

ANTS OF JAPAN



Japanese Ant Database Group

Gakken

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By

Japanese Ant Database Group:

Hirokami T. IMAI

Akira KIHARA

Masaki KONDOH

Masao KUBOTA

Satoshi KURIBAYASHI

Kazuo OGATA

Keiichi ONOYAMA

Robert W. TAYLOR

Mamoru TERAYAMA

Yuuji TSUKII

Masashi YOSHIMURA

Yoshihiro UGAWA

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Ants of Japan

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Japanese Ant Database Group (JADG)

C/O Environmental Education Center

Miyagi University of Education

Aramaki-Aoba, Aoba-ku, Sendai 980-0845, Japan

JADG e-mail address: jp@ant-database.org

Foreword

Ants are insects we often find around us. Since they lead high-level interactive social lives assisting each other to survive, in Japanese, they are called *ari*, which written in *kanji* (蟻), literally signifies "insects of loyalty" with respect. So far, there are 273 species of ants known in Japan today. However, until some ten years ago, in spite of the efforts made by the great pioneers in ant taxonomy in Japan such as M. Yano and C. Teranishi, the scientific names of ants commonly found were not clear. This was because the majority (over 200 species) of the type specimens were stored in the natural history museums of the West, and also because there was no literature on ants available in Japan. It was a private ant researcher who resolved this unfortunate situation: his name was M. Kubota and he had spent his entire personal fortune on collecting literature on ants as well as ant specimens. Upon Kubota's initiative, a society for people interested in ants ("The Myrmecological Society of Japan") was formed in 1965, and ardent members of this society (M. Kubota, M. Kondoh, H. T. Imai, K. Onoyama, K. Ogata, M. Terayama, etc.) carried out a classification of Japanese ants in a comprehensive manner. The results of these studies were published by the Myrmecological Society of Japan into "A list of the ants of Japan with common Japanese names" (1988), "A guide for the identification of Japanese ants - Volume I" (1989), followed by Volume II (1991) and Volume III (1992), "A list of references on Japanese ants" (Onoyama & Terayama, 1994) as well as "Distribution maps of Japanese ants" (Terayama & Kihara, 1994).

Later, we attempted to publish an encyclopedia of Japanese ants based on the results of the above taxonomical studies together with color photographs of ants taken by H.T. Imai and M. Kubota, but this plan was difficult to achieve because of the high cost of color printing. It was around this time that the Internet started to come into widespread use, and fortunately, we were able to obtain the cooperation of scholars of bioinformatics (Y. Tsukii, Y. Ugawa, A. Kihara), who were well versed in the use of personal computers and consequently, in January 1995, we were the first in the world to open a "Japanese Ant Color Image Database" on the Web. Although this was at first a strongly academic database focusing on the classification and identification of ants, we made improvements by placing the focus on high-grade color images and by including Gakken's Photo Encyclopedia "Ants" (Kondoh, 1979), with Gakken's permission, for the benefit of beginners, and this improved version of the database has been well received on the grounds that it serves both scientific and educational purposes. Encouraged by this success, we invited R.W. Taylor, an Australian ant taxonomist, to join us as an overseas member, and in 1998, we launched an English version of this database, which has gained high recognition and evaluation worldwide, having recorded a total of 39,740,000 accesses by March 2003. (In the past three years, the monthly average of accesses amounted to a million, and August 2002 marked the highest record of 1,950,000 accesses in a single month.)

Despite such success, the contents of the database were becoming somewhat outdated with progress recently taking place in the taxonomy of ants. Accordingly, it was decided that JADG would conduct an overall review of the database with the help of two new members: M. Yoshimura, a young ant taxonomist, and S. Kuribayashi, a professional insect photographer. As a result of this review, a revised edition in 2003 of the "Ant Image Database (Japan)" (<http://ant.edb.miyakyo-u.ac.jp/>) has appeared on the Web. In this revised version, we have renewed the scientific contents, improved the retrieval system, and included color photographs covering all 273 existing species, and moreover, we have newly added "The Ant Kingdom" (Kondoh, 1986) in the menu for beginners. At the same time, based on our desire for this database to serve as the groundwork for databases on ants worldwide in both scientific and educational fields, we not only deal with Japanese ants, but have also included the "Australian Ant Image Database" (R.W.Taylor)

as well as the "Image Database of Japanese Ant Typespecimens housed at MCZ, Harvard University" (G. D. Alpert and E. O. Wilson).

While preparations were being made for this revised 2003 edition, many of the members of this group requested that we publish the essence of this database in an illustrated encyclopedia consisting mainly of images. After considerable efforts, we managed to receive a subsidy for publication (2002) from the Graduate University for Advanced Studies (SOKENDAI), and GAKKEN CO., LTD. kindly agreed to take on the publication. For this reason, we were able to achieve our long-cherished dream of producing an illustrated book on Japanese ants entitled "Ants of Japan". Readers accustomed to analogue information can familiarize themselves more with the information medium of printed books, which are highly realistic. However, it is also true that printed books are restricted in many ways such as the number of pages and retrieval system. To overcome these drawbacks, we included an ant image database CD-ROM as a supplement in order to provide more detailed information that could not be included in the printed book.

Having finished editing this book, we feel relieved that an overall framework for the taxonomy of Japanese ants has been organized with JADG's efforts over a period of more than 10 years. At the same time, we are acutely aware of the fact that this book still contains quite a number of specimens that are expected to have their scientific names changed in the future, and there is considerable scope for further improvements in the classification details. We intend to make the correction of these imperfections a goal of the future. In the meanwhile, however, we would be more than happy if readers can trace the ants corresponding to the existing names of specimens and enjoy imagining what these ants look like by referring to the color images of this encyclopedia.

March 2003

Hirotsami T. Imai

(Representative Japanese Ant Database Group)

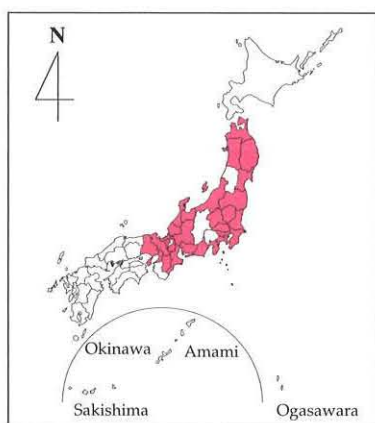
Acknowledgements

In this book, we used live ants as far as possible in our photography in order to reproduce as faithfully as possible the colors of ants found in the natural world. We would like to take this opportunity to express our profound gratitude to all those who kindly cooperated in the collection of the ants: Rikio Sonobe, Haruhiko Sakai, Katsusuke Yamauchi, Kyouichi Kinomura, Fuminori Ito, Hirofumi Watanabe, Seiki Yamane, Katsuyuki Eguchi and Hidetsune Takamine. Furthermore, we would like to mention that the holotype of the rare species *Rhopalomastix* were lent to us by the Museum of Nature and Human Activities, Hyogo. At the same time, we are deeply grateful to Toshikazu Ito who kindly agreed to undertake the printing and publication of this book and willingly devoted himself to the task of editing, to Ryosuke Tanimizu who made a contribution to the image layout and book design, to Masaki Matsubara who provided us with invaluable technical support in the photography of ants by using Stereo Microscope (Olympus, SZX12), to Hideo Mitani of Nature Production who kindly gave us permission to reproduce the booklets of Gakken's Photo Encyclopedia "Ants" and "The Ant Kingdom" in a CD-ROM as a supplement to this book, and to Tokuko Imai who dedicated herself in all areas ranging from the photography of ants, data organization, to the cover design.

This book has been published with a subsidy for publication (2002) of the Graduate University for Advanced Studies (SOKENDAI). The "Ant Image Database (Japan) 2003", based upon which this book was produced, was compiled with grants-in-aid from the Ministry of Education, Japan (1989-1991, 1993-1998), from Sokendai Collaborative Research (1997-2002) as well as from the Japan Science and Technology Corporation (2002).

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Distribution details regarding Japanese ant species:

Prefectures where a particular species has been recorded are represented in red on its distribution map. In the text the major mainland Japanese Islands - Hokkaido, Honshu, Shikoku and Kyushu - are often cited. Because the ant faunas of the Ogasawara, Amami, Okinawa and Sakishima islands differ from those of mainland Japan, records from these areas are given separately. The citation Nansei Is. is also used. It covers Amami, Okinawa and Sakishima islands. Note that these islands are placed in areas to the south those shown in the main maps.

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Monomorphic

worker



worker



soldier

Dimorphic



minor
worker



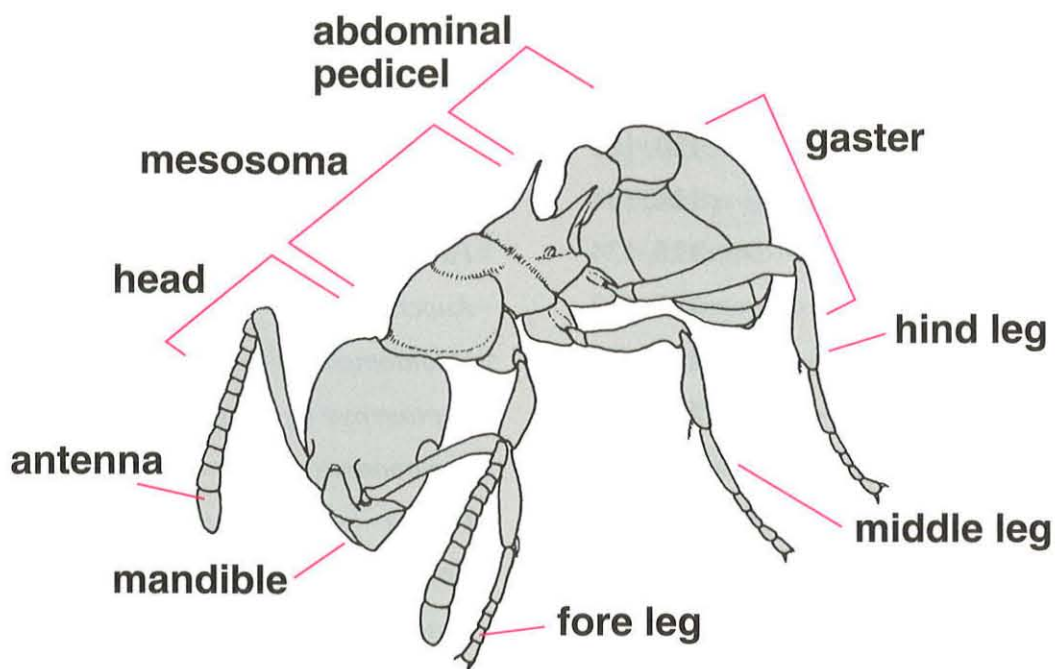
major
worker

Polymorphic

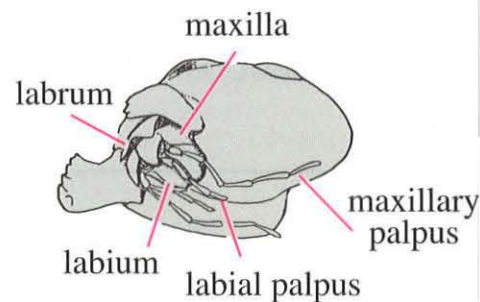
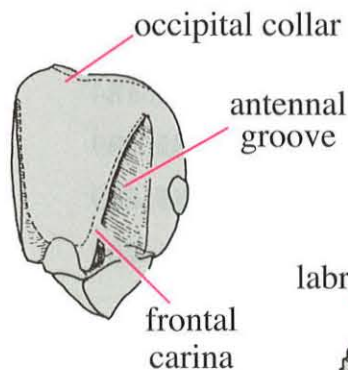
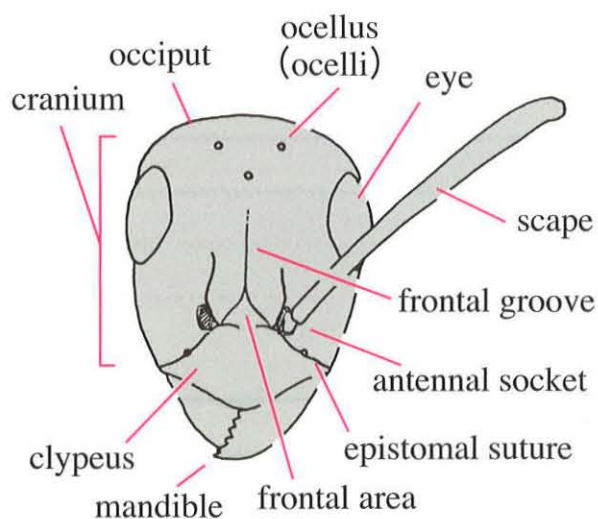
Representation of worker size in mm.

The size of worker specimens is enlarged greatly in the photographs reproduced here. Japanese ants in nature are in fact very small, ranging from 1 mm to 13 mm in length, as cited with each set of illustrations. In many species the workers are polymorphic, sometimes ranging more-or-less continuously in size and relative proportions. Other species have two distinct castes differing greatly in average size, without intermediates. In order to properly image caste differences, illustrated species are classified in three categories - monomorphic, dimorphic or polymorphic, and the figures of the castes in each polymorphic or dimorphic species are reproduced at the same magnification.

Terms used in the keys and descriptions



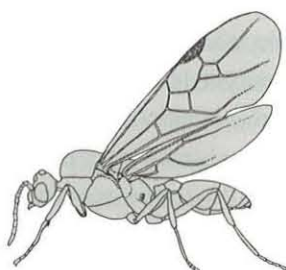
Head



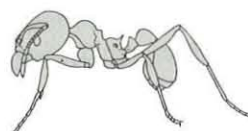
Caste



female (queen)



