los Alamos Co.**, Los Alamos, **McKinley Co.**, 25 m E Gallup (Snelling, 1976), Zuni Mts (southeast of Gallup), **Santa Fe Co.**, Santa Fe (Snelling, 1976), 6 mi NW Santa Fe (Snelling, 1976), 4 m NE Santa Fe (Snelling, 1976), **San Miguel Co.**, Pecos (Snelling, 1976), **Sierra Co.**, Caballo (Snelling, 1976), Truth or Consequences, **Socorro Co.**, Sevilleta, Socorro, **Taos Co.**, 18 m S Taos (Snelling, 1976),

Torrance Co., 24 k S Mountainair; MEXICO: Chihuahua, Coahuila, San Luis Potosí, Durango, Guanajuato, Baja California.



Habitat. Typical creosotebush desert scrub, sagebrush, oak woodland up to pinyon-juniper. This is one of the most common species of *Myrmecocystus* in New Mexico.

Biology. The nest of this species is usually a crater surrounded by pebbles or coarse gravel. The nest entrance consists of a single, large diameter (over 2 cm) tunnel. The foragers are active just before dusk, throughout the night and until after dawn. It also forages on cool, overcast days.

Workers forage individually, collecting nectar and excretions of Homoptera. Although they collect dead arthropods, they are apparently not predaceous. Flights occur late in the afternoon just before dusk. A myrmecophilous scarabaeid beetle appears to be an obligate predator on the larvae of this species.

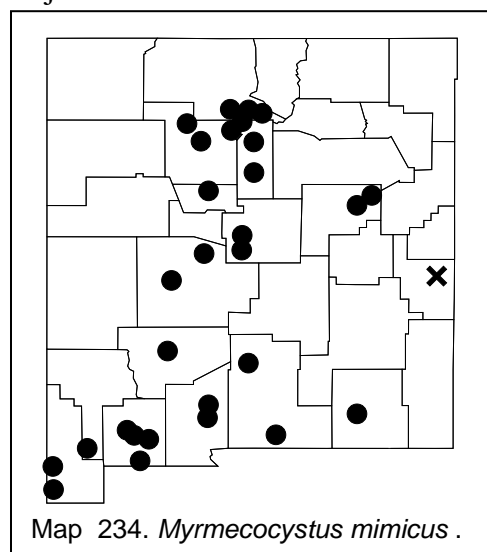
Crazier and Mortenson, 1965, Snelling, 1976

***Myrmecocystus mimicus* Wheeler**

Discussion. The malar area of this species has fewer than ten erect, usually only on the lower half; the frons and vertex are smooth, shiny and with little or no pubescence; the third tergum of gaster with only sparse pubescence, and the pronotal hairs are short, stiff and blunt.

Distribution. USA: CA, AZ, KS, OK, TX; NM: **Bernalillo Co.**, Albuquerque (Snelling, 1976), **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), Isaac's Lake, 28.8 mi W Las Cruces (Snelling, 1976), **Eddy Co.**, 32°22.2'N 103°47.4', **Grant Co.**, 7.5 m W Hachita (Snelling, 1976), **Guadalupe Co.**, Cuervo (Snelling, 1976), 0.6 m S Cuervo (Snelling, 1976), **Hidalgo Co.**, 1 mi W Rodeo (Snelling, 1976), Peloncillo Mts. (Snelling, 1976), **Los Alamos Co.**, Los Alamos, **Luna Co.**, Columbus, Deming, 18 k NW Deming, 23 m E Deming (Snelling, 1976), 6 mi NW Deming (Snelling, 1976), Pancho Villa State Park, **Otero**

Co., Alamogordo (Snelling, 1976), North MacGregor Range, **Rio Arriba Co.**, Alcalde (Snelling, 1976), 2 k N Dixon, Embudo (Snelling, 1976), Truchas (Snelling, 1976), **Roosevelt Co.**, without locality, **Sandoval Co.**, 4 k W Cuba, West Mesa, **Santa Fe Co.**, Galisteo, 10 m S Santa Fe (Snelling, 1976), **Sierra Co.**, Truth or Consequences, **Socorro Co.**, Durfee Canyon, Sevilleta National Wildlife Refuge, **Torrance Co.**, Mountainair, 24 k S Mountainair; MEXICO: Chihuahua, Morelos, Sonora, Baja California.



Habitat. Desert grasslands through creosote bush scrub, sagebrush, oak forest to pinyon juniper woodland.

Biology. Nests range from a hole to a hole hidden at the base of a desert plant to a normal crater or mound as is found in other species in the genus. Foraging occurs during the day with the workers scavenging on dead arthropods or preying on living insects and feeding on nectar in flowers. This species also tends aphids. Workers are timid and rapid. Mating flights occur late in

the afternoon after a significant rain event, although flights may occur in the morning. Several queens may start a single nest, although this is apparently uncommon.

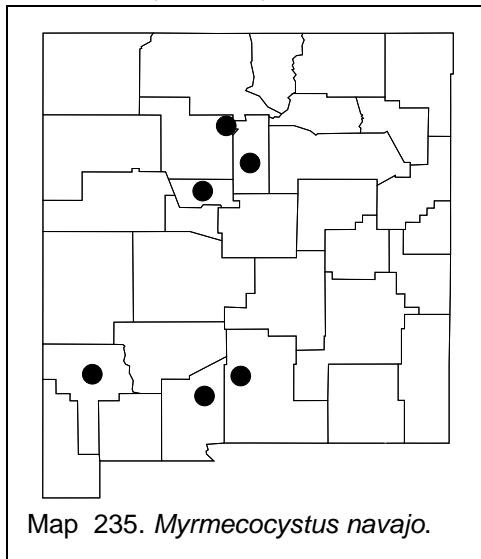
Cole, 1934, Mallis, 1941, Cole, 1966, Wheeler and Wheeler, 1973, Hölldobler, 1976, Snelling, 1976

***Myrmecocystus navajo* Wheeler**

Discussion. The dorsum of the propodeum is evenly convex with abundant erect hairs, appressed pubescence is sparse on the head, mesosoma and gaster, and the hind tibia has few or no erect hairs on the outer face. Workers are similar to those of *M. mexicanus*, but differs in being smaller, having sparser cephalic pubescence, and lack the erect hairs on the extensor surfaces of the femora and tibiae. The node of the petiole of *M. navajo* workers is usually thinner and with

fewer erect hairs than that of *M. mexicanus*. Often workers of the two species cannot be separated.

Distribution. USA: NV, CA, UT, CO, KS, AZ, TX; NM: **Bernalillo Co.**, Albuquerque (Snelling, 1976), **Doña Ana Co.**, Jornada Experimental Range, **Grant Co.**, 23 m SW Silver City (Snelling, 1976), **Los Alamos Co.**, Rio Grande, **Otero Co.**, White Sands National Monument, **Santa Fe Co.**, Kennedy (Snelling, 1976); MEXICO: Chihuahua., Sonora, San Luis Potosí.



Habitat. Chihuahuan Desert, sagebrush and grasslands up to oak and pinyon juniper woodlands.

