

A New Species of *Veromessor* from the Nevada Test Site and Notes on Related Species (Hymenoptera: Formicidae)¹

ARTHUR C. COLE

Department of Zoology and Entomology, University of Tennessee, Knoxville

ABSTRACT

Four species of *Veromessor* are known from the Nevada test site, namely *pergandei* Emery, *lariversi* M. R. Smith, *lobognathus* (Andrews), and *smithi*, n. sp. The new species is described from all three castes, the

sexual castes of *lariversi* and *lobognathus* are described, the four species are keyed, and essential features of the workers and males are figured.

During the summer of 1962 I had an opportunity to study the ants of the U. S. Atomic Energy Commission's Nevada test site, Mercury, Nevada. The present paper has been prepared to validate the name of a new species of *Veromessor* and to com-

pare it with other species, to which it is closely related, that inhabit the site. A detailed account of the ants of the site is in preparation and will be published later.

Veromessor smithi, new species

Holotype.—Worker.

Overall length 6.85 mm; head length 1.53 mm; head width 1.50 mm; cephalic index (head width x

¹This investigation was supported by U. S. Atomic Energy Commission Contract No AT (11-1) 786 (CETO Project CEP 59.6) under the direction of Brigham Young University. Accepted for publication October 1, 1962.

100/head length) 98; scape length 1.43 mm; scape index (scape length \times 100/head width) 95; ocular index (eye length \times 100/head length) 31; thoracic length 2.31 mm; petiole length 0.75 mm; petiolar node length 0.24 mm; petiolar node width 0.29 mm; postpetiole length 0.56 mm; postpetiolar node length 0.43 mm; postpetiolar node width 0.46 mm; gaster length 1.70 mm.

Head length and width subequal, a little narrower in front of than behind the eyes, posterior border weakly and broadly concave, posterior corners well defined. Antennal scape extending distinctly beyond occipital border, its base flattened, dilated laterally, and broader than its apex. Eye large, strongly convex, without a sharp anteroventral angle, placed at approximately its greatest diameter from base of mandible. Clypeal border without a median tooth.

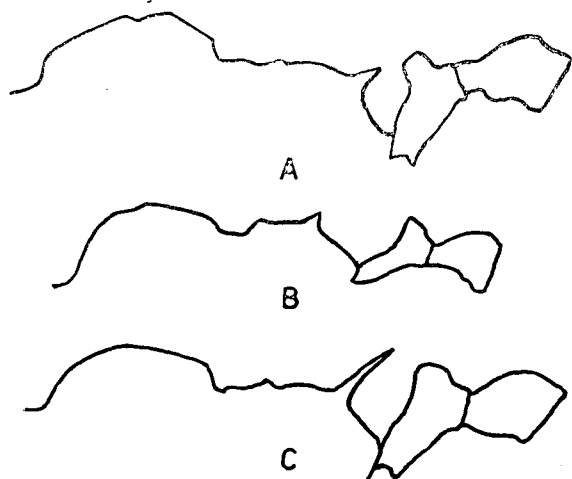


FIG. 1.—Thoracic, petiolar, and postpetiolar contours of worker; A, *Veromessor smithi*, n. sp.; B, *V. lariversi* M. R. Smith; C, *V. lobognathus* (Andrews).

Thorax, in profile, as shown in figure 1A. Promesonotum strongly convex, promesonotal impression distinct, posterior declivity of mesonotum steep and making a strongly rounded angle with the well defined mesoepinotal impression. Anterior margin of epinotum elevated as a transverse carina which appears, in profile, as a short tooth; base of epinotum faintly convex and meeting the steep posterior declivity at a pronounced angle; epinotal spines moderately long, triangular and sharp, the interspinal distance basally subequal to the spine length. Petiolar node thick, its height a little less than its greatest breadth, its declivities steep, anterior declivity meeting the peduncle at a broadly rounded concavity, posterior declivity meeting posterior surface of node at a sharp angle, apex broadly and rather evenly convex, not acute; peduncle with a well-defined ventral lamella and a weakly developed tooth. Anterior declivity of postpetiolar node long and slightly convex, posterior declivity very short.