male

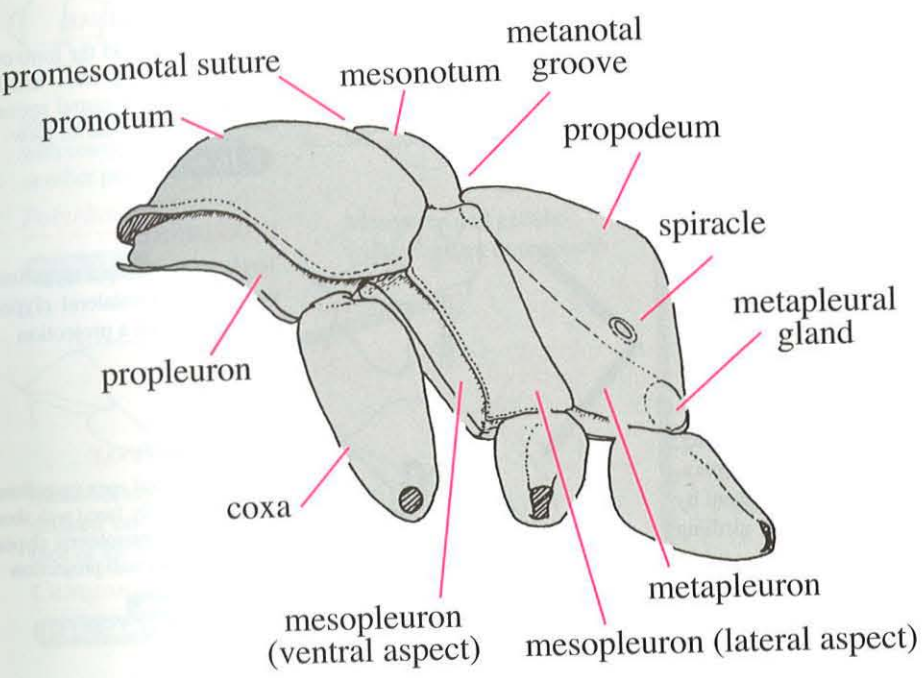


soldier

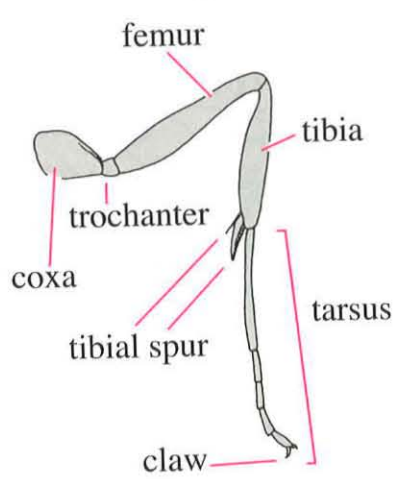


worker

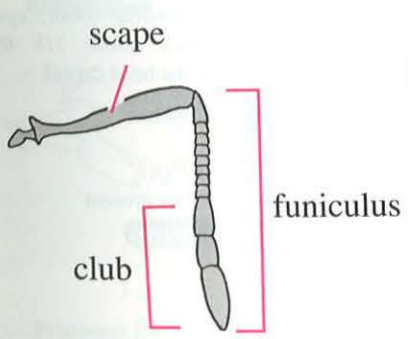
Mesosoma



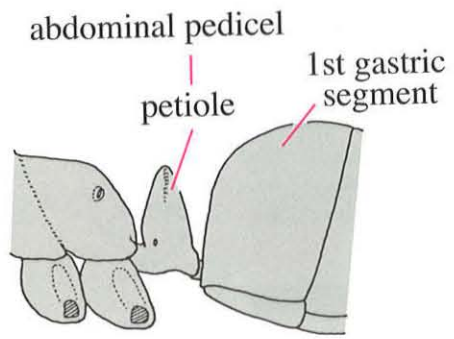
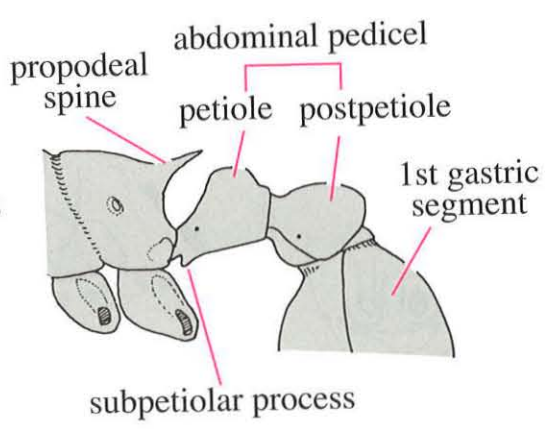
Leg



Antenna

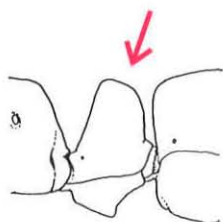


Abdominal pedicel

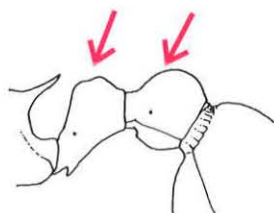


Key to the SUBFAMILIES

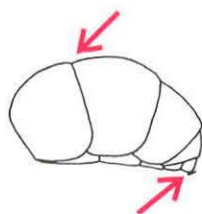
Start from here



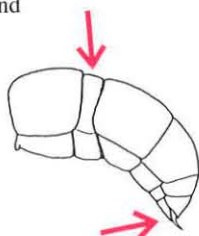
Body with single reduced or isolated segment (the petiole) between mesosoma and gaster



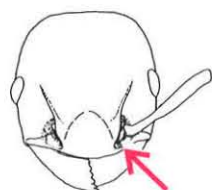
Body with 2 reduced or isolated segments (the petiole and postpetiole) between mesosoma and gaster



Apex of gaster lacking a sting; first gastral segment entirely confluent with the second



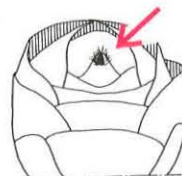
Apex of gaster with a sting; first gastral segment separated from second segment by an extensive, deep, girdling constriction



Frontal lobes partially to completely concealing antennal sockets; if antennal sockets are significantly exposed, then propodeal spines are present



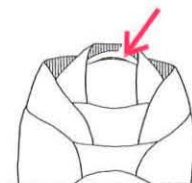
Frontal lobes either present or absent; in either case the antennal sockets are completely exposed; propodeal spines lacking



FORMICINAE

Ventral apex of gaster develops to form a conical structure with circular opening, often with fringe of setae, through which venom is ejected

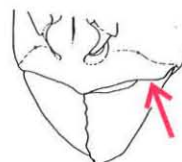
P 9 →



DOLICHODERINAE

Venom aperture in the form of transverse slit; petiole usually overhung by first gastral segment and not visible in dorsal view

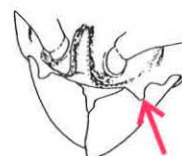
P 16 →



PONERINAE

Tergite at gastral apex (pygidium) unarmed; anterolateral clypeus margin without a projection

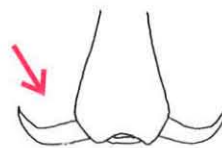
P 14 →



CERAPACHYINAE

Tergite of gastral apex (pygidium) bordered or partly faced with short peg-like teeth; anterolateral clypeus margin with a small projection

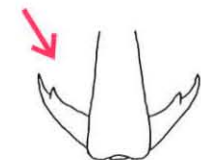
P 187, 210 →



MYRMICINAE

Pretarsal claws simple; eyes small, maximum length less than 1/4 the length of head capsule (excluding mandibles)

P 10 →



PSEUDOMYRMECINAE

Pretarsal claws with a supplementary median tooth; eyes large, each about 1/3 the length of the head capsule

P 186, 209 →



AENICTINAE

Frontal lobes present

P 185, 209 →



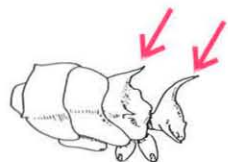
LEPTANILLINAE

Frontal lobes absent or very reduced

P 16 →

Key to the genera : FORMICINAE

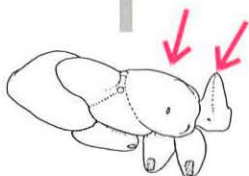
Start from here



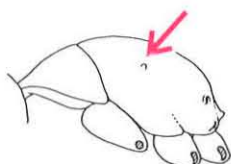
Mesosoma and petiole with conspicuous spines or other processes

Polyrhachis

P 17, 33 →



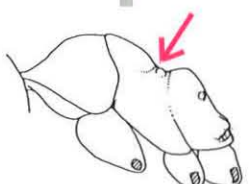
Mesosoma and petiole without spines or processes



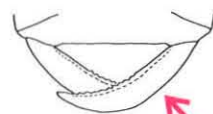
Mesothoracic spiracle situated on the lateral face of the sclerite

Camponotus

P 19, 34 →



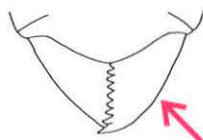
Mesothoracic spiracle situated on the dorsal face of the sclerite



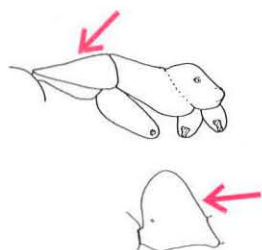
Mandibles falcate, with rudimentary teeth

Polyergus

P 32, 39 →



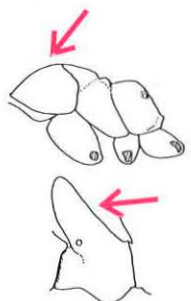
Mandibles more or less triangular, with distinct teeth



Pronotum long; petiole long (or thick) in profile

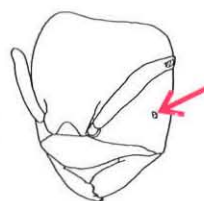
Anoplolepis

P 67, 82 →



Pronotum short; petiole short (or thin) in profile

Antennae less than 12 segments

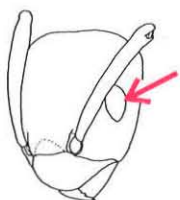


Eyes small, each with only 1 or a few facets

Acropyga

P 68, 82 →

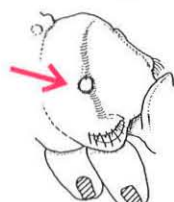
Antennae 12-segmented



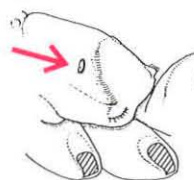
Eyes larger, each with 10 or more facets

Plagirolepis

P 67, 82 →



Propodeal spiracles subcircular



Propodeal spiracles elliptical and nearly vertical

Formica

P 32, 40 →

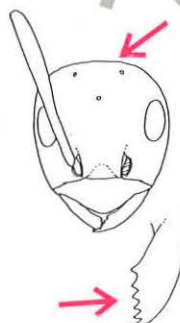


Eyes situated behind the mid-length of the sides of the head in lateral view

Eyes situated at the mid-length of the sides of the head in lateral view

Paratrechina

P 53, 63 →



In full-face view the posterior margin of the head straight or only slightly concave; mandibles each with 7 or more teeth

Lasius

P 45, 59 →



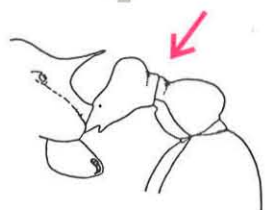
In full-face view the posterior margin of head rounded (at least in Japanese species); mandibles each with 6 teeth

Prenolepis

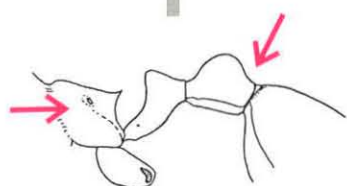
P 66, 81 →

Key to the genera : MYRMICINAE (1)

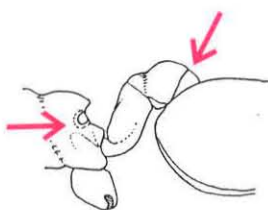
Start from here



Antennae with 9 or more segments; petiole and postpetiole without spongiform material

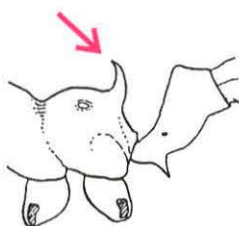


Antennae with 6 or fewer segments; petiole and postpetiole with outgrowths of spongiform material



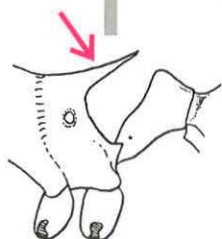
Postpetiole articulated on dorsal face of first gastral tergite; gaster capable of reflexion upwards; propodeal spiracles situated on the margins of posterior face of propodeum

Crematogaster P 96, 108 →

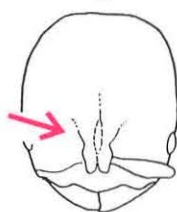


Propodeal spines curved upwards and forwards

Recurvidris P 103, 112 →

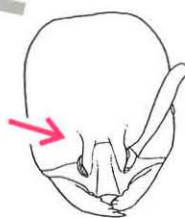


Propodeal spines present or absent; when present, they are not curved forwards

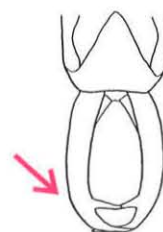


Frontal lobes closely approximate

Rhopalomastix P 103, 112 →



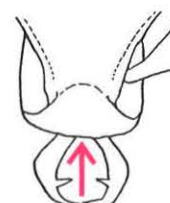
Frontal lobes widely separated



Mandibles elongate and straight or weakly curved

Strumigenys (in part)

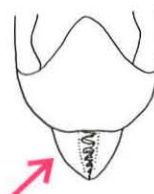
P 74, 85 →



Mandibular insertions closely approximate; labrum not produced apically

Strumigenys (in part)

P 74, 85 →



Mandibles more or less triangular

Pyramica (in part)

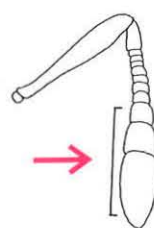
P 79, 88 →



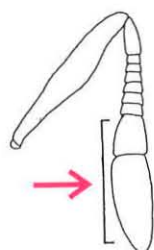
Mandibular insertions widely separated; labrum produced apically

Pyramica (in part)

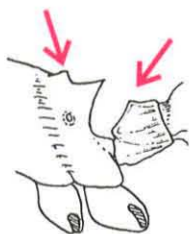
P 80, 88 →



Antennal club either with 3 or more segments or indistinct



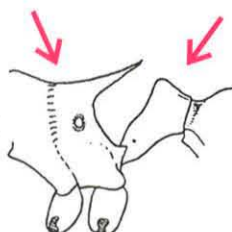
Antennal club composed of 2 segments



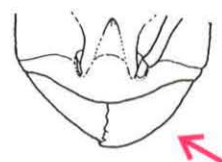
Petiole without a raised node, more or less cylindrical in shape; dorsal face of propodeum with a pair of small process additional to the propodeal spines

Myrmecina P 100, 111 →

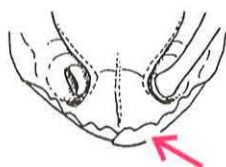
Continued to P 12 →



Petiole with a distinct node, which is clearly set-off from its anterior peduncle; propodeum without small supplementary processes

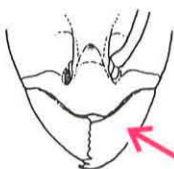


Mandibles more or less triangular and bearing teeth

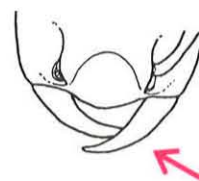


Clypeus with several denticles on its anterior margin

Pristomyrmex P 100, 110 →



Clypeus without denticles on its anterior margin



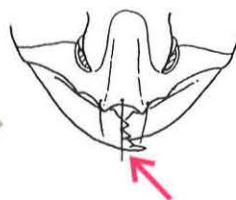
Mandibles falcate and edentate

Strongylognathus

P 124, 134 →

Antennae 11-segmented

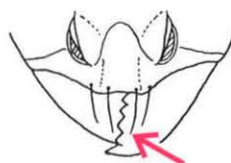
Pheidologeton P 118, 131 →



Worker caste monomorphic, or polymorphic; with a graded series of intermediates between minors and majors; clypeus with a single seta at the midpoint of its anterior margin

Solenopsis P 118, 132 →

Antennae 10-segmented

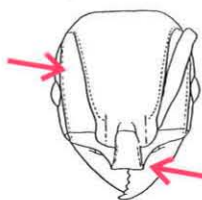


Worker caste dimorphic, without intergrades between majors and minors; the majors often with a pair of denticulate processes on the posterior part of head; clypeus medially with paired setae in both minors and majors

Oligomyrmex P 115, 130 →

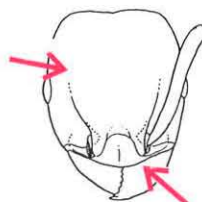
Key to the genera : MYRMICINAE (2)

From P 11

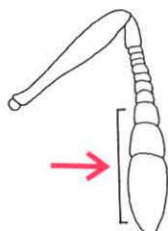


Median part of clypeus produced anteriorly to partly cover the mandibles; antennal scrobes distinct, extending to the posterolateral corners of the head

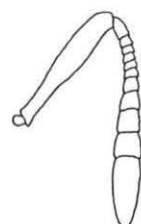
Lordomyrma P 102, 112 →



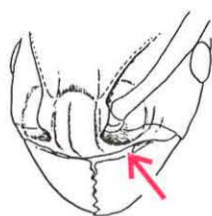
Clypeus shorter, not overhanging the mandibles; antennal scrobes usually absent, or, if present, not extending to the posterolateral corners of the head