Biology. These ants nest in the soil with the entrance surrounded by a low mound of soil. Wheeler (1908) reports that the colonies are small, 100 - 150 workers, although this estimate is probably low as was suggested by Snelling (1976). Larvae occurred in nests in March. Foraging occurs primarily at night, with the workers tending Homoptera and feeding on flower nectar. Dead arthropods are

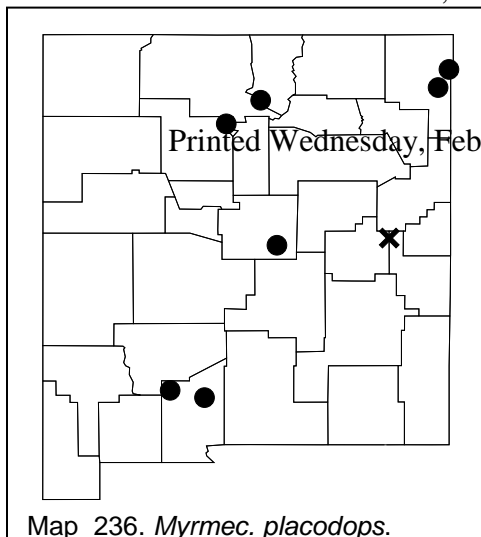
also collected.

Cole, 1942, Gregg, 1963, Wheeler and Wheeler, 1973, Snelling, 1976, DuBois and Danoff-Burg, 1994

Myrmecocystus placodops Forel

Discussion. The longest hairs on the pronotum and dorsum of second segment of gaster are less than half the maximum diameter of eye, those on the pronotum are abruptly tapered at the tip; then malar area has numerous erect hairs; the head of the larger workers is orbiculate in shape. Only the largest workers can be separated from those of *M. mendax*, the smaller workers of the two species are indistinguishable. The sexual forms of the two species cannot be separated using morphological characters.

Distribution. USA: AZ, TX; NM: **Doña Ana Co.**, Hatch (Snelling, 1976), 45 k NE Las



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Cruces (Long Term Ecological Research site), **Los Alamos Co.**, Rio Grande, **Roosevelt Co.**, without locality, **Taos Co.**, 5 mi SE Dixon, **Torrance Co.**, 5 mi NE Corona, **Union Co.**, 10 mi SE Clayton, 6 mi E Clayton; MEXICO: Sonora, Chihuahua, Durango, Nuevo León, Tamaulipas.

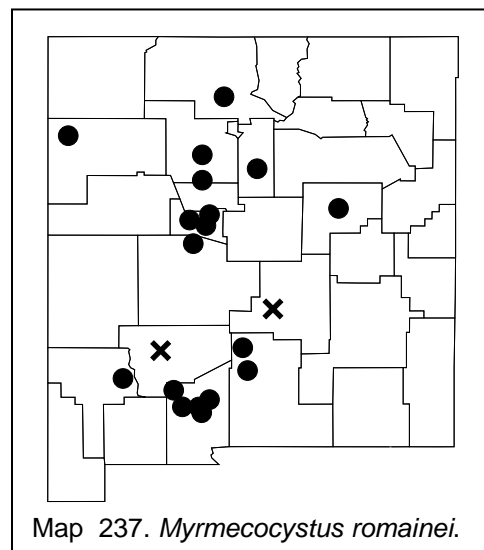
Habitat. Sagebrush (Rio Grande). Found in most habitats in arid environments, except grasslands. This ant is most abundant in the Rio Grande Valley and plains of western Texas, ranging from grasslands and shrub grassland to mesquite savannas and creosotebush/tarbush grassland.

Biology. This is a diurnal species, which feeds on small arthropods and visits flowers to obtain nectar. They nest in the soil in open areas, usually in rocky soil, with the maximum depth being 4.8 m. There are as many as 1500 repletes in a single nest.

Creighton and Crandall, 1954, Snelling, 1976, Rojas-Fernández and Fragoso, 1994, 2000

***Myrmecocystus romainei* Snelling**

Discussion. In this species, the malar area (front view) has 5 - 17 hairs extending beyond the margin, the head width is less than 1.55 mm, the frons and vertex are finely and closely punctate and the longest occipital hair is less than half the maximum eye diameter.



Distribution.

USA: Throughout the southwest; **NM:** **Bernalillo Co.**, Albuquerque, Petroglyph Park, **Doña Ana Co.**, Hatch (Snelling, 1976), 45 k NE Las Cruces (Long Term Ecological Research site), 3 mi E Las Cruces, 20 m W Las Cruces (Snelling, 1976), Mesilla Park (Snelling, 1976), **Grant Co.**, 2 m N San Juan (Snelling, 1976), **Guadalupe Co.**, Santa Rosa State Park, **Lincoln Co.**, without locality, **McKinley Co.**, 30 m N Gallup (Snelling, 1976), **Otero Co.**, White Sands Nat. Monument, Tularosa Desert

(Snelling, 1976), **Rio Arriba Co.**, Abiquiu Dam, **Sandoval Co.**, Rio

Rancho, 1 mi S Zia Indian Pueblo, **Santa Fe Co.**, Kennedy, **Sierra Co.**, Truth or Consequences, **Socorro Co.**, without locality, **Valencia Co.**, Los Lunas (Snelling, 1976); MEXICO: Chihuahua., Nuevo León.

Habitat. Numerous habitats, ranging from grasslands through creosotebush scrub up to pinyon juniper woodlands.

Biology. These ants have irregular craters, with a diameter up to 20 cms. This species can nest in loose, sandy soils, but prefers the more stable interdunal areas at White Sands National Monument.

Cole, 1954 (as *M. semirufa* in part), Gregg, 1963 (as *M. semirufus* in part), Snelling, 1976



Fig. 446. Pronota of workers of *A. bruesii* (top) and *A. terricol* (bottom) as seen in profile.

Genus *Paratrechina*

(Key: Trager, 1984)

This is a common, widely distributed genus in New Mexico which can be easily recognized by the numerous thick, dark, erect hairs on the mesosoma (Fig.). These are slender ants with a scape which extends past the posterior edge of the head. Antennal fossa inserted near to, but not touching posterior border of clypeus. Mesopropodeal region impressed

dorsally, but without the strong constriction seen in *Prenolepis*. The petiolar node is somewhat hidden by the anterior surface of the gaster. Identification to species is difficult and the workers of two common species, *P. vividula* and *P. terricola*, are almost impossible to separate.

Nests have up to a few hundred species and are usually found in the soil or under stones, especially in arid and semiarid ecosystems. These ants tend Homoptera and may be house pests.

Key to the workers of the genus *Paratrechina* (see Trager, 1984)

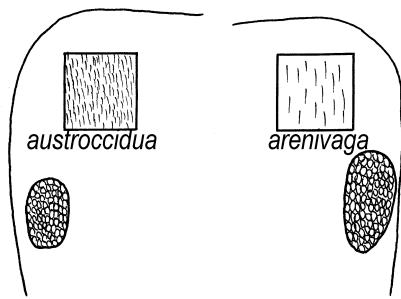


Fig. 447. Pubescence on the dorsum of the heads of workers of *P. austroccidua*, and of *P. arenivaga*.