Frontal region of head with rather strong, moderately coarse, longitudinal rugae which become

wavy as they diverge toward (but do not enter) the posterior corners; rugae bordering antennal fossae longitudinal; interrugal spaces and the mid-vertex beyond the divergent median rugae densely and finely punctate and rather shining; posterior corners of head smooth, strongly shining, faintly shagreened; clypeus smooth and highly polished, faintly shagreened, without rugae. Promesonotum coarsely rugo-reticulate, pronotal rugae transverse, those elsewhere longitudinal; rugae on epinotum and in mesoepinotal impression extremely coarse, wavy, and widely spaced; epinotal spines and infraspinal facet smooth, faintly shagreened, strongly shining. Petiole and postpetiole densely and finely punctate and subopaque. Gaster strongly shining, very obscurely shagreened. Size and pattern of hairs not definitive.

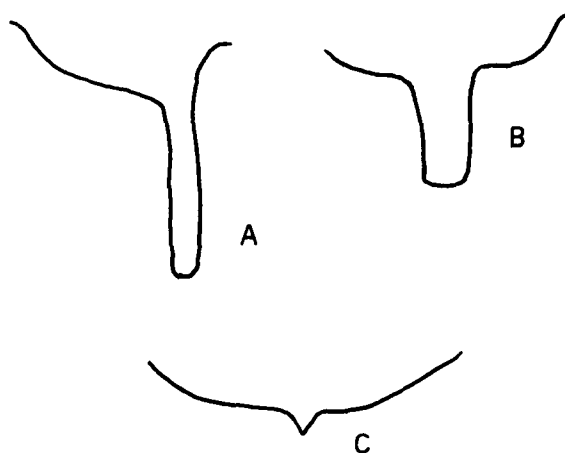


FIG. 2.—Shape of midventral protuberance between middle and hind coxae of male: A, *Veromessor smithi*, n. sp.; B, *V. lariversi* M. R. Smith; C, *V. lobognathus* (Andrews).

Head, thorax, petiole, and postpetiole a rather uniform medium reddish brown; appendages slightly lighter.

Paratype.—Male.

Readily distinguished from the known males of other species of *Veromessor* by the following combination of characters:

Epinotum unarmed; midventral process between middle and hind coxae well developed, slender, and rather long (fig. 2A); rugae on occipital corners of head sparse and fine; pronotum shagreened; petiolar and postpetiolar contour as shown in figure 3A; apex of petiolar node broadly convex; ventral lamella of petiolar peduncle well developed and with a prominent tooth; body length 5.44 mm; thorax, petiole, and postpetiole light yellowish brown, head and gaster darker.

Paratype.—Alate female.

Differing from known females of other species of *Veromessor* by the following combination of characters:

Eye large (ocular index 33), its length distinctly

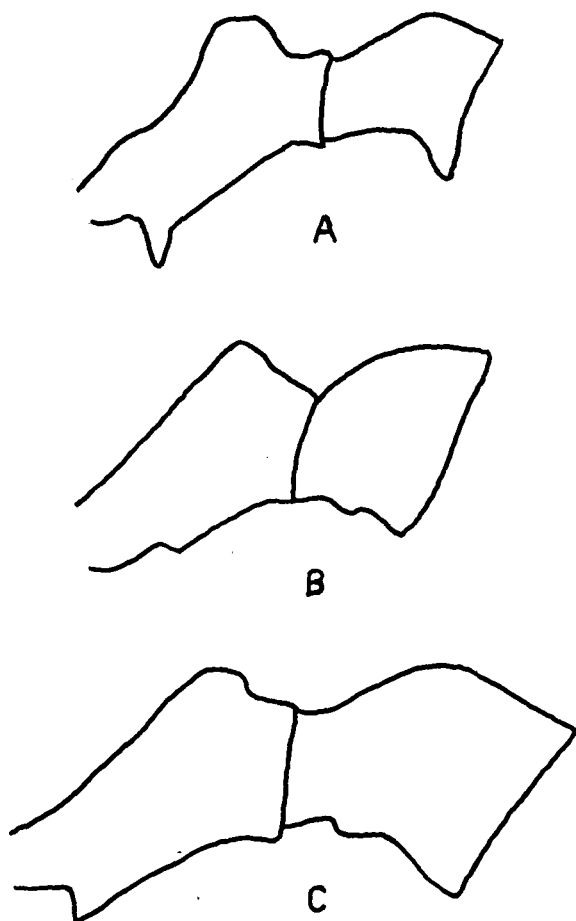


FIG. 3.—Petiolar and postpetiolar contours of male: A, *Veromessor smithi*, n. sp.; B, *V. lariversi* M. R. Smith; C, *V. lobognathus* (Andrews).

greater than distance from posterior margin of eye to occipital margin of head; cephalic index 102; scape index 87; base of antennal scape flattened, dilated laterally, broader than apex; sculpture of occipital corners distinct, consisting of rugulae and fine punctures; rugae around antennal fossae not concentric; apex of petiolar node broadly convex; ventral lamella of petiolar peduncle strong, its anterior margin meeting the peduncle at nearly a right angle; body subopaque and of a rather uniform medium reddish brown, its length 7.29 mm.