Antennal club composed of 3 segments

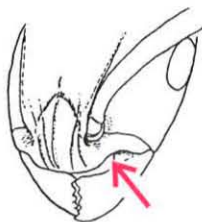


Antennal club either indistinct or with 4 segments

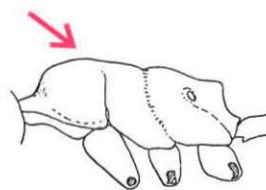


Lateral portions of clypeus raised to form a distinct transverse ridge on each side, in front of the antennal insertion

Tetramorium P 125, 134 →

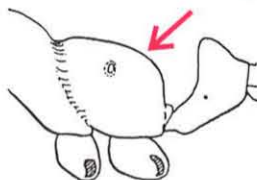


Lateral portions of clypeus not raised to produce such ridges



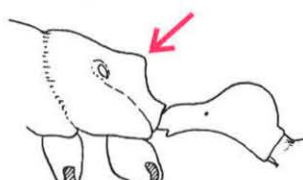
Head and mesosoma dorsally without hairs; occipital carina absent

Cardiocondyla P 137, 153 →

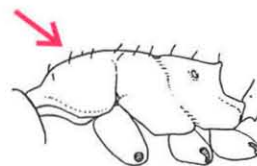


Propodeal dorsum posteriorly rounded or slightly angulate - never produced to form a pair of processes; clypeus anteriorly with a single median seta at its midpoint

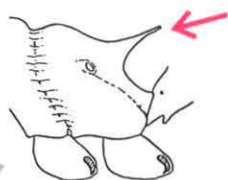
Monomorium P 120, 132 →



Propodeal dorsum posteriorly with a pair of spines or denticles; clypeus anteriorly with paired median setae

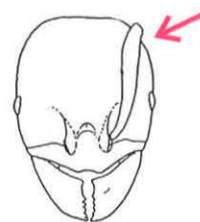


Head and mesosoma with at least some hairs; occipital carina present



Propodeal spines present

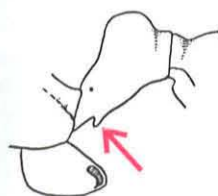
Myrmica P 169, 181 →



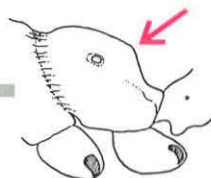
Antennal scapes shorter, at most slightly exceeding posterior margin of head in full-face view; petiolar node lower and less-strongly raised

Stenamma

P 168, 180 →

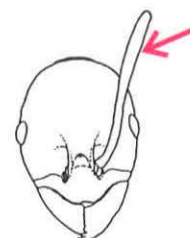


Petiole with a distinct subpetiolar process



Propodeal spines absent

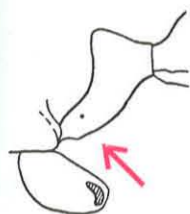
Manica P 169, 180 →



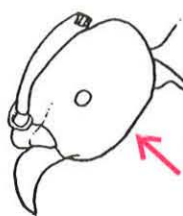
Antennal scapes long, extending well beyond posterior margin of head in full-face view; petiolar node strongly raised

Aphaenogaster

P 152, 160 →



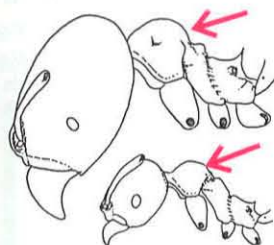
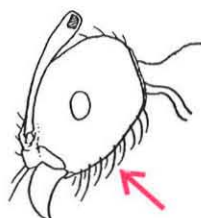
Subpetiolar process absent



Head often ventrally with hairs, but never with thick setae; propodeal spines present

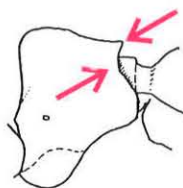
Head ventrally with long, thick setae; propodeal spines absent

Messor P 152, 160 →



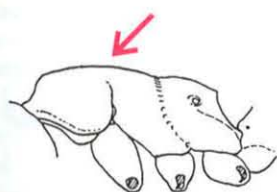
Promesonotum distinctly raised; worker caste with clear dimorphism producing strongly differentiated major and minor castes; head ventrally with several pairs of processes on the anterior margin

Pheidole P 147, 158 →

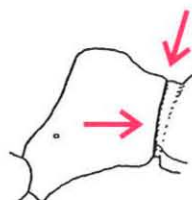


In profile petiole depressed posteriorly, with its posterior edge produced

Vollenhovia P 104, 112 →



Promesonotum at most only weakly raised; worker caste monomorphic; head ventrally without processes on the anterior margin

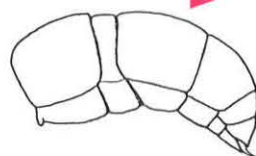


In profile posterior portion of petiole nearly straight; its posterior edge not produced

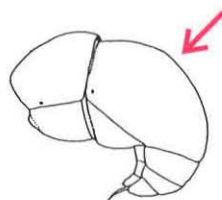
Leptothorax P 140, 154 →

Key to the genera : PONERINAE

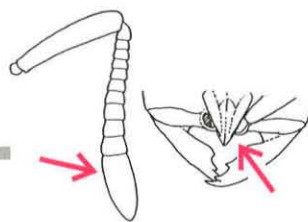
Start from here



Second gastral tergite not swollen, only slightly larger than its sternite; the gaster thus not strongly down-curved

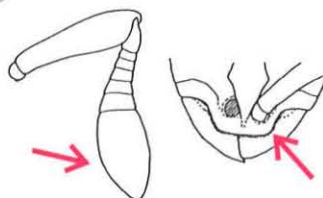


Second gastral tergite swollen dorsally, much larger than its sternite, so that the gaster is strongly down-curved, with its apex turned ventrally or anteroventrally



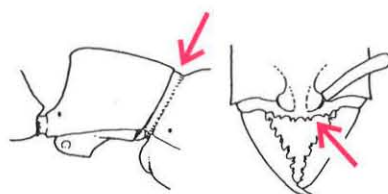
Antennae 12-segmented (left), apical segment shorter than the remaining funiculus; anterior margin of clypeus straight or projecting in the middle, but not overhanging the mandibles (right)

Proceratium P 204, 217 →



Antennae 8- or 9-segmented (left), apical segment as long as or longer than the remaining funiculus; anterior margin of clypeus projecting in the middle and overhanging the mandibular bases (right)

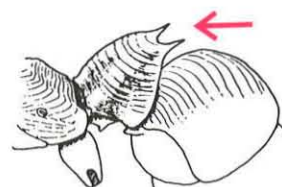
Discothyrea P 203, 217 →



Connection between petiole and gaster narrowly constricted; anterior margin of clypeus not denticulate

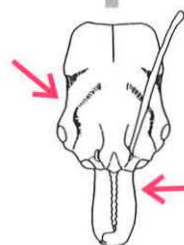
Connection between petiole and gaster broad (left); anterior margin of clypeus with several denticles (right)

Amblyopone P 207, 219 →



Petiolar dorsum with a pair of distinct projections

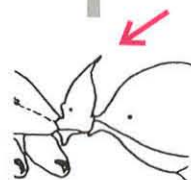
Diacamma P 202, 217 →



Mandibles linear, inserted at the median portion of the anterior margin of head (right); head more or less constricted behind eyes (left)

Mandibles more or less triangular, inserted at the sides of the anterior margin of head; head not constricted behind eyes

Frontal carina more or less covering the antennal insertions; anterior clypeal margin not produced forwards to cover the mandibles



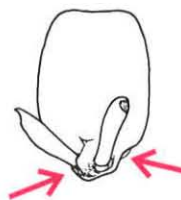
Petiolar dorsum spiniform; Carina separating dorsal from posterior surfaces of head, converging in a V shape at the midline; posterior surface with a pair of prominent, dark lines; larger species, body length exceeding 8 mm

Odontomachus P 192, 212 →



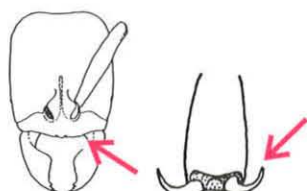
Petiolar dorsum not spiniform; Carina separating dorsal from posterior surfaces of head, forming a broad uninterrupted curve across the posterodorsal extremity of head; posterior surface without paired dark lines; smaller species, body length less than 6 mm

Anochetus P 192, 212 →



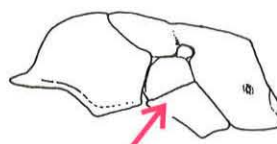
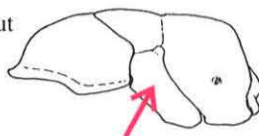
Frontal carinae not covering antennal insertions (left), but forming a vertical lamella; anterior clypeal margin prominently produced, so that it almost completely covers the mandibles (right)

Probolomyrmex P 206, 218 →



Anterior margin of clypeus straight (left); pretarsal claws simple (right)

Mesepisternum without an oblique furrow

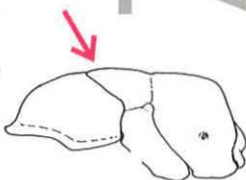


Mesepisternum with an oblique furrow

Pachycondyla (in part)

P 191, 212 →

Promesonotum nearly flat in lateral view

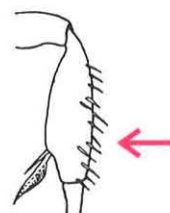
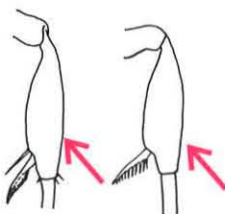


Promesonotum strongly raised in lateral view

Pachycondyla (in part)

P 191, 211 →

Outer surfaces of middle tibiae without spine-like setae



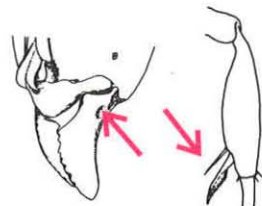
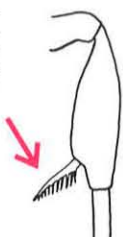
Outer surfaces of middle tibiae with short, spine-like setae

Cryptopone

P 201, 216 →

Petiolar dorsum without projections

Basal portions of mandibles without small pits; middle and hind tibiae with one pectinate spur



Basal portions of mandibles each with a small pit dorso-laterally (left); middle and hind tibiae each with two spurs, one simple, the other pectinate (right)

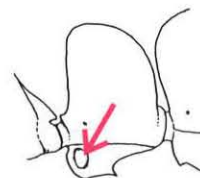
Pachycondyla (in part)

P 189, 211 →

Subpetiolar process with a translucent "window" in lateral view

Ponera

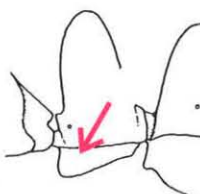
P 196, 214 →



Subpetiolar process without a translucent "window" in lateral view

Hypoconera

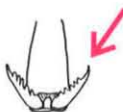
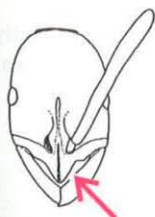
P 194, 213 →



Anterior margin of clypeus projecting prominently (left); pretarsal claws pectinate (right)

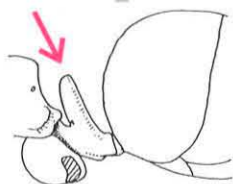
Leptogenys

P 193, 213 →

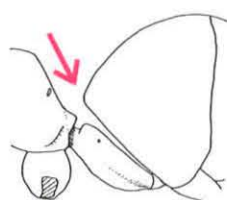


Key to the genera : DOLICHODERINAE

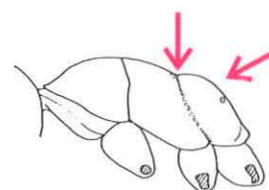
Start from here



Petiole scale-like or nodiform not overhung by first gastral segment

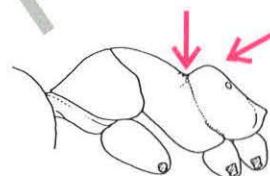


Petiole reduced, in profile lacking a scale or node and overhung by first gastral segment



In dorsal view only 4 gastral tergites visible, the fifth concealed by the fourth; gastral tip opening posteriorly; metanotal groove shallow; propodeum not strongly raised

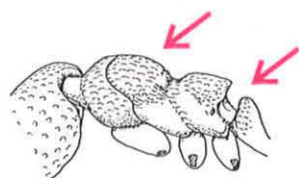
Tapinoma P 72, 84 →



In dorsal view 5 gastral tergites visible, the fifth small but not concealed beneath the fourth; gastral tip opening ventrally; metanotal groove more or less deep, propodeum distinctly raised

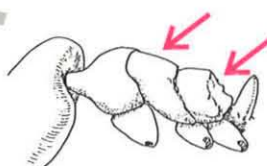
Technomyrmex

P 71, 84 →

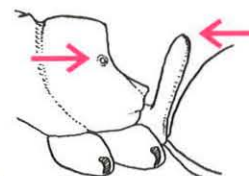


Integument thick and hard, the surface sculptured; posterodorsal margin of propodeum projecting prominently backwards, declivitous face concave

Dolichoderus P 73, 85 →

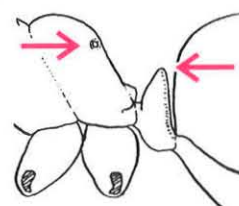


Integument thin and flexible, the surface smooth and shining; posterodorsal margin of propodeum not projecting backwards, the declivitous face flat



Petiolar scale high, the dorsal apex situated over the level of propodeal spiracle

Linepithema P 70, 83 →

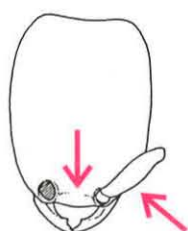


Petiolar scale low, the dorsal apex situated under the level of propodeal spiracle

Ochetellus P 73, 85 →

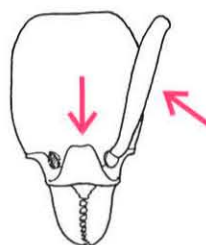
Key to the genera : LEPTANILLINAE

Start from here

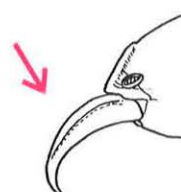


Antennal scapes short, only slightly exceeding mid-length of head; clypeus very short, its posterior border obscure

Leptanilla P 174, 184 →



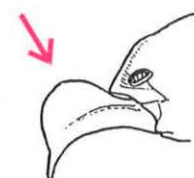
Antennal scapes long, reaching the posterior margin of head; clypeus trapezoidal, its borders distinct



Mandibles slender and long in lateral view

Protanilla

P 173, 183 →



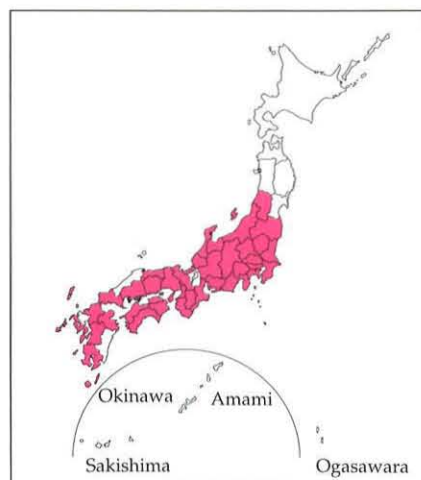
Mandibles downwardly curved in lateral view, prominently extended dorsally

Anomalomyrma

P 174, 183 →

FORMICINAE

Polyrhachis lamellidens F. Smith

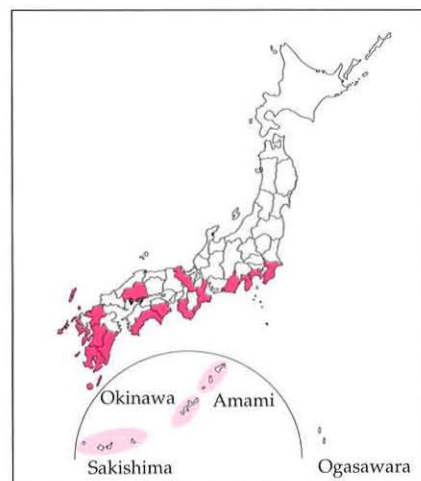


Workers 7-8 mm. Head, legs, gaster black; mesosoma, petiole reddish brown. Pronotum: a pair of forwardly-directed spines. Mesonotum: a pair of backwardly curved spines. Propodeal spines long, apices curved. Petiole: a pair of long, hooked spines.