- Pubescence on head dilute (Fig.) or absent, surface strongly shining and easily seen; pronotum convex in profile, or only weakly angular (Fig.) **2**

2(1). Yellow with large black eyes (Fig.); nesting in mounds in sandy areas; not known from New Mexico **arenivaga (Wheeler)**

- Usually darker, if yellow, eyes are smaller (Fig.); nests under stones or other objects, or not in sandy areas **3**

3(2). Scape with fewer than 10 coarse, nearly erect hairs, other finer semierect hairs may be present; pronotum with fewer than 14 coarse hairs; head length less than 0.65 mm **4**

- Scape with 13 - 19 coarse, nearly erect hairs (in addition to many finer, semierect hairs), pronotum with at least 14 coarse hairs; head length greater than 0.65 mm **bruesii**

1. Pubescence on head dense, partially obscuring the surface (Fig.); weak bluish reflections often present on head and mesosoma; pronotum angular, with short, steep anterior face and longer, flattened or concave dorsal face (Fig.) **austroccidua Trager**

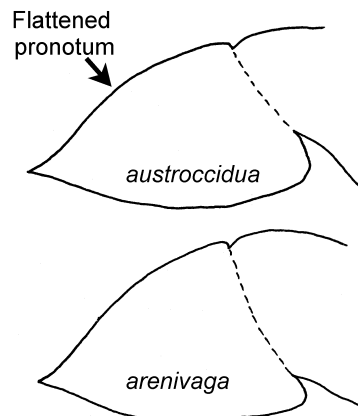


Fig. 448. Pronota of workers of *P. austroccidua* (indicating the concave or flat area on dorsum of pronotum) and *P. arenivaga* as seen in profile.

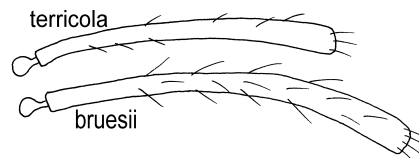


Fig. 449. Antennal scapes of workers of *P. terricola* and *P. bruesii*.

(Wheeler)

4(3). Eye larger, about 1/4 head length or larger (eye length / head

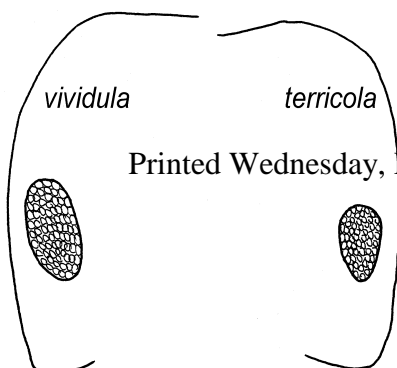


Fig. 450. Full face views of heads of workers of *P. vividula* and *P. terricola*, showing the relative eye sizes.

length ranges from 0.24 - 0.47); side of head nearly straight
..... *vididula* (Nylander)

- Eye smaller, less than $\frac{1}{4}$ head length (eye length / head length
ranges from 0.20 - 0.24); side of head obviously convex *terricola*
(Buckley)

***Paratrechina arenivaga* (Wheeler)**

Discussion. This is a yellow ant with large, black eyes. The head is densely pubescent, the mesosoma usually lacks pubescence, but has a few, erect hairs. It can be separated from both *P. terricola* and *P. vividula* by the large eyes, and usually the lighter color.

Distribution. USA: southeastern part of country, as far west as north western Texas near Union Co., **NM:** No records from the state, but may occur in northeastern New Mexico.

Habitat. Open areas with sandy soils

Biology. These ants nest in the soil, and the entrance is surrounded by a small mound. It rarely or never nests under objects. They are predominantly nocturnal. Sexualls were found in the nest throughout the year, flights occurred in the spring (April or May). Colonies have multiple mounds (up to 20 entrances over 1 meter apart). This species tends a variety of homopterans. They also feed on dead insects.

Van Pelt, 1956, 1958, Trager, 1984

***Paratrechina austroccidua* Trager**

Discussion. This is a yellow-brown to dark brown (or weakly bicolored) species, which often has bluish reflections on the head and mesosoma). It can usually be separated from other New Mexican species by the dense, decumbent pubescence on the head. The dorsum of the pronotum is flat or concave.

Distribution. USA: AZ (southeast), UT, TX (Brewster Co.); **NM:** none, but expected to be in southwestern corner of state; **MEXICO:** Chihuahua, Hidalgo, Nuevo León.

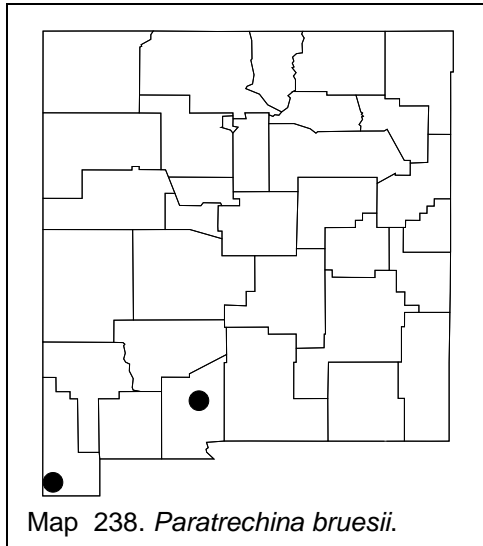
Habitat. Mesic habitats at elevations of 1400 - 2400 m, in oak-maple forest, oak pine forest and pine forests (on north-facing slope). It is moderately abundant in high forest and canyons of the Chisos Mountains.

Biology. This ant nests in the soil, often under a stone. Brood was found in nests in July, callow males and mature females were in nests in

July, mature alates in September. Flights occurred in May and July. It nests together with *Liometopum apiculatum* as well as with *P. melanderi* and *P. bruesii*.

Chew and Chew, 1980, Van Pelt, 1983, Trager, 1984

***Paratrechina bruesii* (Wheeler)**



Map 238. *Paratrechina bruesii*.

Discussion. The workers of this species are brown with a shining gaster, which is often enlarged. Decumbent pubescence on the head is sparse, there is little or no such pubescence on the mesosoma. The hairs on the scape are abundant (usually), and erect or semierect.

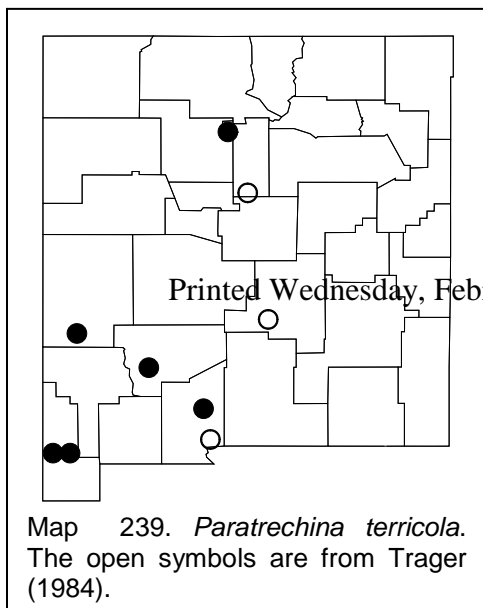
Distribution. USA: AZ (Cochise Co.), TX (Brewster Co., Presidio Co.); NM: **Hidalgo Co.**, Guadalupe Canyon (first state record); what is other dot??? MEXICO: Baja California Sur,

Chihuahua, Nayarit, Jalisco, Coahuila, Hidalgo.