Type locality.—Nevada test site (Area 12 desert), Mercury, Nye Co. Nevada, July 15, 1962. Described from the holotype and numerous paratypic workers, males, and alate females, all bearing Cole Coll. No. Nev-721; also from numerous paratypic workers, males, and females, from the same locality, bearing Cole Coll. Nos. Nev-722 to 757, inclusive. Nest Nev-721 was in open sandy desert of mixed vegetation, at an elevation of 3,300 ft., and was surmounted by a circular sand crater about 5 in. in diameter.

Variation in paratype series.—There are slight

differences in the size of workers (length 6.03-7.21 mm), males (length 5.22-5.55 mm), and females (length 7.00-7.69 mm) and in the degree of development of the epinotal spines, the peduncular lamella and spine, and the midventral process between the middle and hind coxae (males).

Affinities.—The new species is closely related to both *V. lobognathus* (Andrews) and *lariversi* M. R. Smith and more remotely to *pergandei* Emery. At the test site, it is sympatric with and even occupies the same stations as *lariversi*. Indeed, some of the nests that I observed were no more than 5 feet apart. The affinities are apparent in the descriptions and the key which appear later in this paper.

Disposition of type material.—Long series of paratypic workers, males, and females will be deposited in the U. S. National Museum, where Dr. M. R. Smith, after whom the new species is affectionately named, has spent so many dedicated years in a meticulous study of ants; in the Museum of Comparative Zoology (Harvard); in the American Museum of Natural History; and in the collections of Dr. W. S. Creighton, Dr. R. E. Gregg, and Drs. G. C. and J. Wheeler. The holotype and the remaining paratypes will be consigned to my collection.

Descriptions of the sexual castes of two species of *Veromessor*, which also occur at the site, have not been published previously, with the exception of the queen of *lariversi* (Cole 1955); they are presented herewith.

Veromessor lariversi M. R. Smith

Male (Cole Coll. No. Nev-784).

Occipital corners of head with irregular striae as well as dense, fine punctures; epinotum armed with prominent angles; midventral process between middle and hind coxae prominent and robust (fig. 2B); apex of petiolar node subacute (fig. 3B); ventral lamella of petiolar peduncle very weak, the tooth absent; body rather uniformly black, its length 5.61 mm.

Female, alate (Cole Coll. No. Nev-784).

Eye large (ocular index 36), its length distinctly greater than distance from posterior margin of eye to occipital margin; cephalic index 99; scape index 86; base of antennal scape narrower than apex, not flattened; sculpture of occipital corners of head obscure, consisting largely of fine shagreening; rugae around antennal fossae concentric; scutum smooth and shining; apex of petiolar node very acute; ventral lamella of petiolar peduncle weak, the tooth absent. Body strongly shining, its color a deep and rather uniformly infuscated brown; length 6.58 - 6.72 mm.

Veromessor lobognathus (Andrews)

Male (Cole Coll. No. Nev-760).

Epinotum unarmed; contour of petiole and postpetiole as shown in figure 3C; apex of petiolar node broadly convex; mid-ventral process between middle and hind coxae weakly developed, a short acute

spine sometimes present (fig. 2C); occipital corners of head with numerous coarse rugae as well as striae and dense, fine punctures; ventral lamella of petiolar peduncle strongly developed and with a prominent tooth; body a rather uniform and very dark reddish brown, its length 6.27-6.31 mm.

Female, alate (Cole Coll. No. Nev-760).

Eyes small (ocular index 26); cephalic rugae very coarse, wavy, tending to form reticulations on vertex; base of antennal scape flattened, dilated laterally, broader than apex; scutum with prominent longitudinal rugae; apex of petiolar node rounded; spine on venter of petiolar peduncle well developed; body subopaque, rather uniform medium reddish brown, length 7.68-7.99 mm.