Nests in hollow tree trunks. Nuptial flights September to November. A temporary social parasite, queens invade nests of *Camponotus japonicus*, *C. obscuripes*, and probably *C. kiusiuensis*.

FORMICINAE

Polyrhachis moesta Emery

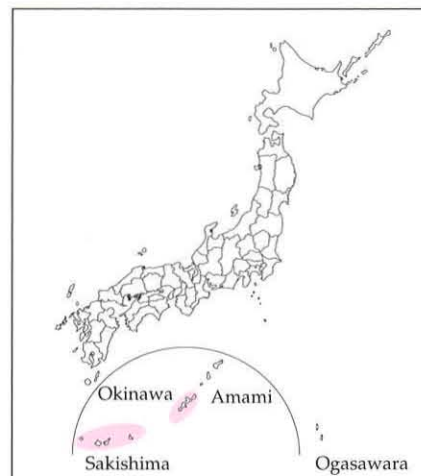


Workers 6 mm. Body black, legs reddish brown. Mesosomal dorsum arched, without lateral carinae. Pronotal shoulders angulate in dorsal view, without spines. Mesonotum without teeth. Propodeum: well developed spines. Petiole: a pair of large spines. Dorsal margin of petiole, viewed anteriorly, straight, with a small cornicle posteriorly.

Arboreal, nests in dead twigs incorporate larval silk. Relatively rare.

FORMICINAE

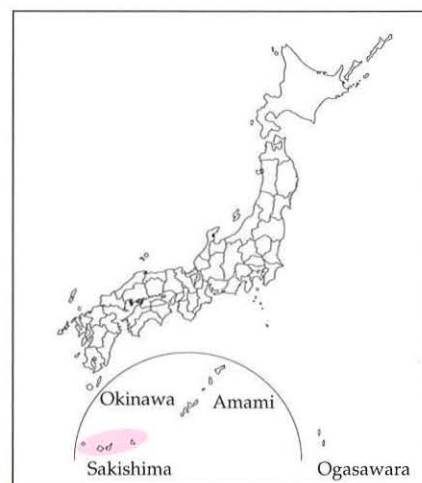
Polyrhachis dives F. Smith



Workers 5-6 mm. Black. Mesosoma coarsely punctate. Head, gaster with yellowish pubescence. Mesosomal dorsum arched, dorsolateral margins acarinate. Pronotum: a pair of strong teeth directed laterally. Mesonotum without teeth. Propodeum: a pair of strong teeth. Petiole: a pair of spines, longer than mesosomals, and a pair of small median cornicles. Nests on grasses or trees, utilise leaves, dead twigs, silk. Polygynous.

FORMICINAE

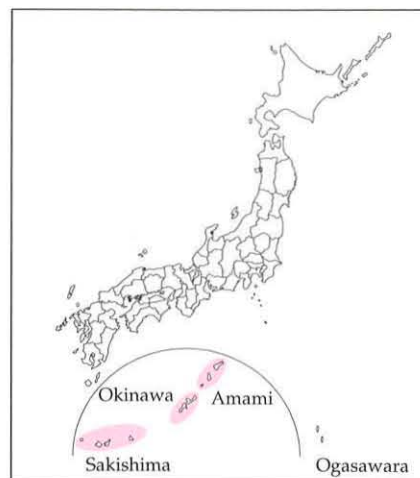
Polyrhachis latona Wheeler



Workers 5-6 mm. Black, with dense whitish pubescence. Mesosomal dorsum roundly convex in profile, transversely flat, marginate laterally. Pronotum: a pair of acute teeth directed forwards. Mesonotum without teeth. Propodeum: small teeth; posterodorsal margin carinate. Petiole: two pairs of spines, inner pair largest; dorsal margin with a median blunt angle in frontal view. Nests in soil.

FORMICINAE

Camponotus shohki Terayama

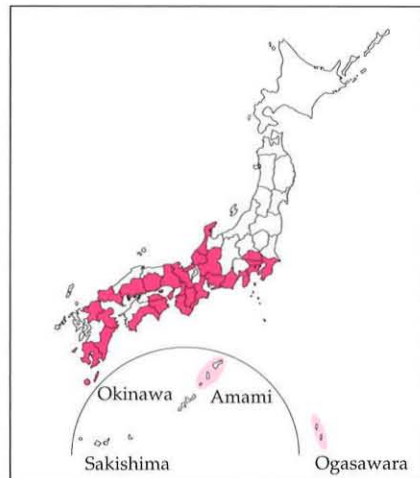


Minor workers 2.5-3 mm, majors 5 mm. Head and mesosoma yellowish brown to reddish brown (sometimes blackish brown); gaster black.

Distinguished from *C. nipponicus* by the longer heads of major workers (head length 1.10 mm, versus 1.00-1.05 mm), and shape of anterior margin of head, which has a pair of blunt projections visible in full face view. Arboreal.

FORMICINAE

Camponotus nipponicus Wheeler

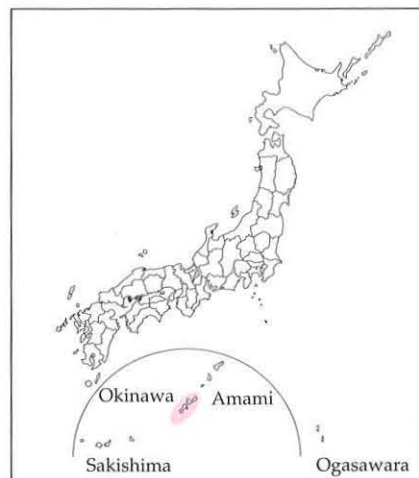


Minor workers 2.5-3mm, majors 5 mm. Head, mesosoma blackish brown to black; gaster black. Anterior margin of head in major workers straight, without projections in full face view.

Arboreal. Nuptial flights: June and July.

FORMICINAE

Camponotus daitoensis Terayama

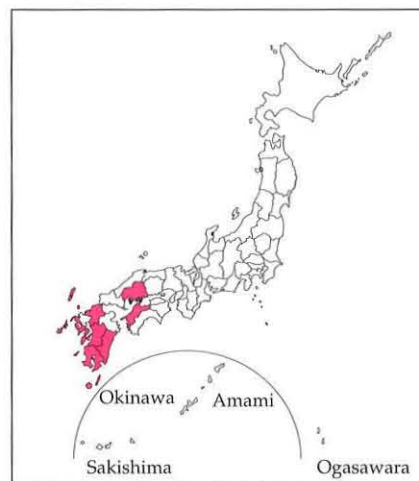


Majors 5.5-6 mm. Head, mesosoma, legs reddish brown; 1st gastral tergite yellowish brown anteriorly, darker posteriorly; remaining gaster blackish brown; pronotal and mesosomal dorsa, propodeum with short erect hairs. Minors 4 mm. Head, mesosoma, legs light yellowish brown; gaster color as in majors; pronotal dorsum hairless; mesonotal dorsum: a pair of erect hairs; propodeum: about 12 erect hairs.

Arboreal nests in dead twigs on trees.

FORMICINAE

Camponotus hemichlaena Yasumatsu & Brown

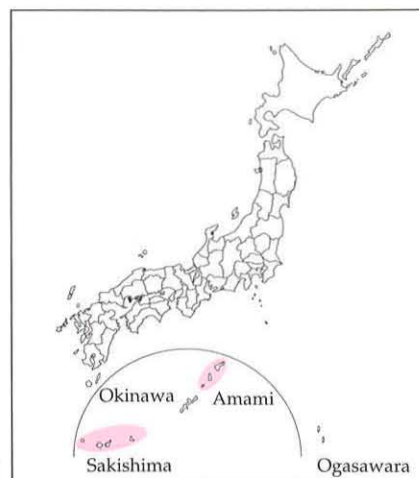


Workers 7-12 mm. Mesosoma (excluding pronotum), petiole, base of 1st gastral segment red; remainder black. Hairs on 2nd gastral tergite not exceeding posterior cephalic margin.

Distinguished from *C. obscuripes* by black pronotum (vs. red in *obscuripes*).

FORMICINAE

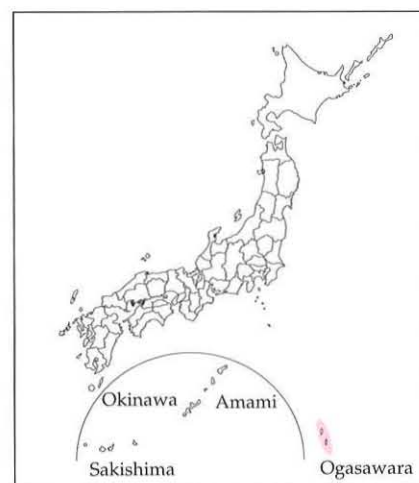
Camponotus friedae Forel



Minor workers 5 mm, majors 7-9 mm. Head black; mesosoma, antennae, legs brown; gaster blackish brown. In majors: mandibles: 5- or 6-toothed. Clypeus produced anteriorly, no anteromedian notch. Propodeal declivity sloping. Vertex, mesosomal dorsum, petiolar dorsum, gaster with long hairs. In minors: mandibles: 5-toothed; propodeal declivity sloping; mesosoma: abundant long hairs. Nests in soil, in forest, forest margins, grasslands. Relatively rare.

FORMICINAE

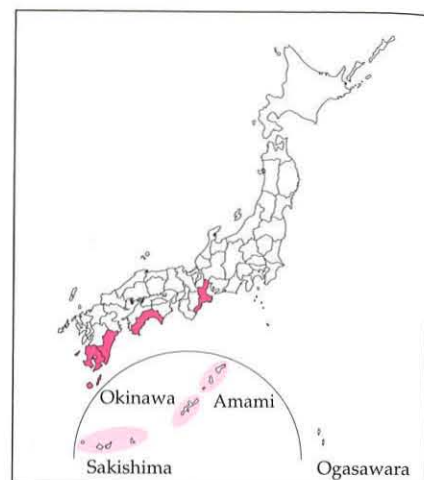
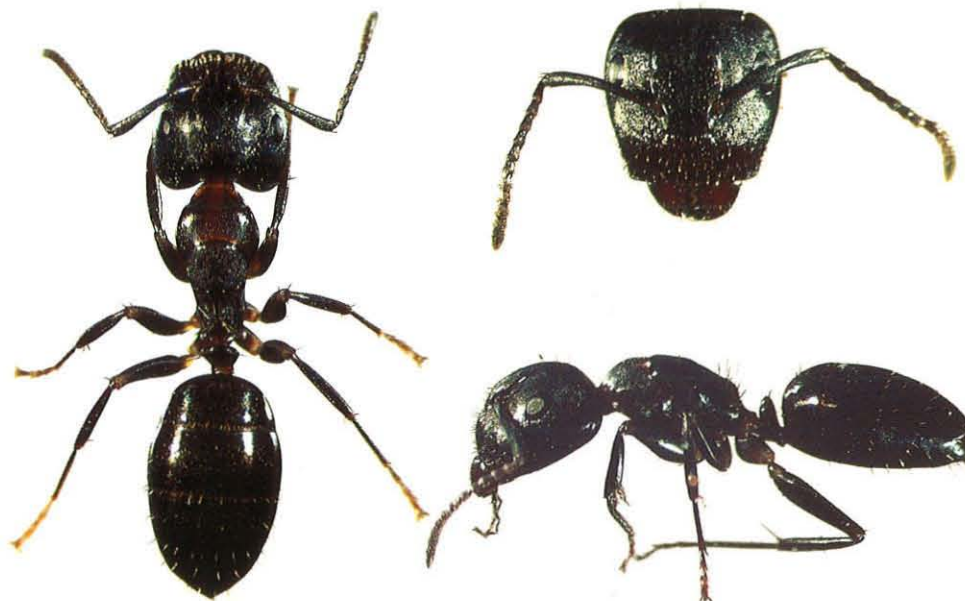
Camponotus ogasawarensis Terayama & Satoh



Workers 4-5.5 mm. Head, mesosoma, petiole yellowish-brown; gaster black, with 2 or 3 pairs of yellow spots (sometimes transversely merged). Propodeal dorsum concave in minors, majors have straight dorsal mesonotal, propodeal profiles, and anterior end of propodeum bluntly angulate. Petiolar profile an inverted U-shape. Arboreal, nests in dead twigs on trees.

FORMICINAE

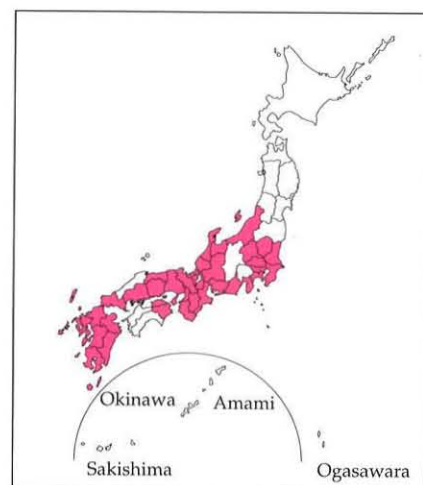
Camponotus bishamon Terayama



Workers 4-4.5 mm. Black. Resembles *C. vitiosus*, but has straight or weakly concave dorsal propodeal margin and asymmetrical petiolar scale profile (anterior margin shorter than posterior margin). Arboreal.

FORMICINAE

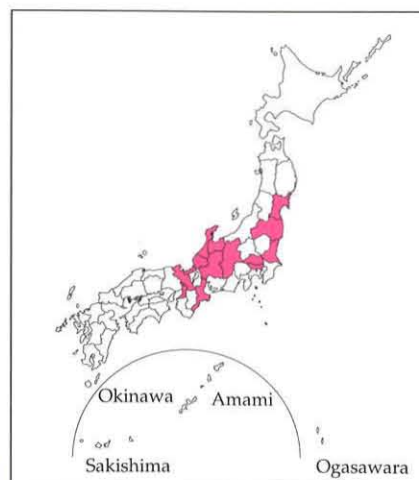
Camponotus vitiosus F. Smith



Workers 5-6 mm. Black; legs blackish brown; pronotum often brownish. Propodeal dorsum concave in lateral view. Petiole thick, with inverted U-shaped profile. Arboreal, nests in dead twigs on trees.

FORMICINAE

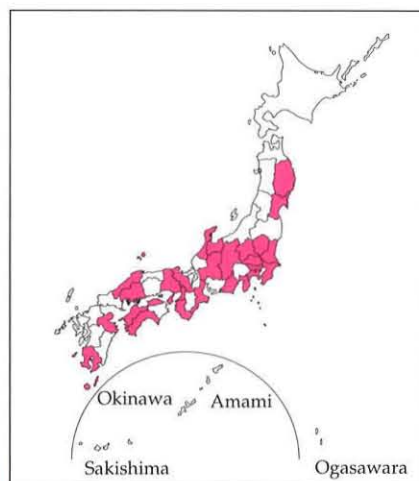
Camponotus nipponensis Santschi



Workers 4-5 mm. Black to blackish brown. Anterior clypeal margin notched medially. Mesosomal dorsum with over 20 long, flagellate hairs; similar hairs on petiolar dorsum. Separated from other Japanese members of subgenus (*Myrmentoma*) by abundant long hairs on mesosoma and petiole. Relatively rare.