Habitat. This species nests under stones in streambeds or arroyos in the lowlands and foothills in scrub lands or grasslands of the Chihuahuan Desert, at elevations of 750 - 1800. It is also found in subtropical thorn forest, juniper-oak or juniper-cottonwood woodlands.

Biology. This ant nests under stones or under wood (such as a dead *Yucca* log). Alates were found in nests from April to December. Apparently the alates remain in the nest throughout the winter and fly at the outset of hot weather or after spring rains.

***Paratrechina terricola* (Buckley)**



Map 239. *Paratrechina terricola*. The open symbols are from Trager (1984).

Discussion. This is a small, yellow-brown or even dark brown species (occasionally bicolored, with darker head and gaster), that is rarely encountered in New Mexico. It is nearly impossible to

separate the workers of this species from those of *P. vividula*, differing only in having smaller eyes. If males are collected, they can be separated by the structure of the genitalia (see Trager, 1984) for details.

Some specimens have abundant, bristly, fine, semierect hairs, on the scape, and the few nearly erect, coarse hairs are slightly longer (nearly 0.05 mm in length) than those found in the “typical” *P. terricola*, and may represent an undescribed species.

Distribution. USA: throughout southern part of country, as far north as South Dakota, south into México. NM: **Catron Co.**, Mogollon Mts., **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, 3 m W Animas, Rodeo, **Los Alamos Co.**, Rio Grande, **Sierra Co.**, 4 k W Hillsboro, other unspecified localities in Trager (1984); MEXICO: Chihuahua.

Habitat. Open disturbed areas, grasslands, mesquite shrubland, pinyon woodland, sagebrush (1770m elevation), post-oak woodlands, areas adjacent to forests, or even in dense, mesic woodlands.

Biology. This species nests under stones, logs or cow dung, or in the soil. Alates overwinter in the nest, and fly early in the spring.

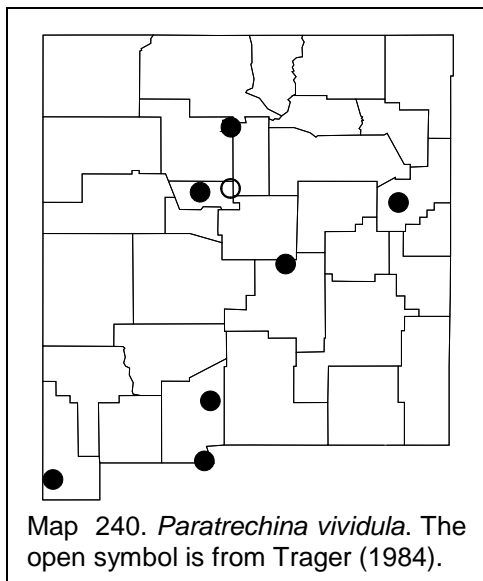
DuBois and Danoff-Burg, 1994, Trager, 1984

***Paratrechina vividula* (Nylander)**

Discussion. This is a weakly bicolored, shiny species (head and gaster yellowish-brown to nearly black, mesosoma and appendages yellow to dark reddish-brown). The pubescence on the head is mostly limited to

the posterior half. The scape has a few erect hairs. The workers of this species are nearly impossible to separate from those of *P. terricola*. They differ in having slightly larger eyes and the sides of the head are straighter. If males are available, they series may be identifiable on the basis of the genitalia (see Trager, 1984, for details).

Distribution. USA: Southern part of country as far north as northern California and



Kansas. NM: **Bernalillo Co.**, NE Albuquerque, **Doña Ana Co.**, 45 k NE Las Cruces (Long Term Ecological Research site), **Hidalgo Co.**, Clanton Draw, **Lincoln Co.**, Corona, **Quay Co.**, 7 mi S Quay, unspecified locality in Trager (1984, apparently **Los Alamos Co.**); MEXICO: Chihuahua.

Habitat. Open, disturbed areas, urban habitats, greenhouses, and grasslands in the Chihuahuan Desert.

Biology. These ants nest in the soil, often under a stone. Brood was present in April and July. Alates were present throughout the year and fly on any warm day with high humidity. Most flights occur from May to October, between 18:00 and 22:00. Females are attracted to lights, even though flights occur during daylight.

Trager, 1984

Genus *Polyergus*

(Key: ____)

This genus is rarely collected in New Mexico. Workers are easily recognized by the long, slender mandibles (Fig.). Other characters would include monomorphic workers, antennal fossa close to or touching posterior edge of clypeus, Ocelli are distinct, the eyes are well developed, and the thick petiole (Fig.). It differs from other from other genera in that it has a four-segmented maxillary palp and a 2 segmented

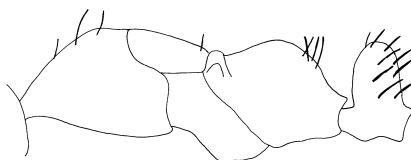


Fig. 452. Mesosoma of a worker of *P. breviceps*.

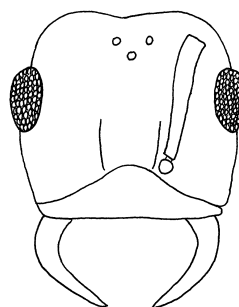


Fig. 451. Head of a worker of *P. breviceps*.

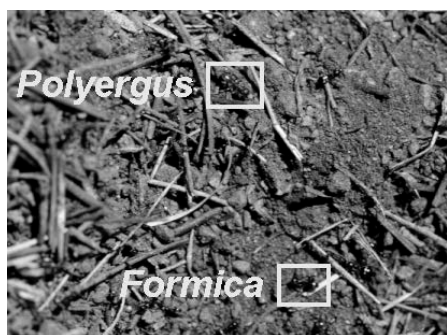


Fig. 453. Mixed nest of *Polyergus* and a species of *Formica* of the *rufa* group.

labial palp.

Workers invade the nests of ants of the subgenera *Formica* and

Neoformica, where they eat part of the brood and take the remainder back to the nest to serve as slaves.

(Key: Smith 1947:150, Creighton, 1950; taxonomy: Wheeler, 1968)

This genus is not commonly collected in the state. These ants enslave species of the genus *Formica*. Cole (1954c) discusses the distribution of the genus in New Mexico.

Key to the workers of the genus *Polyergus*

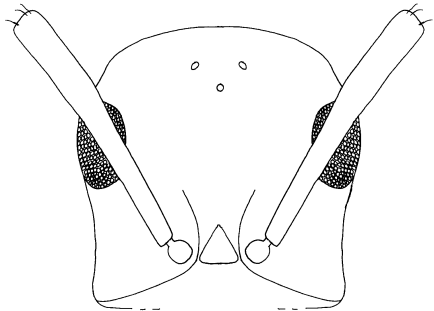


Fig. 454. Head of a worker of *P. lucidus*.