Discussion.—During my investigation at the site I was able to study all four species intensively. Common where it occurs and the dominant species of the *Larrea* plant community is *pergandei*, a diurnal species which is able to flourish under extremely xeric conditions. Long foraging trails were encountered during the intense heat of the July day. Although some colonies had suspended their activities, others nearby continued their forays without interruption. At no place did I find *pergandei* sympatric with *lobognathus*, *lariversi*, or the new species.

V. lariversi and the new species occurred together at several stations, but at one station I found only the new species. These stations were all in sandy desert with mixed vegetation. Nests were in open areas fully exposed to sunshine. Each nest was surmounted by one or two circular craters of sand and each crater contained a rather large, irregular entrance. Craters of the new species were about 5 in. in diameter, whereas those of *lariversi* were 3 in. or less in diameter. Galleries penetrated the loose upper layer of sand and led into chambers in the firmer sand beneath. The depth of a nest was less than 2 feet. In no case had the ants penetrated the hardpan layer. The new species is crepuscular in habits whereas *lariversi* is nocturnal. Although winged castes of both species were within the nests between July 4 and 27, those of the new species were much more numerous than were those of *lariversi*. Mating flights were not observed.

Entire colonies of *lariversi* and the new species were excavated. One such colony of *lariversi* consisted of 342 workers, 2 nest queens, 3 alate females, and no males. A colony of the new species comprised 275 workers, 1 nest queen, 27 alate females, and 97 males. Workers of neither species attempted to bite or sting; they scurried for cover when disturbed. Stored seeds found in chambers within some nests of both species attested to the ants' granivorous habits.

V. lobognathus inhabited only the higher areas of the site and was especially abundant on Rainier Mesa, at an elevation of approximately 7,000 ft.—some 3,500 ft. above the desert floor. On the mesa the ants nested beneath large, flat, and rather firmly

imbedded rocks in a radioactively disturbed area of pinyon-juniper and sagebrush. This area is much less xeric than the lowland desert and the soil is more gravelly and more compact than that at the stations occupied by *lariversi* and the new species. Some of the overlying stones were banked lightly along the periphery with gravel placed there by the ants. One rock had an adjoining gravel crater bearing a single central entrance.

Wheeler and Wheeler (1959) have given an excellent account of nests of *lobognathus* in southwestern North Dakota. My field data on colony strength, behavior, and nest structure corroborate theirs. This species is diurnal, but it suspends activity when soil surface temperatures become high. On Rainier Mesa I opened, studied, and collected from 47 nests of strong colonies. Although *lobognathus* has been called a rare species (Wheeler and Creighton 1934; Gregg 1955; Wheeler and Wheeler 1959), in favorable locations it is probably more common than we have supposed. I feel certain that I could have located more nests than those 47 which were excavated and 11 which I did not disturb.

On Rainier Mesa, *Pogonomyrmex salinus* Olsen and *V. lobognathus* nested at the same stations. This propinquity is of much interest to me because the nest of *lobognathus* that I found near Ely, Nevada, in 1954 (Gregg 1955) also was at a station inhabited by *salinus*. Furthermore, Wheeler and Wheeler (1959) report nests of *P. occidentalis* at the same station where they found *lobognathus* in North Dakota. I suspect we will learn in time of an even greater correlation between the distribution of *lobognathus* and that of these closely related species of *Pogonomyrmex*. As Gregg (1955) and Wheeler and Wheeler (1956) have clearly pointed out, there is a remarkable degree of superficial similarity between the appearance of *lobognathus* and *occidentalis*. This resemblance extends also to *salinus* which, without magnification, cannot be distinguished structurally from *occidentalis*, but which is specifically distinct.² The reader is referred to Gregg's (1955) interesting account of the distributional problem involving *lobognathus*.

There follows a key for the separation of the workers of *Veromessor* species at the Nevada test site:

1. Middle of anterior border of clypeus with a prominent projection; eye with a distinct anteroventral angle; color piceous brown to black; strongly polymorphic; forage in files.....*pergandei* Emery
- Middle of anterior border of clypeus without a projection; eye without a distinct anteroventral angle; color pale brownish yellow to deep ferruginous brown; not strongly polymorphic; forage singly..... 2
2. Head strongly, longitudinally, and rather evenly rugose, the rugae extending into the occipital region; eye small (ocular index 22), the distance from its posterior margin to the occipital

² Based upon my revisionary study of the genus *Pogonomyrmex* Mayr, which has been nearly completed.