FORMICINAE

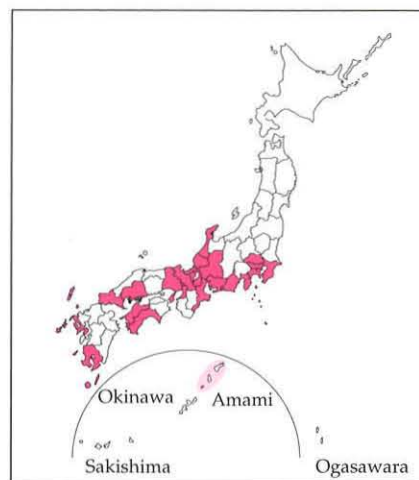
Camponotus yamaokai Terayama & Satoh



Workers 3.5-4.5 mm. Black; pronotum reddish brown; legs brown; a pair of whitish gastral spots. Resembles *C. nawai*, distinguished by more prominent eyes, smaller relative head size in minors and majors; petiolar scale in minors is thinner than in *nawai*; thinner and wider in dorsal view in majors. Polygynous. Nests in woods near seashores; nuptial flights in May after overwintering. Arboreal, nests in dead twigs on trees.

FORMICINAE

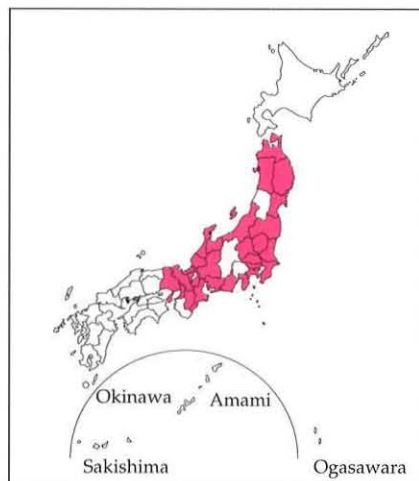
Camponotus nawai Ito



Workers 4-4.5 mm. Ground color black; pronotum reddish to blackish brown; legs brown; gaster usually with 2 pairs of whitish spots. Propodeal dorsum straight in lateral view; petiole thin. Monogynous. Found in woods near the sea. Nuptial flights in August.

FORMICINAE

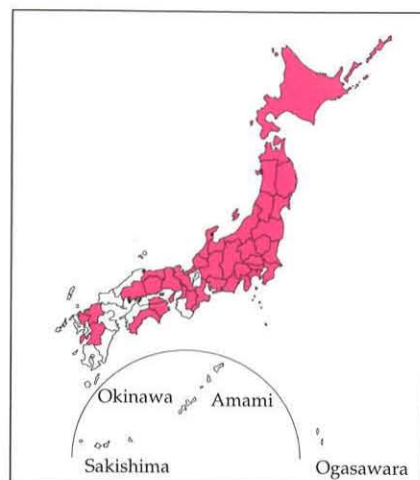
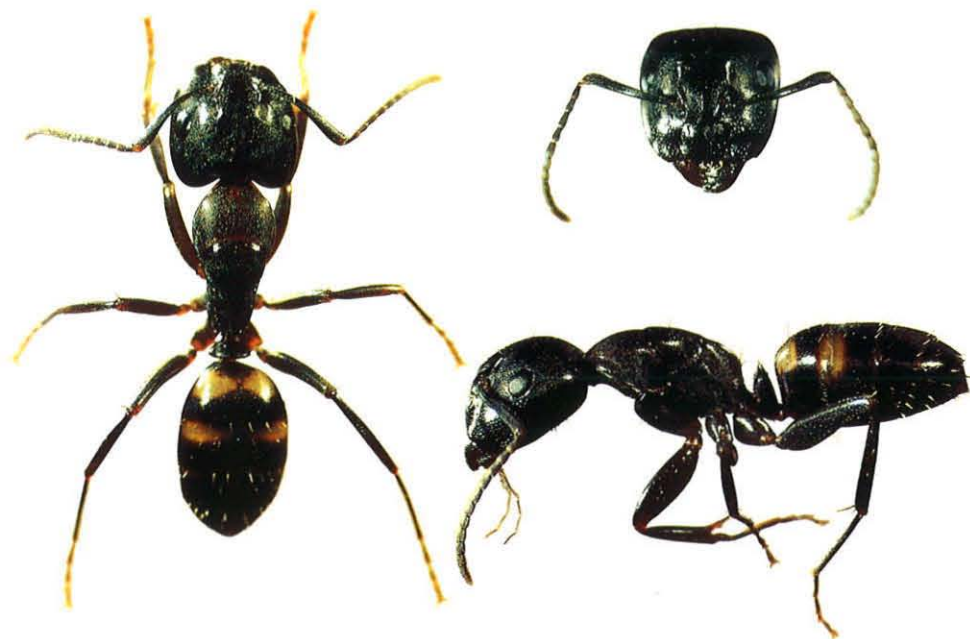
Camponotus itoi Forel



Workers 3.5-4.5 mm. Black. Mesonotal dorsum flat in lateral view; propodeal declivity the most abruptly declivitous in subgenus (*Myrmamblys*), of which this is the smallest Japanese species. Arboreal. Nests in dead twigs on standing trees.

FORMICINAE

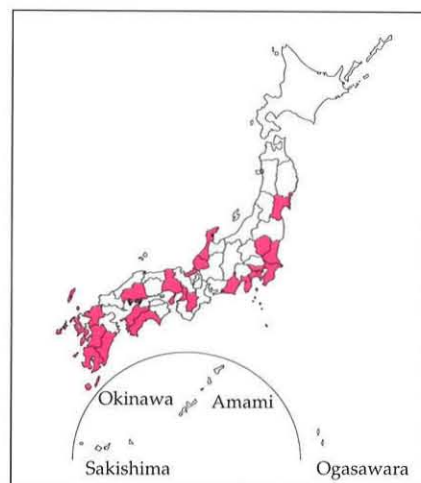
Camponotus quadrinotatus Forel



Workers 5-6 mm. Black; pronotum often brownish. Gaster with two pairs of yellowish spots. Metanotal groove not incised dorsally; petiole with hairs. Arboreal. Nests in bark or crevices on tree trunks.

FORMICINAE

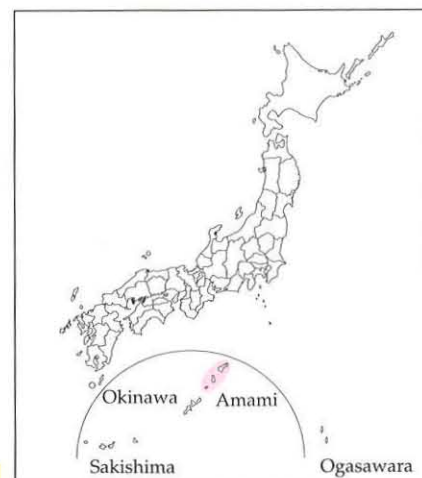
Camponotus keihittoi Forel



Workers 4.5 mm. Shining black. Dorsa of mesosoma and petiole without hairs. Metanotal groove distinctly incised dorsally. Arboreal. Nests in dead twigs on standing trees.

FORMICINAE

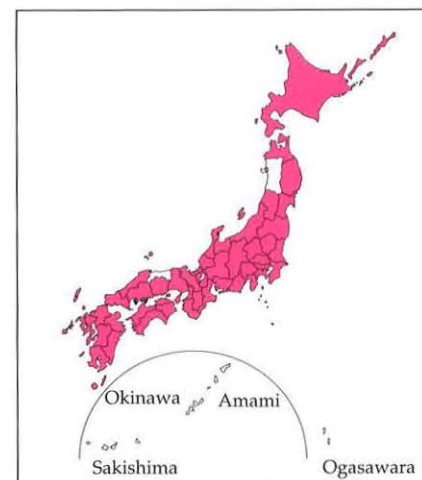
Camponotus amamianus Terayama



Workers 7-13 mm. Black, legs black to reddish brown. Anterior clypeal margin straight in minors, concave medially in majors. Mesosomal dorsum moderately convex from pronotum to propodeum; posterodorsal propodeal corners not angulate in profile. Mesonotal dorsum: fewer than 6 hairs; propodeal dorsum: a single pair of erect hairs. Nests in dead portions of tree trunks and soil in forest.

FORMICINAE

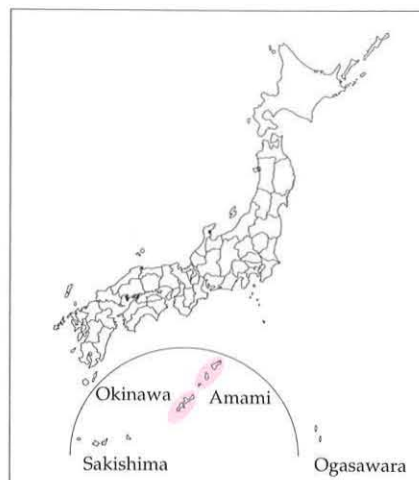
Camponotus kiusiuensis Santschi



Workers 8-11 mm. Black, sometimes brownish; legs brown. Anterior clypeal margin medially concave. Posterodorsal propodeal corner bluntly angulate in profile. Polydomous nests, each with less than 300 workers, in dead bamboo stems or trees. Rare on Hokkaido.

FORMICINAE

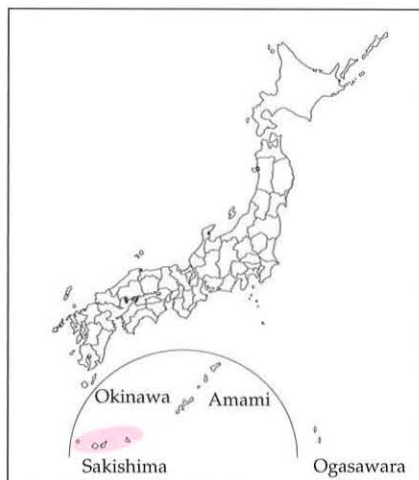
Camponotus kaguya Terayama



Workers 7-12 mm. Head blackish brown; mesosoma, petiole, legs, 1st and 2nd gastral terga reddish brown; 3rd to 5th black. Anterior clypeal margin weakly produced; convex medially. Mandibles 6-toothed. Scapes of minors long: 1.3-1.4 times head width. Mesosomal dorsum strongly convex, sloping from anterior pronotum to posterior propodeum. Posterodorsal propodeal corner rounded, not angulate. Nests in soil in grasslands.

FORMICINAE

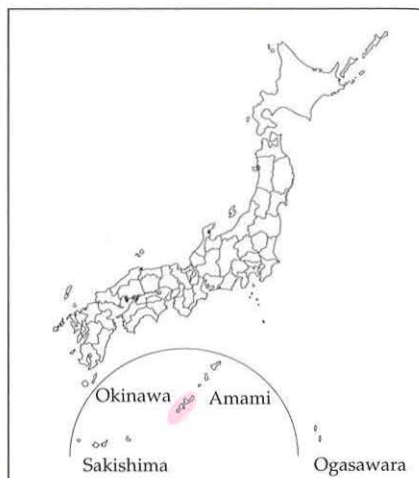
Camponotus albosparsus Bingham



Workers 4-7 mm. Head blackish brown; mesosoma, petiole, legs brown; gaster black, with 2 pairs of yellow spots. Anterior clypeal margin straight. Mandibles 6-toothed. Scapes 1.2-1.3 times head width in minors, just exceeding posterior cephalic border in majors. Petiole relatively high, profile an inverted V-shape. Head and mesosoma relatively hairy.

FORMICINAE

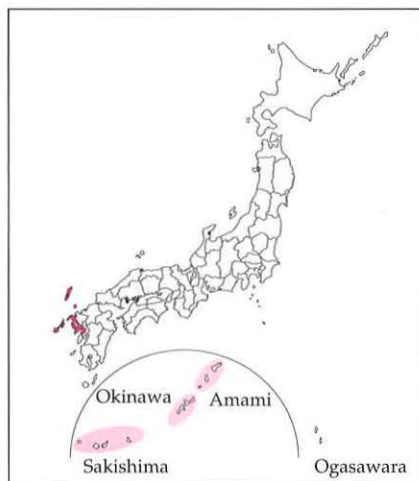
Camponotus yambaru Terayama



Yellowish brown. Majors 5 mm: mandibles 6-toothed; scapes short, reaching cephalic margin; mesosoma short, pro- and mesonotal dorsa flat; pronotal disc wide; pro- and mesonotal dorsa: 2 to 4 hairs; propodeum: about 10; petiolar scale thin. Minors 3.5 mm: mandibles 5-toothed; scapes exceeding cephalic margin, Pronotum: without hairs; mesonotum: one pair; propodeum: about 10. Arboreal. Nests in dead twigs on trees and bamboo.

FORMICINAE

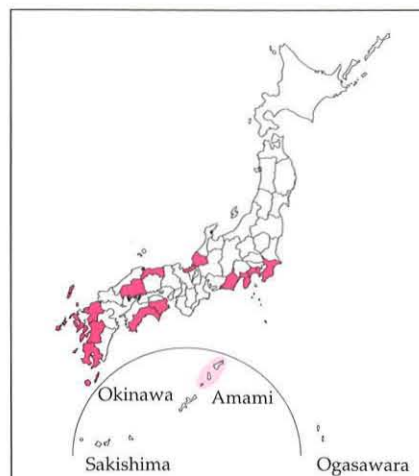
Camponotus monju Terayama



Workers 7-10 mm. Head, gaster blackish brown; mesosoma, petiole, legs brown to blackish brown. Resembles *C. devastivus*, distinguished by more abundant erect hairs on head, dorsa of pronotum and mesonotum, and fore coxae.

FORMICINAE

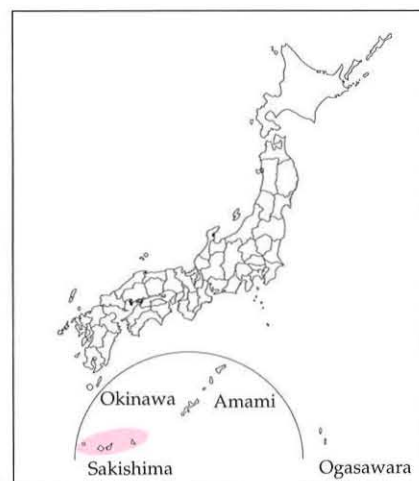
Camponotus devestivus Wheeler



Workers 7-10 mm. Head brown; mesosoma, petiole, legs yellowish brown; gaster brown to blackish. Head long. Clypeus apically truncated. Mandibles 6-toothed. Scapes long, 1.8 times head width in minors, exceeding cephalic margin by 1/4 their length in majors. Petiole in profile thick, triangular. Pronotum: no erect hairs; mesonotum: one pair; fewer than 3 hairs on forecoxae. Nests in tree trunks, dead twigs.