1. Antennal scapes reaching or surpassing occipital border; gastral pubescence dilute, surface shining ***lucidus* Mayr**
 - Antennal scapes not reaching occipital border; gastral pubescence dense, giving surface a grayish sheen ***breviceps* Emery**

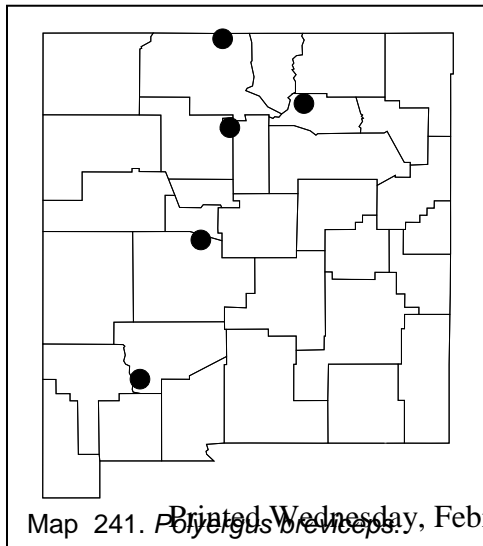
Polyergus breviceps Emery

Discussion. This species is the more common of the two species that occur in New Mexico. It can be easily recognized by the short scapes.

Distribution. USA:

Throughout North America; NM: **Los Alamos Co.**, Los Alamos, 4 k N Los Alamos, **Mora Co.**, Coyote Creek State Park, **Rio Arriba Co.**, 4 k N Chama, **Sierra Co.**, 21 k SW Hillsboro, **Socorro Co.**, Sevilleta National Wildlife Refuge.

Habitat. Urban habitats, meadows, up to pine and aspen forests.

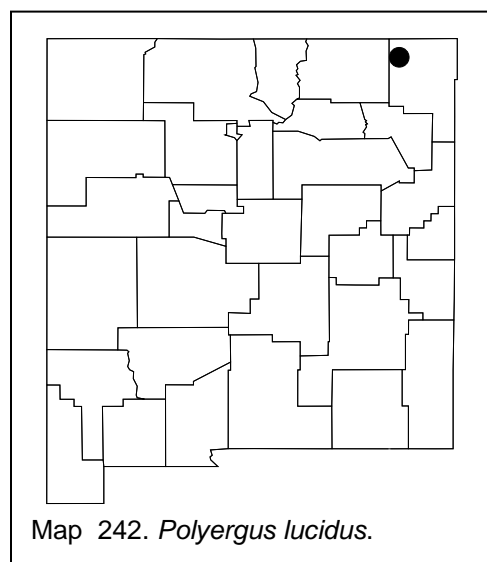


Map 241. *Polyergus breviceps*. Printed Wednesday, February 05, 2014, 4:17 PM

Biology. This species nests in logs or under stones and enslaves species of the genus *Formica* (*F. altipens*, *F. argentea*, *F. fusca*, *F. lepida*, *F. montana*, *F. neoclara*, *F. neorufibarbis*, *F. occulta*, *F. nitidiventris*, *F. podzolica*, *F. schaufussi schaufussi*, *F. subpolita*, and *F. subsericea*. A dealate female was collected in September. It is not commonly collected in the state.

Wheeler, 1910, 1916, Smith, 1928, Mallis, 1941, Wheeler and Wheeler, 1944 1963, Gregg, 1946, 1963, Hung, 1973, DuBois and Danoff-Burg, 1994

***Polyergus lucidus* Mayr**



Discussion. This species can be recognized by the elongate mandibles. It can be easily separated from *P. breviceps* by the elongate antennal scapes.

Distribution. USA: Eastern United States W to ND S to NM; NM: Union Co., Capulin Volcano National Monument.

Habitat. Meadows and woodlands.

Biology. This species nests under stones, and enslaves *F. lasioides*, *F. neogagates*, *F. nitidiventris* and *F. schaufussi*.

McCook, 1880, Burrill, 1908, Wheeler, 1910, Smith, 1934, Cole, 1954, Wheeler and Wheeler, 1963, Gregg, 1963, Talbot, 1967, 1968, Harman, 1968, Marlin, 1968, 1969, 1971

Genus *Prenolepis*

(Key: Wheeler 1930, Creighton 1950)

This is not a common genus in New Mexico. It can be easily recognized due to the constriction of the mesosoma, as can be best seen from above (Fig.). The scape is very long, extending past toe posterior

edge of the head by about one half of its length, fossa either touching the posterior edge of the clypeus or extremely close to it, the mesosoma is strongly constricted into two parts as mentioned above (Fig.), This genus is similar to *Paratrechina*, but can be easily distinguished by the strongly constricted mesosoma and by the lack of course, erect, dark hairs.

This genus is usually found nesting under stones in mesic lowland sites. Workers tend Homoptera and feed on liquids from decaying fruit. They are often found foraging during the coolest time of the year (Tschinkel, 1987), even when the ground is frozen and the air temperature is below 0°C. Repletes are often found in the nests, and ants with somewhat enlarged gasters are common. Mating flights often occur early in the year when it is still cool, in March and April.

***Prenolepis imparis* (Say)**

Discussion. This species can be easily recognized by the narrowed region in the middle of the mesosoma, and can be seen by looking at the mesosoma in profile and from the top. No other species in New Mexico has such a mesosoma.

There are currently 5 subspecies of *P. imparis*, 3 of which (*P. imparis imparis*, *P. imparis arizonica*, and *P. imparis coloradensis*) occur in the United States and 2 (*P. imparis colimana* and *P. imparis veracruzensis*) which occur in México. It is doubtful that the subspecies in the United States are valid taxa. The separation of *P. arizonica* on the basis of the concavity of the apex of the petiole is doubtful, due to the variability among individuals of a nest series, and as *P. imparis imparis* from eastern United States, often have this notch. The separation of *P. imparis coloradensis* on the basis of the shape of the propodeum (see Creighton, 1950:413) is also a character with considerable variation. All of the remaining subspecies of *P. imparis* must be looked at carefully to determine the status of this taxon. For the present time, both subspecies that occur in New Mexico will continue to be recognized, and can be separated with the following key:

Key to the subspecies of workers of *Prenolepis imparis* in New Mexico

1. Apex of the petiole distinctly concave in the middle, the concavity approximately 2/3 as wide as the greatest width of the apex

***imparis arizonica* Wheeler**

- Apex of petiole flat, or if feebly concave, the concavity is only about 1/2 width of apex ***imparis coloradensis* Wheeler**

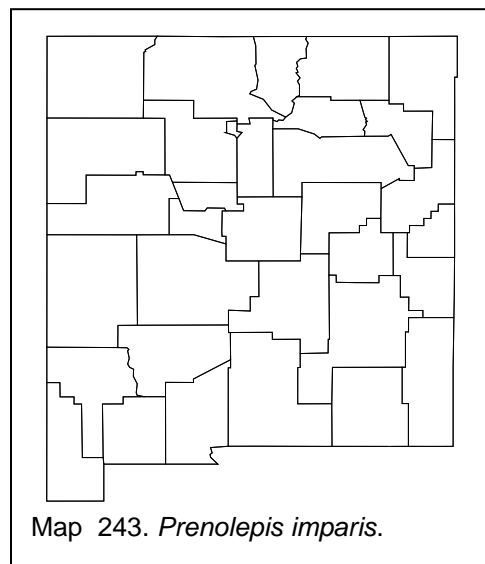
The subspecies *Prenolepis imparis arizonica* Wheeler can be recognized as the apex of the petiole is distinctly concave in the majority of the workers in a series. There is a considerable amount of variability in this character, even among workers from a single nest series. Creighton (1950) also mentions that the sides of the head are almost straight and the mesosoma is especially stout, especially at the mesonotal "waist".