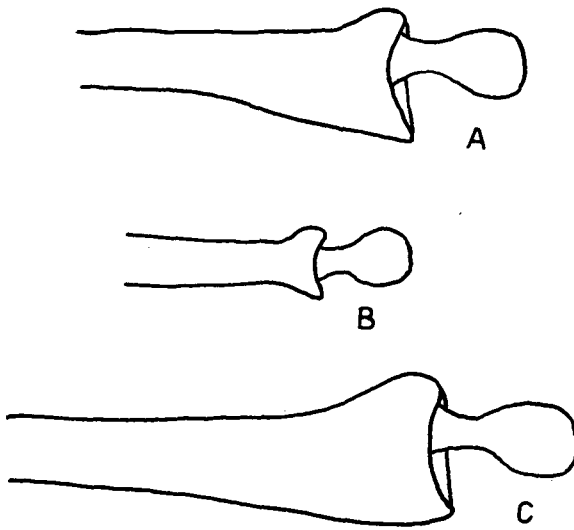


FIG. 4.—Base of antennal scape of worker: A, *Veromessor smithi*, n. sp.; B, *V. lariversi* M. R. Smith; C, *V. lobognathus* (Andrews).

margin greater than $1\frac{1}{2}$ times its maximum diameter; epinotal spines very long, about $1\frac{1}{2}$ times the distance between their bases; nests generally beneath stones in compact gravelly soil; diurnal; length 6.29–6.87 mm; (thoracic profile as shown in figure 1C; base of antennal scape flattened, broader than apex; color a rather uniform deep ferruginous brown).....*lobognathus* (Andrews)

Head not strongly rugose, the rugae not extending into the occipital region; eye large (ocular index, 30–31), the distance from its posterior margin to the occipital margin no greater than or notably less than $1\frac{1}{2}$ times its maximum diameter; epinotal spines shorter, no longer than the distance between their bases; nests in open and surmounted by craters; crepuscular or nocturnal; length 3.61–5.86 mm..... 3

3. Occipital region of head shining and faintly shagreened; rugae around antennal fossae concentric; maximum diameter of eye subequal to distance from posterior margin of eye to occipital margin; scape index 87; base of scape narrower than apex and not flattened, the dilation reduced, involving only the extreme base, and meeting the shaft at strong angles (fig. 4B); thoracic contour as shown in figure 1B; epinotal spines notably shorter than distance between their bases; apex of petiolar node acute; head, thorax, petiole, and postpetiole brownish yellow; gaster darker; length, 3.61–5.86 mm; nocturnal.....*lariversi* M. R. Smith
- Occipital region of head subopaque, densely and finely punctate; rugae around antennal fossae not concentric; distance from posterior margin of eye to occipital margin of head about $1\frac{1}{6}$ times maximum diameter of eye; scape index 96; base of scape flattened, broader than apex, the dilation involving more of the shaft and meeting it at weaker angles (fig. 4A); thoracic contour as shown in figure 1A; length of epinotal spines and their interbasal distance subequal; apex of petiolar node broadly convex; head, thorax, petiole, and postpetiole medium reddish brown, gaster slightly darker; length 5.70–5.86 mm; crepuscular.....*smithi*, n. sp.

REFERENCES CITED

- Cole, A. C. 1955. Studies of Nevada ants. 1. Notes on *Veromessor lariversi* M. R. Smith and a description of the queen (Hymenoptera: Formicidae). Jour. Tennessee Acad. Sci. 30: 51–52.
- Gregg, R. E. 1955. The rediscovery of *Veromessor lobognathus* (Andrews) (Hymenoptera: Formicidae). Psyche 62: 45–52.
- Wheeler, G. C., and J. Wheeler. 1956. *Veromessor lobognathus* in North Dakota (Hymenoptera: Formicidae). Psyche 63: 140–5.
1959. *Veromessor lobognathus*: second note (Hymenoptera: Formicidae). Ann. Entomol. Soc. Amer. 52: 176–9.
- Wheeler, W. M., and W. S. Creighton. 1934. A study of the ant genera *Novomessor* and *Veromessor*. Proc. Amer. Acad. Arts Sci. 69: 341–7.

Reprinted from the

ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA
Volume 56, Number 5, pp. 678–682 September, 1933