FORMICINAE

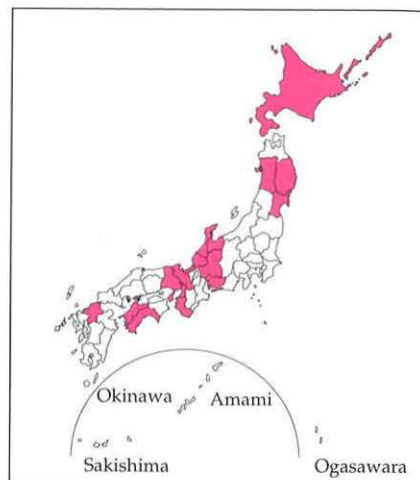
Camponotus sp. 6



Workers 7-9 mm. Black. Propodeal dorsum short, so the mesosoma appears compressed in length. Resembles *C. japonicus*, distinguished by (1) 2nd gastral tergite with non-overlapping pubescence (overlapping in *C. japonicus*); (2) individual hair length 1.5-2 times distance separating them; (3) head and mesosomal pubescence sparse and shorter.

FORMICINAE

Camponotus yessensis Yasumatsu & Brown

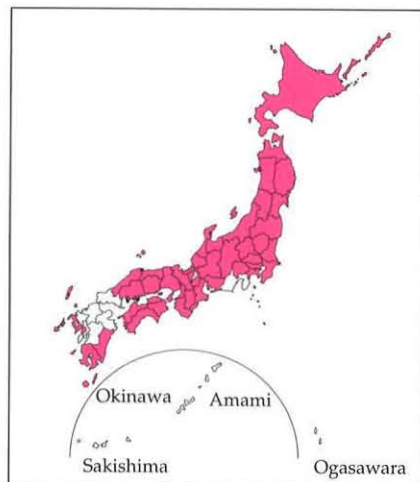


Workers 7-12 mm. Shining black. Head, scapes, dorsum of mesosoma with numerous long hairs.

Easily distinguished from other Japanese ants of subgenus *Camponotus* by its dense, long erect hairs. Nests in dead portions of tree trunks. Widely distributed, but sporadic and rare.

FORMICINAE

Camponotus obscuripes Mayr

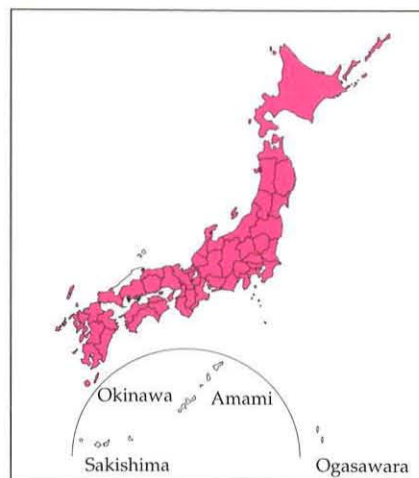
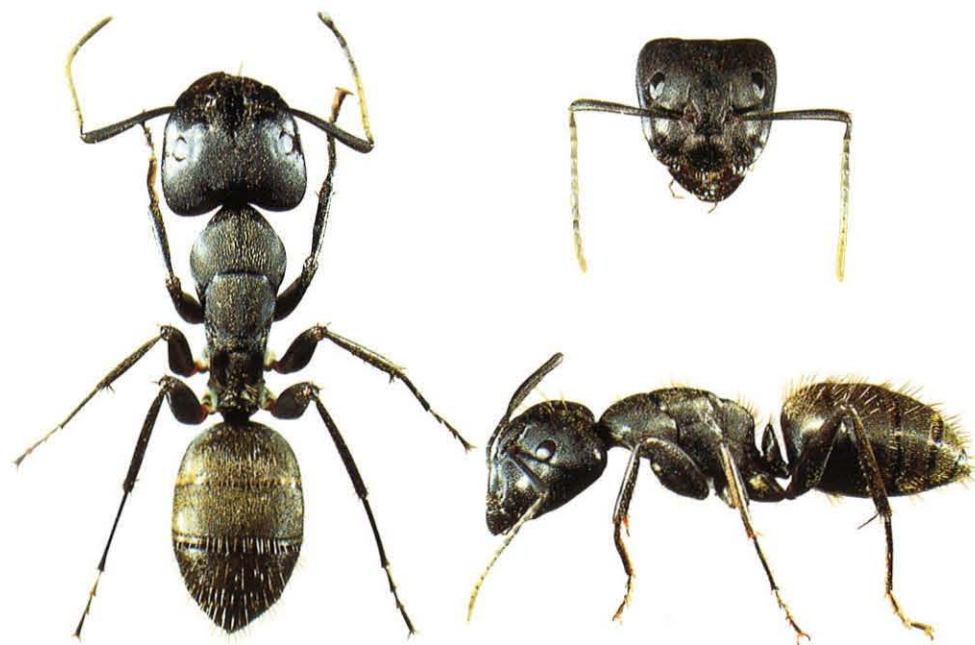


Workers 7-12 mm. Mesosoma, petiole, gastral base yellowish to reddish brown, remainder black. Hairs on 2nd gastral tergite short.

Resembles *C. hemichlaena*, distinguished by red pronotum (versus black). High mountain populations darker than others. Nuptial flights May to June in lowlands, until August in mountains. Nests in dead portions of standing trees or rotting wood in forests.

FORMICINAE

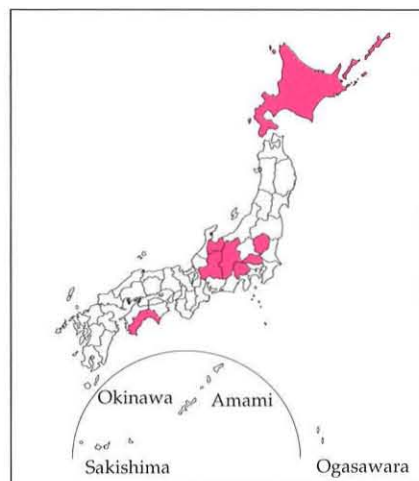
Camponotus japonicus Mayr



Workers 7-12 mm. Black; head subopaque, not shining. Promesonotal profile gently convex. Posterodorsal propodeal corner more rounded, propodeal declivity more gently declivitous than in *C. herculeanus*. 2nd gastral tergite with hairs in 4-8 overlapping rows; hairs 3-5 times as long as interspaces. Promesonotum with few erect hairs. Nests in soil in open habitats. Nuptial flights May to June.

FORMICINAE

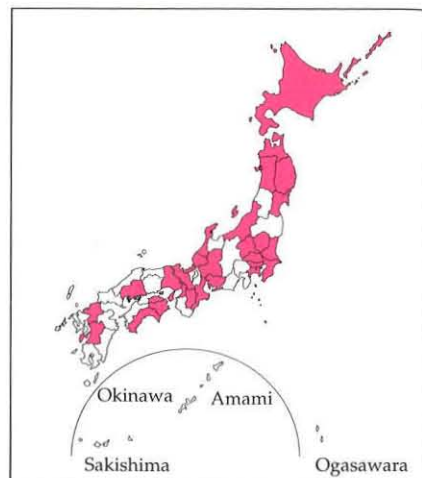
Camponotus sachalinensis Forel



Workers 7-12 mm. Black, somewhat shining. Promesonotal dorsum not distinctly raised. Posterodorsal propodeal corner more strongly angulate, propodeal declivity more steep than in *C. japonicus*. Promesonotal dorsum with hairs lacking or sparse. Found in mountainous regions of Honshu and Hokkaido.

FORMICINAE

Polyergus samurai Yano

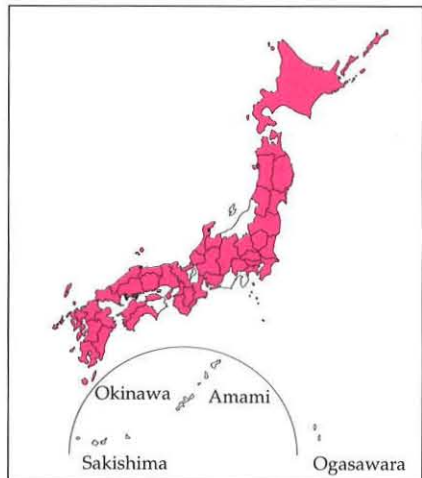


Workers 7 mm. Brownish black. Antennal insertions adjacent to clypeus. Head narrowed posteriorly. Mandibles sickle-shaped. Promesonotum not especially protrusive; mesothoracic spiracles raised. Propodeum posterodorsally angulate, raised.

A slave-making species, usual host *Formica japonica*. Nests in soil, seldom abroad except when raiding (usually around late afternoon in summer, when cocoons of slave species are present). Nuptial flights in July.

FORMICINAE

Formica hayashi Terayama & Hashimoto



Workers 5.5-7 mm. Black. Slender. Antennae, femora, tibiae blackish brown. Head posteriorly slightly shining (compare *F. japonica*). In life gastral tergites appear velvety (greyish in *japonica*). Gastral tergite II virtually lacking setae, unlike *japonica* and *F. lemani*.

Abundant at woodland margins, penetrating grassland in south. Nests under stones etc. Nuptial flight 2 to 3 weeks later than *F. japonica*.

Subfamily FORMICINAE

Polyrhachis lamellidens F. Smith

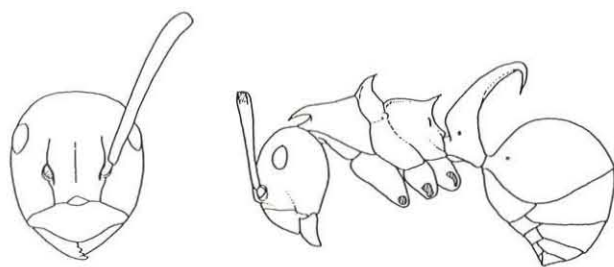
Fig. p 17

Original Reference: Smith, F. (1874)

Distribution: Honshu, Shikoku, Kyushu, Yaku I.; Mainland China, Korea, Hong Kong, Taiwan.

Total length of workers around 7-8 mm. Body bicolored; head, legs and gaster black; mesosoma and petiole reddish brown. Dorsal surface of mesosoma flattened, dorsolateral edges carinate. Pronotum with a pair of forwardly-directed spines. Mesonotum with a pair of backwardly curved spines. Propodeal spines long, their apices curved. Dorsolateral margins of propodeum carinate. Petiole with a pair of long, hooked spines.

This species is referable to subgenus *Polyrhachis* (s. str.). It could be a temporary social parasite, since its queens have been reported to invade the nests of *Camponotus japonicus*, *C. obscuripes*, and probably *C. kiusiuensis* by Sakai (1990). Nests are found in hollow tree trunks. The nuptial flights occur from September to November.



P. lamellidens

Polyrhachis moesta Emery

Fig. p 17

Original Reference: Emery, C. (1887)

Synonym(s): *Polyrhachis hippomanes* var. *moesta* Emery (Emery, 1887)

Polyrhachis moesta Emery (Wang & Wu, 1991)

Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu, Yaku I., Nansei Is.; Mainland China, Taiwan, Indonesia (Java, Sumatra).

Total length of workers around 6 mm. Body color jet black, legs reddish brown. Dorsal surface of mesosoma arched, without dorso-lateral carination. Metanotal dorsum strongly convex in profile. Anterolateral corners of pronotum angulate in dorsal view, without spines. Mesonotum without teeth. Propodeum with well developed spines. Petiole with a pair of large spines. Viewed anteriorly, dorsal margin of petiolar scale straight, with a small cornicle posteriorly.

This taxon was cited as *P. hippomanes moesta* in Myrmecological Society of Japan Editorial Committee (1988). The

subspecies *moesta* was subsequently raised to species rank by Wang & Wu (1991). *P. moesta* is referable to subgenus *Myrmhopla*. It is arboreal, nesting in dead twigs. Yamaoka (1980) reported a nest incorporating larval silk. A relatively rare species.

Polyrhachis dives F. Smith

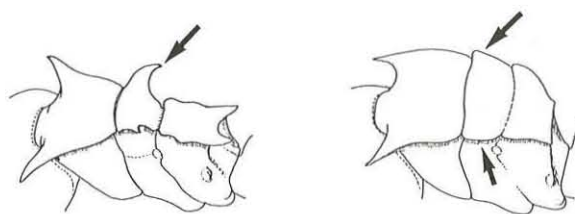
Fig. p 18

Original Reference: Smith, F. (1857)

Distribution: Nansei Is (Okinawa I. and southwards); Mainland China, Taiwan, Philippines, SE Asia, New Guinea.

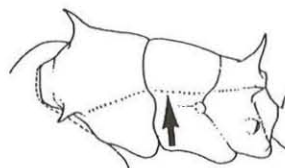
Total length of workers around 5 - 6 mm. Body color black. Mesosoma covered with coarse punctures. Head and gaster with white to whitish yellow pubescence. Dorsal surface of mesosoma arched, dorsolateral margins not carinate. Pronotum with a pair of well-developed teeth directed laterally. Mesonotum without teeth. Propodeum with a pair of well-developed teeth. Petiole with a pair of long lateral spines, which are longer than those of mesosoma, and a pair of small median cornicles.

This species is referable to subgenus *Myrmhopla*. Its nests are found on grasses or trees. They are constructed by the ants using plant leaves and dead twigs, which are woven together with larval silk (Takahashi, 1937; Takamine, 1983). This species is polygynous, including around 50 females in a colony (Yamauchi et al., 1989).

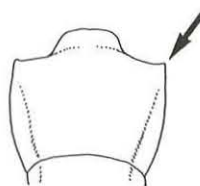


P. lamellidens

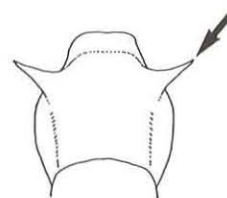
P. latona



P. dives



P. moesta



P. dives

Polyrhachis latona Wheeler

Fig. p 18

Original Reference: Wheeler, W. M. (1909)

Distribution: Nansei Is (Sakishima group); Taiwan.

Total length of workers around 5 - 6 mm. Body color black with dense whitish pubescence. Dorsal outline of mesosoma roundly convex in profile, the dorsal surface transversely flat with lateral margination. Pronotum with a pair of acute teeth directed forwards. Mesonotum without teeth. Propodeum with small teeth; posterodorsal margin carinate. Petiole with two pairs of spines, the inner pair larger than the others; dorsal margin of petiole with a median blunt angle in frontal view.

This species is referable to subgenus *Myrma*. It is commonly distributed in the Sakishima group of the Nansei Islands. It nests in the soil.

Camponotus shohki Terayama

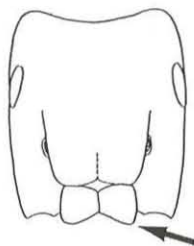
Fig. p 19

Original Reference: Terayama, M. (1999)

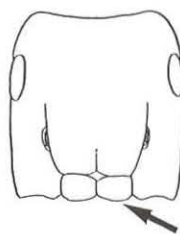
Distribution: Nansei Is (Yoron-jima I. and southwards), Daito Is.

Total length around 2.5 - 3 mm in minor workers and around 5 mm in major workers. Head and mesosoma yellowish brown to reddish brown (sometimes blackish brown); gaster black.

This species is distinguished from *C. nipponicus* by the much longer heads of its major workers (head length about 1.10 mm, versus 1.00 - 1.05 mm in *C. nipponicus*), and the shape of the anterior margin of the head, which has a pair of blunt projections visible in full face view. This is an arboreal species.



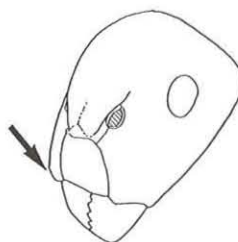
P. shohki



P. nipponicus



P. nipponicus



P. vitiosus

Camponotus nipponicus Wheeler

Fig. p 19

Original Reference: Wheeler, W. M. (1928)

Synonym(s): *Camponotus (Colobopsis) rothneyi* Forel (Wheeler, 1906)

Camponotus (Colobopsis) truncatus Spinola (Ito, 1914)

Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu, Yaku I., Nansei Is. (Amami-oshima I., Tokunoshima I., Tokashiki-jima I.), Ogasawara Is.