The subspecies *Prenolepis imparis coloradensis* Wheeler can be recognized by the lack of a concavity on the apex of the petiole. It is doubtful that this subspecies is distinct from *P. imparis arizonica*.

Distribution. USA: NM: USA: AZ, CO, NM: **Bernalillo Co.**, near Albuquerque (Ciéneja Canyon, Cimarron Canyon), Sandia Mts., **Catron Co.**, (Mogollon Mts.) near Snow Lake, **Colfax Co.**, 41 k E Eagle Nest, **Grant Co.**, (Gila Mts.) Iron Creek, 5 m N Pinos Altos, near Snow Lake, **Lincoln Co.**, Sacramento Mts. (2 mi W Alto, 2 mi SE Alto, 5 m E Red Cloud Campground), Mescalero, **Sandoval Co.**, Bandelier National Monument; MEXICO: Chihuahua.

Habitat. Grasslands and forested areas, including juniper woodlands (with cholla), forests of silver leaf oak, white oak, Chihuahua pine, ponderosa pine, Douglas fir.

Biology. This species nests in the soil, with simply a hole or with a small mound, occasionally it nests under stones, in loam soils with rocks. Brood was found in nests in June to August, reproductives from March to June and in August. Winter active species Tschinkel???. It is apparently polygynous as up to four dealate females were found in a single nest. One colony was



Map 243. *Prenolepis imparis*.

nesting under a stone together with *Formica podzolica*. The two species were completely mixed, including the brood of the two species.

Smith, 1924, 1928, 1965, Dennis, 1941, Talbot, 1943, 1943, Gregg 1963, Tarpley, 1965, DuBois and Danoff-Burg, 1994

BIOGEOGRAPHY OF ANTS IN NEW MEXICO

see DuBois and Danoff-Burg 1994 # 13476

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GLOSSARY

Acidopore - orifice at the end of the gaster which is used by ants of the subfamily Formicinae to spray formic acid, among other uses.

Alitrunk - same as mesosoma.

Ammochaetae - see psammophore.

Angle - dull spine or triangular projection.

Antenna - One of the pair of appendages on the dorsum of the head. This appendage consists of the basal most segment, the scape and several distal segments, the funiculus. (Antennae is plural form)

Apical - section of structure farthest from body.

Appressed - refers to hairs, which form an angle of less than 30° with body surface, usually laying on the body surface.

Articulation - area where two sections of the body unite and where they are movable. An example would be the union of the antenna and the head.

Basal border - edge of mandible which is located under the clypeus when the mandibles are closed.

Bicarinate - with two carinae, for example the clypeus of some ant species, in which two small teeth often extend from the carinae anteriorly from the medial border.

Buccal cavity - the mouth cavity.

Carina - a ridge in the sculpture of an ant. (Carinae is plural form)

Caste - a form of an adult ant, for example worker, soldier, female, male.

Cheek - same as the genae

Claustral - Type of nest formation in which a single female digs a nest and later plugs the entrance before egg laying.

Club - Enlarged apical segment or segments of the funiculus, which form a distinct mass separated from the remainder of the funiculus.

Clypeus - a sclerite of the head located between the frons and labrum, above and posterior to the mandibles.

Colony - a single unit, consisting of a reproducing female (queen) and workers. Other castes, such as soldiers, winged females and winged males, together with brood, may occur in the nest.

Connule - lateral tooth or projection on the sides of the postpetiole, common in *Pheidole*. connule

Cordate - heart shaped.

Coriaceous - leather-like sculpture.

Coronula - circle of hairs located around the acidopore.

Cotype - one of the specimens chosen to represent a species by the individual who originally described the species.

Coxa - basal segment of leg.

Crenulate - scalloped with small, blunt teeth.

Denticle - small tooth.

Denticulate - covered with small teeth or spines.

Dimorphic - Refers to a situation in which workers are of two sizes or forms. For example, most ants of the genus *Pheidole* are in the form of small workers and large headed soldiers. See monomorphic and polymorphic.

Distal - section of an appendage farthest from the to body.

Dorsal - top of structure.

Dorsum - referring to the top of structure.

Ecarinate - lacking carina or ridge.

Edentate - without teeth.

Emarginate - notched.

Epigaeic - Active on soil surface. (See hypogaeic).

Epinotum - Old term for propodeum.

Epistome - Old term for clypeus.

Erect - refers to hairs ,which are at or close to a 90° angle with the surface. See suberect, subappressed and appressed.

Ergatogyne - individual intermediate between a worker and a female.

Extensor surface of leg - outer surface.

Female - reproductive individual in the nest, or the queen, or winged individuals that are capable of reproduction after mating. Although workers and soldiers are also female, they are not referred to as the female.

Femur - Third segment of the leg, located between the trochanter and the tibia.

Fenestra - circle in the integument located in the ventral part of the petiole of ants in the genus *Ponera*. The integument is so thin in the area that it allows the transmission of light, similar to a window.

Flexor surface of leg - posterior surface.

Flexuous - refers to hairs, which are long and curved.

Fossa - The concavity where the base of the scape articulates with the head. (Fossae is plural form).

Foveolate - sculpture of holes or round depressions.

Frons - section of the head located between the frontal area and the region of the median ocellus.

Frontal area - small triangular area located between the frontal carinae and posterior to the clypeus.

Frontal carinae - longitudinal ridges on the inner side of the insertion of the antenna.

Frontal lobe - platelike extension of the frontal carina above the insertion of the antenna.

Foramen - hole, such as at the posterior of the head where it attaches to the mesosoma (occipital foramen).

Funiculus - The remainder of the antenna distal to the first segment or scape.

Gaster - the section of the abdomen posterior to the petiole of the postpetiole in those subfamilies that have one. Actually composed of the third or fourth segment of the abdomen posterior to the end of the abdomen.

Gena - part of the head on each side, below (anterior to) the eyes.

Granulose - form of sculpture in which the surface resembles sandpaper.

Gula - ventral surface of the head behind the labium, extending to the occipital foramen and bounded laterally by the malar area.

Gyne - female or queen.

Haplodiploid - method of reproduction in which the determination of sex is due to the number of chromosomes, the male is haploid, the female is diploid. This form of sexual determination occurs in ants and other Hymenoptera.

Holotype - a single specimen selected by the authority who described a species to represent the species. It is considered to be the true form of the species.

Humeral angles - anterolateral corners of the pronotum.

Hypogaecic - subterranean.

Inquiline - a species which lives in the nest of an ant species, usually doing no harm other than consuming food from ant workers.

Insertion - The place where the antenna connects to the head.

Labial palp - one of the two elongated appendages located in the mouth region. This palp is shorter than the maxillary palp and is often composed of 4 segments.

Labium - One of the mouthparts, the second maxilla, forms the floor of the buccal cavity.

Labrum - One of the mouthparts located immediately below the clypeus, which covers the base of the mandibles and forms the roof of the buccal cavity.

Lectotype - a single specimen chosen by a reviewer of a group, to represent a species. It is selected from a series of 2 or more cotypes, which were named by the individual who originally described the species.