Total length around 2.5 - 3 mm in minor workers and around 5 mm in major workers. Head and mesosoma blackish brown to almost black; gaster black. Anterior margin of the head in major workers straight, without projections in full face view.

This species is arboreal. Nuptial flights occur during June and July.

Camponotus daitoensis Terayama

Fig. p 20

Original Reference: Terayama, M. (1999)

Distribution: Daito Is (Minami-daito I.).

Total length around 4 mm in minor workers; 5.5 - 6 mm in major workers. In major workers: head, mesosoma and legs reddish brown; 1st gastral tergite yellowish brown excepting posterior margin which is blackish brown to black; 2nd to terminal segments blackish brown to black; pronotal dorsum with several relatively short erect hairs; mesonotal dorsum with 4 to 6 such hairs; propodeum with more than 10 erect hairs. In minor workers: head, mesosoma and legs light yellowish brown; coloration of gaster as in the major worker; pronotal dorsum without hairs; mesonotal dorsum with a pair of erect hairs; propodeum with about 12 erect hairs.

This is an arboreal species which nests in dead twigs on trees.

Camponotus hemichlaena Yasumatsu & Brown

Fig. p 20

Original Reference: Yasumatsu, K. & Brown, W. L., Jr. (1951)

Synonym(s): *Camponotus obscuripes hemichlaena* Yasumatsu & Brown (Yasumatsu & Brown, 1951)

Camponotus hemichlaena Yasumatsu & Brown (Yasumatsu & Brown, 1957)

Distribution: Honshu (Chugoku District), Shikoku, Kyushu, Yaku I.

Total length of workers around 7 - 12 mm. Body bicolored: mesosoma (excluding pronotum), petiole and basal portion of 1st gastral segment red; the remainder black. Hairs on posterior section of 2nd gastral tergite not extending beyond its posterior margin.

This species is distinguished from *C. obscuripes* by its black

pronotum (pronotum red in *C. obscuripes*). It was originally described as a subspecies of *C. obscuripes* and later raised to species rank by Yasumatsu & Brown (1957). However, since no other morphological distinctions have been observed between it and *C. obscuripes*, separation from *obscuripes* depends exclusively on coloration. Further study on its taxonomic status is needed. Both *C. hemichlaena* and *C. obscuripes* are present in Shikoku and Kyushu, with *obscuripes* tending to distribution at higher elevations. On Honshu, *C. hemichlaena* is known only from Hiroshima.

Camponotus friedae Forel

Fig. p 21

Original Reference: Forel, A. (1912)

Distribution: Nansei Is (Amami-oshima I., Miyako I.); Taiwan, Mainland China.

Total length around 5 mm in minor workers and 7 - 9 mm in major workers. Head black; mesosoma, antennae and legs brown; gaster blackish brown. In major workers: mandibles each with 6 teeth (5 in smaller individuals); clypeus produced anteriorly, anterior margin without a median notch; propodeal declivity abruptly sloping; dorsum of mesosoma with more than 20 long, erect hairs; similar hairs also present on vertex of head, petiolar dorsum and gaster. In minor workers: mandibles each with 5 teeth; propodeal declivity abruptly sloping; mesosoma with more than 20 long, erect hairs.

This species nests in the soil and under stones in forest, at forest margins, and in grasslands. Relatively rare in Japan.

Camponotus ogasawarensis Terayama & Satoh

Fig. p 21

Original Reference: Terayama, M. & Satoh, T. (1990c)

Distribution: Ogasawara Is.

Total length of workers around 4 - 5.5 mm. Head, mesosoma and petiole yellow; ground color of gaster black; 1st to 3rd gastral tergites each with a pair of yellow spots or a yellow transverse band; 4th gastral tergite often with a pair of similar spots (absent in some individuals). Dorsal margin of propodeum concave in minor workers. Viewed from the side, major workers have straight dorsal mesonotal and propodeal profiles, and the anterior end of the propodeum forms a blunt angle. Petiolar scale with an inverted U-shaped profile.

This is an arboreal species which nests in dead twigs on trees.

Camponotus bishamon Terayama

Fig. p 22

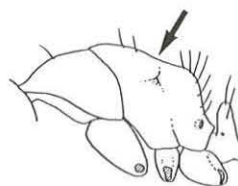
Original Reference: Terayama, M. (1999)

Distribution: Honshu (southern parts), Shikoku, Kyushu, Yaku I., Nansei Is.

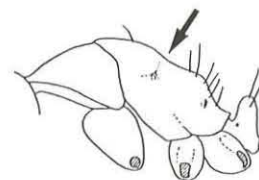
Total length of workers around 4 - 4.5 mm. Body black. This

species resembles *C. vitiosus*, but is distinguished by the straight or very weakly concave dorsal margin of its propodeum and the asymmetrical shape of its petiolar scale (the anterior margin of the petiolar scale is shorter than the posterior margin in profile).

This is an arboreal species which is common in the Nansei Islands. It was referred to as *Camponotus (Myrmamblys) sp.* by Onoyama (1976), and *Camponotus sp.* "Senaga-umematsu-oo-ari" by Terayama & Satoh (1990c).



C. bishamon



C. vitiosus

Camponotus vitiosus F. Smith

Fig. p 22

Original Reference: Smith, F., (1874)

Synonym(s): *Camponotus itoi tokioensis* Ito (Ito in Forel, 1912)

Camponotus (Myrmentoma) itoi tokioensis Ito (Emery, 1925)

Camponotus (Myrmamblys) itoi tokioensis Ito (Wheeler, 1928)

Camponotus (Myrmamblys[!]) tokioensis v. inconstans Santschi (Santschi, 1937)

Camponotus (Myrmamblys) tokioensis v. atrigenatus Santschi (Santschi, 1937)

Camponotus (Myrmentoma) tokyoensis[!] Ito (Menozzi, 1940)

Camponotus (Myrmamblys) tokioensis Ito (Terayama & Satoh, 1990)

Distribution: Honshu, Shikoku, Kyushu; Mainland China, Korean Peninsula.

Total length of workers around 5 - 6 mm. Body black; legs blackish brown; pronotum often brownish. Propodeal dorsum concave in lateral view. Petiole thick, with an inverted U-shaped profile.

C. tokioensis Ito was synonymized with *C. vitiosus* by Yamane and Terayama (1999). This is an arboreal species which nests in dead twigs of trees.

Camponotus nipponensis Santschi

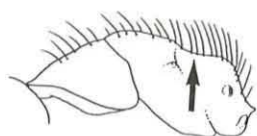
Fig. p 23

Original Reference: Santschi, F. (1937)

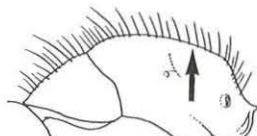
Distribution: Honshu; Korean Peninsula.

Total length of workers around 4 - 5 mm. Body black to blackish brown. Anterior margin of clypeus with a median notch. Dorsum of mesosoma with more than 20 long, flagellate hairs; similar hairs also present on petiolar dorsum.

This species is easily separated from the other Japanese members of subgenus (*Myrmentoma*) by the abundant long hairs on its mesosoma and petiole. It is distributed from lowlands to lower mountainous regions and is relatively rare.



C. nipponensis



C. yesensis

Camponotus yamaokai Terayama & Satoh

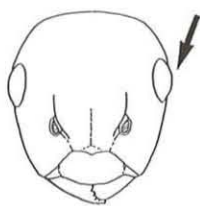
Fig. p 23

Original Reference: Terayama, M. & Satoh, T. (1990a)

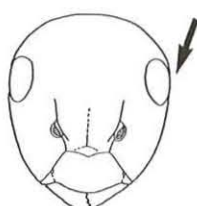
Distribution: Honshu, Shikoku, Kyushu, Yaku I.

Total length of workers around 3.5 - 4.5 mm. Body black; pronotum reddish brown; legs brown. First and 2nd gastral terga each with a pair of whitish spots which vary intraspecifically in size.

This species resembles *C. nawai*, but is distinguished by its much more prominent eyes and smaller relative head size in minor and major workers. Also, in minor workers, the petiolar scale is thinner in lateral view than in *C. nawai*; while in major workers it is thinner and wider in dorsal view than in *C. nawai*. *C. nawai* is monogynous, nests in woods near seashores, nuptial flights occur during August. *C. yamaokai* is polygynous, new queens over-winter in the nests and decamp during May (Satoh, 1989). This species is arboreal and nests in dead twigs on trees.



C. yamaokai



C. nawai

Camponotus nawai Ito

Fig. p 24

Original Reference: Ito, T. (1914)

Synonym(s): *Camponotus fallax* var. *nawai* Ito (Ito, 1914)

Camponotus (Myrmamblys) itoi var. *nawai* Ito (Emery, 1925)

Camponotus caryae var. *nawai* Ito (Wheeler, 1928)

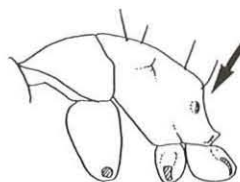
Camponotus nawai Ito (Terayama & Satoh, 1990)

Distribution: Honshu (central to southern parts), Shikoku, Kyushu, Yaku I., Nansei Is (Yokoate I., Takara I., Amami-oshima

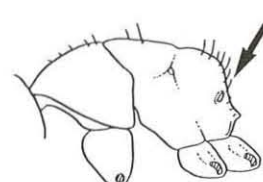
I.).

Total length of workers around 4 - 4.5 mm. Ground color of body black; pronotum reddish brown to blackish brown; legs brown; 1st and 2nd gastral terga each with a pair of whitish spots, which vary from well-developed to almost absent. Propodeal dorsum straight in lateral view; petiole thin.

The Izu Islands and central Honshu populations show slight morphological differences in petiolar shape and coloration from those of the Kii Peninsula and Shikoku. Further studies are needed to determine the range of this species in Japan. *C. nawai* is monogynous. It is distributed in woods near the sea coast (Satoh 1989). Nuptial flights occur during August. *C. yamaokai*, on the other hand, is polygynous, with nuptial flights during May. It is distributed from lowlands to mountainous regions. *C. nawai* is arboreal and nests in dead twigs. In "A List of the Ants of Japan with Common Japanese Names" (Myrmecological Society of Japan Editorial Committee, 1988), the name "*nawai*" was listed as a variety of *C. itoi*. Terayama & Satoh (1990a) later raised it to full species rank.



C. nawai



C. itoi

Camponotus itoi Forel

Fig. p 24

Original Reference: Forel, A. (1912)

Distribution: Honshu, Kyushu; Korean Peninsula.

Total length of workers around 3.5 - 4.5 mm. The smallest Japanese species in subgenus (*Myrmamblys*). Body black. Mesonotal dorsum flat in lateral view; propodeal declivity the most abruptly declivitous in subgenus (*Myrmamblys*).

This is an arboreal species. It nests in dead twigs on standing trees.

Camponotus quadrinotatus Forel

Fig. p 25

Original Reference: Forel, A. (1886)

Synonym(s): *Camponotus marginatus* var. *quadrinotatus* Forel (Forel, 1886)

Camponotus (Myrmentoma) caryae var. *quadrinotatus* Forel (Wheeler, 1928)

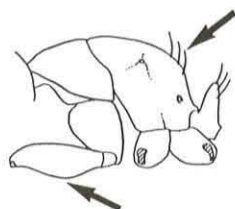
Camponotus quadrinotatus Forel (Collingwood, 1976)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Mainland

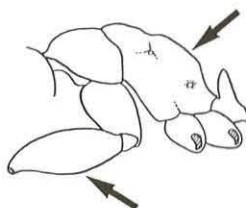
China, Korean Peninsula.

Total length of workers around 5 - 6 mm. Body black; pronotum brownish in many individuals. First and 2nd gastral terga each with a pair of yellowish spots. Metanotal groove not incised dorsally; petiole with hairs.

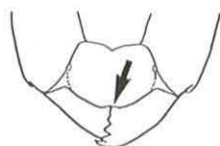
This is an arboreal species which nests in bark or crevices on tree trunks.



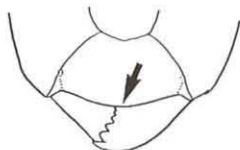
C. quadrinotatus



C. keihittoi



C. quadrinotatus



C. vitiosus

Camponotus keihittoi Forel

Fig. p 25

Original Reference: Forel, A. (1913)

Synonym(s): *Camponotus fallax* var. *keihittoi* Forel (Forel, 1913)

[Replacement name for *C. tokyoensis* Teranishi (Teranishi, 1915)]

Camponotus tokyoensis Teranishi (Teranishi, 1915)

Camponotus caryae var. *keihittoi* Forel (Wheeler, 1923)

Camponotus (Myrmentoma) caryae var. *teranishii* Wheeler (Wheeler, 1928)

Camponotus keihittoi Forel (Terayama & Satoh, 1990)

Distribution: Honshu, Shikoku, Kyushu; Korean Peninsula.

Total length of workers around 4.5 mm. Body black, evenly shining. Dorsum of mesosoma and petiole without hairs. Metanotal groove distinctly incised dorsally.

This is an arboreal species, nesting in dead twigs on standing trees. The name "*keihittoi*" was listed as a variety of *Camponotus caryae* in "A List of the Ants of Japan with Common Japanese Names" (Myrmecological Society of Japan Editorial Committee, 1988), but Terayama and Satoh (1990b) later raised it to full species rank.

Camponotus amamianus Terayama

Fig. p 26

Original Reference: Terayama, M., (1991)

Distribution: Amami-oshima I.

Total length of workers around 7 - 13 mm. Body jet black, legs jet

black to reddish brown. Anterior margin of clypeus straight in minor workers, concave medially in medium and major workers. Dorsum of mesosoma moderately convex from pronotum to posterior portion of propodeum; posterodorsal corner of propodeum not forming an angle in profile. Mesonotal dorsum with fewer than 3 pairs of hairs; propodeal dorsum with a single pair of erect hairs.

This species is found in forests. It nests in dead portions of tree trunks and in the soil.

Camponotus kiusiuensis Santschi

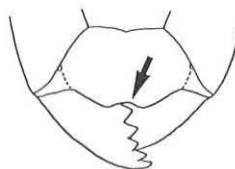
Fig. p 26

Original Reference: Santschi, F. (1937)

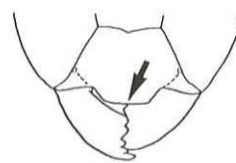
Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Korean Peninsula.

Total length of workers around 8 - 11 mm. Body black, sometimes slightly brownish; legs brown. Anterior margin of clypeus medially concave. Posterodorsal corner of propodeum bluntly angulate in profile.

This species nests in dead bamboo stems or trees. Its colonies occupy several small nests, each with less than 300 workers. For this reason queens are seldom found in nests (Ito et al., 1988). Foraging is largely nocturnal, but above-ground activity occurs during the day in dark forests (Sonobe, 1984). This species is rare on Hokkaido.



C. kiusiuensis



C. japonicus

Camponotus kaguya Terayama

Fig. p 27

Original Reference: Terayama, M. (1999)

Distribution: Nansei Is (Akuseki-to I., Amami-oshima I., Tokunoshima I., Okinawa I.).

Large species: total length of workers around 7 - 12 mm. Head blackish brown; mesosoma, petiole, legs and 1st and 2nd gastral terga reddish brown; 3rd to 5th gastral terga black. Anterior margin of clypeus weakly produced; convex medially. Mandibles each with 6 teeth. Scapes of minor workers long: 1.3 - 1.4 times head width. Mesosomal dorsum strongly convex, sloping from anterior portion of pronotum to posterior portion of propodeum. Posterodorsal corner of propodeum rounded, not forming an angle.