Lestobiosis - situation in which a species of tiny ants lives in the walls of the nest of a larger species and steals food from the larger ants.

Lobe - rounded structure, for example when the frontal carinae are rounded and cover the insertion of the antennae or the posterior lateral corners of the head (occipital lobe).

Major - Largest worker (see minor).

Malar area - region between the base of the mandible and the compound eye, along the side of the head.

Male - the masculine caste in an ant nest. These members normally have wings and mating with females is their only function, after which they die. They play no other role in the nest, such as excavation, caring for brood, foraging etc. Those of many species are not even able to feed themselves. These individuals have only one set of chromosomes, see haplodiploidy.

Mandibles - the jaws, or first pair of appendages, located in the head anterior to the buccal cavity.

Marginate - bounded by an elevated border.

Masticatory border - surface of mandible with teeth.

Maxilla - one of the mouthparts, located immediately behind or under the mandibles (pleural is maxillae).

Maxillary palp - one of the two elongated appendages located in the region of the mouth. This palp is longer than the labial palp and is often composed of 6 segments.

Mesonotum - the dorsum of the second section of the mesosoma.

Mesopleuron - the side of the mesonotum.

Mesopropodeal suture - suture separating the mesonotum from the propodeum.

Mesosoma - middle region of the ant's body, consisting of the thorax and the propodeum, or first segment of the abdomen. It cannot be called thorax as it is a compound structure. Also referred to as alitrunk, especially in winged ants.

Metapleuron - the region on the side of the propodeum.

Metapleural lobe - rounded structures on the metapleuron adjacent to the point of insertion of the peduncle of the petiole.

Minim - smallest worker in a dimorphic or polymorphic species, or one of the first, small workers to appear as a result of the formation of a new nest.

Minor - smallest worker (see major).

Monogynous - species in which there are several queens or reproducing individuals, in a single nest.

Monomorphic - refers to a situation in which all of the workers of a species are of a single size or form. See dimorphic and polymorphic.

Myrmecology - the study of ants.

Myrmecologist - ant specialist.

Nanitic - small worker that is a member of a new nest. Later the workers will be normal sized as in other colonies.

Nest - often synonymous with colony, but may be simply a satellite group of ants, which are part of a larger colony.

Node - the dorsal section of the petiole, which is somewhat differentiated from the remainder of the petiole.

Nuptial flight - a situation found in most species of ants in which individuals of both sexes fly from the nest and either mate in the air or mate on the ground some distance from the nest,

Ocellus - one of the small, single faceted eyes located near the posterior border of the head in workers of a few genera of ants and in females and males of most genera of ants.

Occipital lobe - prominent posterolateral corner of the head in some genera of ants.

Occipital corners - the posterolateral areas of the head.

Occipital lobes - same as occipital corner, but usually refers to well developed structures which are separated by a deep depression, such as the lobes of the head of soldiers of *Pheidole*.

Ommatidium - a single ocular unit of the compound eye of an insect (plural form is ommatidia).

Palp - a segmented appendage located either on the maxilla or labium.

Parabiosis - situation in which two species of ants live together in a single colony, but maintain their brood separately.

Paratype - one of the specimens chosen to represent a species by the individual who originally describes a species (see holotype).

Pectinate - refers to a situation in which a structure has a row of tiny teeth or spines. This occurs on the tibial spurs of many genera of ants and on the tarsal claws of *Leptogenys*.

Pedicel - One or two segments of the abdomen, which are called the petiole and the postpetiole. Actually they are the second and third segments of the abdomen, the first being the propodeum. Also refers to the second segment of the antennae, part of the funiculus, and attached to the remaining segments of the antenna.

Peduncle - anterior portion of the petiole which is long and stalklike in some genera of ants. The peduncle articulates with the mesosoma.

Petiole - the single segment of the pedicel or the anterior segment in subfamilies that have two segments in the pedicel. It is actually the second segment of the abdomen.

Pheromone - a chemical substance used for communication between members of a species. Common examples would include the alarm pheromone which alerts others to a threat, trail pheromone, which attracts and guides workers to a food site, and the sexual pheromone which serves to attract males to females.

Piligerous - bearing hair.

Pleometrosis - situation in which two or more females participate in the formation of the same initial nest. They may continue to coexist or may fight and be reduced to a single female at a later time after the nest is well established.

Pleural - lateral section of a body part.

Polydomous - refers to a species in which a single colony occupies several nesting sites.

Polyethism - division of labor in workers. It can be based on age (younger workers responsible for nest activities, older ants responsible for foraging), or size

Polygynous - two or more reproducing females in a single nest. In a situation in which a single male mates with several females, it is simply referred to as multiple mating.

Polymorphic - refers to a situation in which ant workers are of several sizes or forms. See monomorphic and dimorphic.

Porcate - sculpture that consists of longitudinal and parallel raised lines.

Postpetiole - the second segment of the pedicel of ants which have a two segmented pedicel. It is actually the third abdominal segment.

Promesonotal suture - suture located between the pronotum and the mesonotum.

Pronotum - The dorsum of the first section of the mesosoma.

Propodeum - The posterior most part of the mesosoma, which is actually the first segment of the abdomen which has become fused with the thorax in ants and most other Hymenoptera. Two parts are extremely important for the identification of ants: the basal face or the dorsal surface, and the declining face, or the posterior, usually vertical surface.

Prothorax - first segment of mesosoma.

Protuberance - protruding bump on the surface.

Proximal - section closest to body, i.e. of an appendage (see distal).

Pruinose - covered with fine silvery hairs, giving the surface a frosted appearance.

Psammophore - a beard of long hairs located at the underside of the head. This is commonly found in desert ants, especially those that live in sandy areas. The ants use it to carry "baskets" of small sand grains during excavation.

Pubescence - short, usually fine, appressed hairs covering a specific area of the body surface.

Punctate - sculpture marked by small, round depressions.

Pygidium - dorsal surface of the last exposed gastral segment.

Queen - egg laying female in nest.

Queenright - Colony with a queen, usually used to refer to a laboratory colony.

Replete - an inactive worker with a greatly distended gaster which is used for food storage. Occurs in *Myrmecocystus* and *Prenolepis*.

Reticulate - net-like sculpture,

Rugae - wrinkles on the surface of a specific structure. (ruga is singular).

Rugulae - small wrinkles.

Rugulose - with small wrinkles.

Scale - refers to a rudimentary, forward angled petiole in some genera of ants (i.e. *Tapinoma*).

Scape - The first segment of the antenna, which is elongated in ant workers.

Scrobe - a groove on the dorsum of the head which serves for the reception of the antennal scape.

Sculpture - the pattern of elevated and impressed surfaces on an ant.

Soldier - a worker ant, which is much larger than normal workers and often has an enlarged head. Often their function is not that of a soldier. For example, soldiers of *Pheidole* are often the first to hide and workers are more involved in defense of the nest. The function of the soldiers in this genus may be to break larger seeds.

Spatulate - spoon shaped.

Spine - a thornlike outgrowth of the body.

Spur - Stiff, sharp projection located on the distal surface of the tibia.

Sting - spinelike organ located at the apex of the gaster and is used for defense in ant workers.

Sternum - ventral section of a structure, especially of the mesosoma.

Stria - fine raised line on the surface of specimen. Pleural is striae.

Striate - possessing striae.

Stridulation - production of sound produced by friction between two body parts. Used for communication, especially when a worker alerts others that she is buried.

Subappressed - refers to hairs, which are about 45° with the body surface.

Subequal - almost equal in length or size to another structure.

Suberect - not quite upright, at between 44 -90°.

Subopaque - nearly opaque but with a slight luster.

Sulcus - a furrow or groove.

Suture - a elongate depression, usually located at the juncture of two body sections.

Tarsus - The ultimate part of the leg, consisting of several segments and two tarsal claws.

Tergum - dorsum of each segment, usually refers to the gaster.

Tergite - dorsum of a segment, usually used when only 1 sclerite is involved.

Thorax - the generalized middle section of an insect. In ants, it is referred to as either the mesosoma or alitrunk, and includes the propodeum, which is actually the first segment of the abdomen. Thus it should not be referred to as the thorax.

Trophallaxis - the interchange of food between individual ants. These liquids are stored in the crop, which is located inside the gaster.

Type - a specimen chosen to represent a species. It could be any of a number of forms, including holotype, paratype and lectotype, among many others.

Type locality - location where the specimen or series were collected, which were used to describe the species.

Ventral - refers to the underside of a structure.

Voucher specimen - a specimen (usually a series of several specimens) which is (are) deposited in a museum, as part of an ecological, behavioral or other study. It can be referred to if there is any question concerning the identity of the specimens that were studied. The deposition of voucher specimens is an important part of any scientific investigation.

Worker - a normally non-reproductive member of the colony which is responsible for the normal nest activity such as nest excavation, foraging, brood care, etc.

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MacKay

Species: _____ Field # _____
Locality: _____

Latitude: _____° _____' _____", Longitude _____° _____' _____"
Date: _____ Time: _____ Elevation _____m Satellites _____ PDOP _____

☐ **1. NEST:** (marked box indicates more information on back)
- Soil only, Mound, Pebbles, Thatch, Diameter _____ cm.
- Rock (Size _____)
- In/Under Log (Stage _____), Stump, in Soil or _____
- In Trunk, Branch, Hollow Twig, Stem, Thorn, Gall or _____
- Manure (cow or _____), stage of decomposition: _____
- Misc: Loose Ground, Vegetation, Blacklight (Time: _____)
- Other: _____

☐ **2. ACTIVITY:** _____ ants out of nest, very active, active, normal, sluggish, immobile or _____

☐ **3. BEHAVIOR:** Aggressive, hide, individual, group forager.

☐ **4. POPULATION:** eggs, larvae, pupae, females, males, guests.

☐ **5. FOOD:** seeds, insects, Homoptera or _____

☐ **6. ABUNDANCE** of species at site _____

☐ **7. POSITION** of nest: Level, SFS, NFS, EFS, WFS or _____

See Number _____ if the following is not completed.

☐ **8. VEGETATION:**

Type _____

Abundance: heavy, average, sparse. Other Notes: _____

☐ **9. CLIMATE:** sky overcast _____%, RH _____

Wind _____ Other _____

Temperatures:

Site _____, _____°C Site _____, _____°C

Site _____, _____°C Site _____, _____°C

☐ **10. SOIL:** Texture _____

Color _____ Drainage _____

Moisture _____ Organic Content _____

☐ **11. OTHER:** _____

_____ pinned;
few, some,
many or
_____ in

ROH,
including _____
females and
_____ males

Fig. 455. Main field notebook page.

MacKay

Locality: _____

Field # _____

Latitude: _____° _____' _____" Longitude _____° _____' _____"

Date: _____ Time: _____ Elevation _____ m PDOP _____

BL = blacklight, L=log, LG=loose on ground, LV=loose of veg. M= under/in manure, R=under rock, S=nest in soil, St=nest in stump, T = nest in twig, Tr = nest in tree, trunk or branch of tree
 A=aggressive, H=Hide, * = ** =

Number	nest site	Position	brood	reproductives	behavior	see back	Species
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	1	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	2	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	3	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	4	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	5	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	6	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	7	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	8	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	9	_____ pinned; few, some, many or _____ ROH
	R S LG LV M St T L Tr Bl	LEVEL SFS NFS EFS WFS	e l p c	f m	A H	10	_____ pinned; few, some, many or _____ ROH

Fig. 456. Secondary field notebook page.

FIELD TRIP SUPPLIES AND EQUIPMENT

ESSENTIAL:

sleeping bag / ground cloth	Money (amount?)
flashlight (extra bulb, batteries)	prescription drugs
jacket (or coat, gloves)	notebook / pen / pencil
long sleeve shirt / t-shirt	field books
toilet paper, shovel	boots
	food, water, ice, fuel

OTHER:

hat / sunglasses	shorts / cut - offs
pocket knife	socks / underwear
suntan lotion	long pants
towel / washcloth	pillow / extra blankets
canteen	camera, film
soap / toothbrush etc.	first aid kit / snake kit

POSSIBILITIES:

extra shoes	utensils, cup
binocs	visa, identification
vials, bottles	novel / magazine / chair
collecting equipment	swim suit
(tapes, frames, meter sticks)	tent, stoves, lanterns
(picks, trowels, calculator)	snacks, drinks, matches

Fig. 457. Check list of field trip supplies.

10/21/98 259 pages Sprint
imported into word, double spaced, 293 pp
single spaced 233 pages
cleaned up, single spaced 147 pages
wider margins 216 pages
starting figures, about 185 pages
full sized 123 pages
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10/27/1999 291 pp.
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December 4 pages, -2 figs

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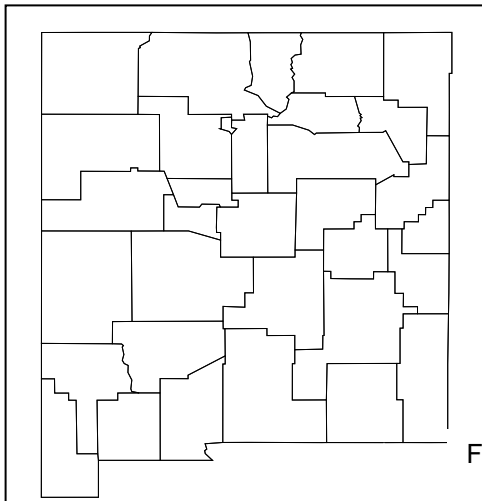
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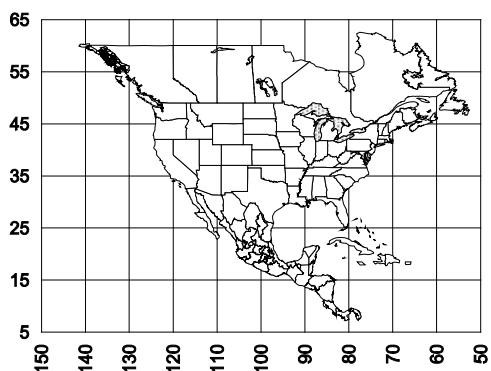
Fig. 458

Map 244. *L. carinatus*.

XX XX XX

Discussion. ###

Distribution.: % % %



Map 1. Distribution of *C. xx*.

Habitat. ^^^

Biology. &&&