This species is found in grasslands and nests in the soil.

Camponotus albosparsus Bingham

Fig. p 27

Original Reference: Bingham, C. T. (1903)

Synonym(s): *Camponotus taylora* var. *albosparsus* Bingham (Bingham, 1903)

Camponotus albosparsus Bingham (Wang et al., 1989)

Distribution: Nansei Is (Sakishima Is); Taiwan, China (southern parts), SE Asia.

Total length of workers around 4 - 7 mm. Head blackish brown; mesosoma, petiole and legs brown; gaster black, 1st and 2nd gastral terga each with a pair of yellow spots (often merging on the 1st tergite). Anterior margin of clypeus straight. Mandibles each with 6 teeth. Scapes short: 1.2 - 1.3 times the head width in minor workers, and just exceeding the posterior border of the head in majors. Petiole relatively high, with an inverted V-shaped profile. Head and mesosoma with relatively abundant erect hairs.

This species is widely distributed in Southeast Asia. Nests are found in soil in open country or grassland.

Camponotus yambaru Terayama

Fig. p 28

Original Reference: Terayama, M. (1999)

Distribution: Northern part of Okinawa I.

Total length around 3.5 mm in minor workers, 5 mm in majors. Body color yellowish brown. In major workers: head somewhat darker than mesosoma and gaster; mandibles each with 6 teeth; scapes short, just reaching posterior margin of head; mesosoma short, pro- and mesonotal dorsa almost flat in profile; in dorsal view, pronotal disc wide; propodeal declivity abruptly declivitous; dorsum of pro- and mesonota each with 2 to 4 erect hairs; propodeum with about 10 erect hairs; petiolar scale thin, with hairs dorsally. In minor workers: mandibles each with 5 teeth; scapes each exceeding posterior margin of head by 1/3 its length; pronotal dorsum without erect hairs; mesonotal dorsum with a pair of erect hairs; propodeum with about 10 erect hairs.

This is an arboreal species which nests in dead twigs on trees and bamboo internodes. It is known only from the northern part of Okinawa.

Camponotus monju Terayama

Fig. p 28

Original Reference: Terayama, M. (1999)

Distribution: Kyushu (Unzen), Ryukyu Is; Taiwan.

Total length of workers around 7 - 10 mm. Head and gaster blackish brown to black; mesosoma, petiole and legs brown to blackish brown.

This species resembles *C. devestitus*, but is distinguished by the much more abundant erect hairs on the head, the dorsa of the

pronotum and mesonotum, and the fore coxae.

Camponotus devestitus Wheeler

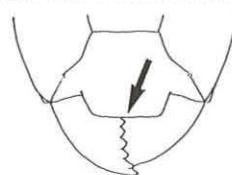
Fig. p 29

Original Reference: Wheeler, W. M. (1928)

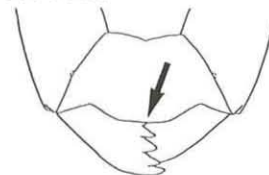
Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu, Yaku I., Ryukyu Is (Tokunoshima I. and northwards).

Total length of workers around 7 - 10 mm. Head brown to dark brown; mesosoma, petiole and legs yellowish brown; gaster brown to blackish brown. Head long. Clypeus apically truncated. Mandibles each with 6 teeth. Scapes long, more than 1.8 times head width in minor workers, exceeding posterior margin of head by 1/4 their length in major workers. Petiolar scale thick and triangular in profile. Pronotum without erect hairs; mesonotum with only one pair of erect hairs; fewer than 3 hairs on anterior coxae.

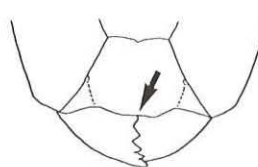
This species nests in tree trunks or dead twigs. Three worker subcastes are recognized (Harada 1993, 1996)



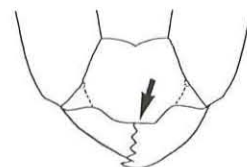
C. devestitus



C. obscuripes



C. sachalinensis



Camponotus sp. 6

Camponotus sp. 6

Fig. p 29

Distribution: Senkaku Is (Uotsuri-jima I.).

Total length of workers around 7 - 9 mm (based on 2 individuals only). Color black. Propodeal dorsum short, so that the mesosoma appears compressed in length.

This species resembles *C. japonicus*, but is distinguished from it by the following characteristics: (1) 2nd gastral tergite with sparse pubescence, the hairs not overlapping their neighbours (they overlap in *C. japonicus*); (2) the length of the individual hairs of the pubescence 1.5 to 2 times the distance separating them; (3) pubescence on head and mesosoma more sparse and shorter than in *C. japonicus*. This species is found only on Uotsuri-jima Island. *C. japonicus* has been recorded from Okinawa Island, Ishigaki Island, Iriomote Island and Senkaku Is (Ikehara & Shimojana, 1971; Takara & Azuma, 1973). The relevant records could involve

Camponotus sp. 6 or another species.

Camponotus yessensis Yasumatsu & Brown

Fig. p 30

Original Reference: Yasumatsu, K. & Brown, W. L., Jr. (1951)

Synonym(s): *Camponotus* (*Camponotus*) *herculeanus* *vagus* var. *yessensis* Teranishi (Teranishi, 1940)

Camponotus yessensis Yasumatsu & Brown (Yasumatsu & Brown, 1951)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu.

Total length of workers around 7 - 12 mm. Body color shining black. Head, scapes and dorsum of mesosoma with numerous long, erect hairs.

This species is easily distinguished from other Japanese ants of subgenus *Camponotus* by its dense, long erect hairs. *C. yessensis* nests in dead portions of tree trunks. It is widely distributed in the Japanese archipelago, but sporadic and rare.

Camponotus obscuripes Mayr

Fig. p 30

Original Reference: Mayr, G. (1879)

Synonym(s): *Camponotus ligniperdus* var. *obscuripes* Mayr (Mayr, 1879)

Camponotus obscuripes Mayr (Yasumatsu & Brown, 1957)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima I., Yaku I.; Kurile Is, Sakhalin.

Total length of workers around 7 - 12 mm. Body bicolored: mesosoma, petiole and basal portion of gaster red (sometimes yellowish brown to reddish brown); the remainder black. Hairs on 2nd gastral tergite short, those of the most posterior row not extending beyond posterior margin of the tergite.

This species resembles *C. hemichlaena*, but is distinguished by its red pronotum (pronotum black in *hemichlaena*). Color variation is seen in some populations. For example, the body is almost black except for the petiole and adjacent areas which are reddish in Obihiro, Hokkaido; or completely black at Mt. Kuju, Kyushu. In these cases *C. obscuripes* is distinguished from other black Japanese *Camponotus* species, except *C. yessensis*, by the short pubescence on its 2nd gastral tergite. *C. obscuripes* is distributed from lowland to mountain areas. The high mountain populations tend to be darker in color than lowland ones. Nuptial flights occur from May to June in lowlands, and until August in the mountains. This species is found in forested areas. It nests in dead portions of standing trees or in rotting wood. The black woodpecker *Dryocopus martius* feeds preferentially on *C. obscuripes* in Hokkaido.

Camponotus japonicus Mayr

Fig. p 31

Original Reference: Mayr, G. (1866)

Synonym(s): *Camponotus pennsylvanicus* var. *aterrima* Emery

(Emery, 1894)

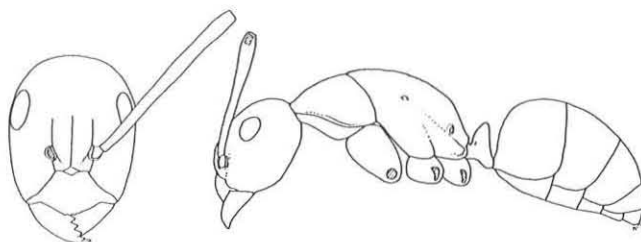
Camponotus herculeanus saxatilis Ruzsky (Ruzsky, 1895)

Camponotus herculeanus japonicus Mayr (Yasumatsu & Brown, 1951)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima I., Yaku I., Tokara Is (Suwanose-jima I. and northwards); Mainland China, Korean Peninsula.

Total length of workers around 7 - 12 mm. Body color black; head subopaque, not shining. Promesonotum gently convex in profile. Posterodorsal corner of propodeum more rounded, and propodeal declivity more gently declivitous than in *C. herculeanus*. Hairs on 2nd gastral tergite arranged in 4 to 8 rows, each overlapping the next; the hairs 3 - 5 times as long as their interspaces. Promesonotum with a few erect hairs

This species nests in the soil in open land. Nest entrances open directly without a surrounding mound. Nuptial flights occur from May to June (Abe, 1973). Chromosome number is $2n = 26$ (Imai & Kubota, 1972).



C. japonicus (A minor worker)

Camponotus sachalinensis Forel

Fig. p 31

Original Reference: Forel, A. (1904)

Synonym(s): *Camponotus herculeanus* var. *sachalinensis* Forel (Forel, 1904)

Camponotus herculeanus sachalinensis Forel (Collingwood, 1976)

Camponotus sachalinensis Forel (Collingwood, 1981)

Distribution: Hokkaido, Honshu (central mountainous region); Sakhalin, Siberia, Mongolia, NE China, Korean Peninsula.

Total length of workers around 7 - 12 mm. Body color black, somewhat shining. Promesonotal dorsum not distinctly raised. The posterodorsal corner of propodeum more strongly angulate, and propodeal declivity more steep, than in *C. japonicus*. Promesonotal dorsum lacking hairs or with only a few hairs.

This species found in the mountainous regions of Honshu and Hokkaido in Japan.

Polyergus samurai Yano

Fig. p 32

Original Reference: Yano, M. (1911)

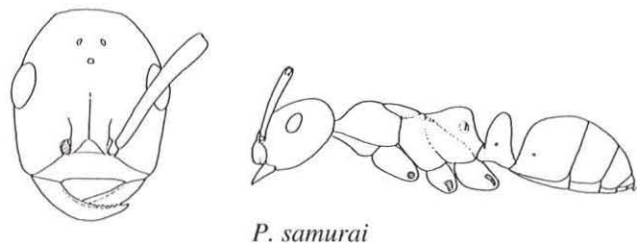
Synonym(s): *Polyergus rufescens* subsp. *samurai* Yano 1911

Polyergus samurai: Emery, 1925

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Mainland China, Korean Peninsula.

Total length of worker about 7 mm. Body color somewhat brownish black. Antennal insertions situated adjacent to posterior margin of clypeus. Posterior border of head narrowed. Promesonotum not especially protrusive; spiracles of mesothorax conspicuously raised. Posterodorsal portion of propodeum slightly angulate and raised.

This species much resembles its slave *Formica japonica* Motschoulsky in size and color, but is distinguishable by its slightly larger size, more blackish body colour and sickle-shaped mandibles (versus subtriangular in *F. japonica*). *Formica japonica* is its main slave, and sometimes *F. hayashi*. A colony comprising three species, with both *F. fukaii* Wheeler and *F. japonica* as slaves, has been observed on Mt. Zao, Miyagi Prefecture (Sonobe, unpublished); this seems to be a rare occurrence. *P. samurai* nests in the soil and is seldom seen on the ground except when slave-raiding. Raids are carried out at around 3 to 4 pm during summer, when cocoons of slave species are to be found. Hasegawa & Yamaguchi (1995) reported the detailed ecology and raiding behavior of this species. Less common in Shikoku and Kyushu than elsewhere. Nuptial flights occur around July. Chromosome number $n = 27$ (Crozier, 1970).



Formica hayashi
Terayama & Hashimoto

Fig. p 32

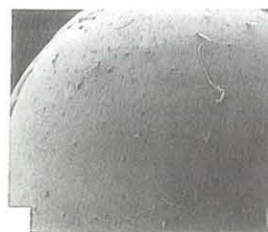
Original Reference: Terayama, M. & Hashimoto, Y. (1996)

Distribution: Hokkaido (Sapporo and southwards), Honshu, Shikoku, Kyushu, Tsushima I., Yaku I.; southern part of Korean Peninsula.

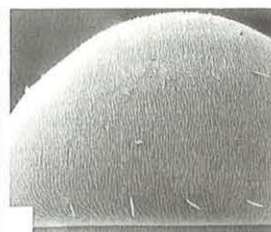
Total length of workers around 5.5 - 7 mm. Body color black. Antennae, femora and tibiae dark brown to blackish brown, tarsi a little lighter. Posterior margin of head slightly shining, and thus different from *F. japonica*. It is easy to distinguish the two species in the field: the gastral tergites have a velvety sheen in *Formica hayashi*, and those of *F. japonica* are greyish. In museum specimens this species is distinct from *F. japonica* and *F. lemani*

because it virtually lacks setae on gastral tergite II. Head and body slender.

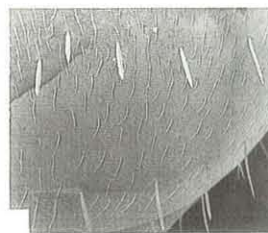
F. hayashi was described by Terayama & Hashimoto (1996), and corresponds to the former *F. sp. 5* of Myrmecological Society of Japan Editorial Committee (1988). This species is abundant at woodland margins from low elevations to mountainous regions. In southern Kyushu it penetrates grassland areas and is more abundant there than *F. japonica*. It nests under stones or other covering material. The nuptial flight occurs 2 to 3 weeks later than in *F. japonica*.



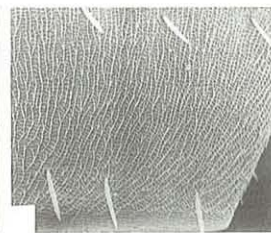
F. candida



F. japonica



F. gagatoides



F. japonica



F. japonica



F. lemani



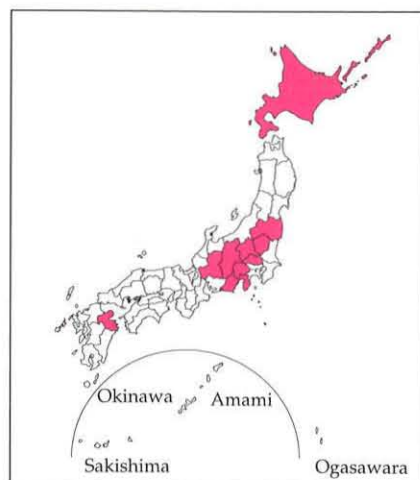
F. hayashi



F. japonica

FORMICINAE

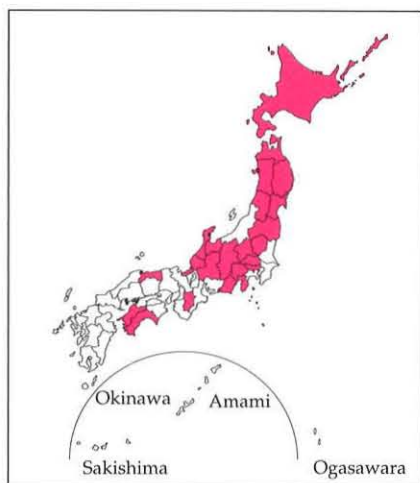
Formica candida F. Smith



Workers 4-5.5 mm. Shining black, Mesosoma densely pubescent, weakly shining; pronotum, mesonotum, petiole brownish; legs, antennae blackish brown. Distinguished from other *Formica* by sparsity of pubescence on dorsum of first gastral tergite. Long white hairs often on ventral side of head. Nests in soil under stones.

FORMICINAE

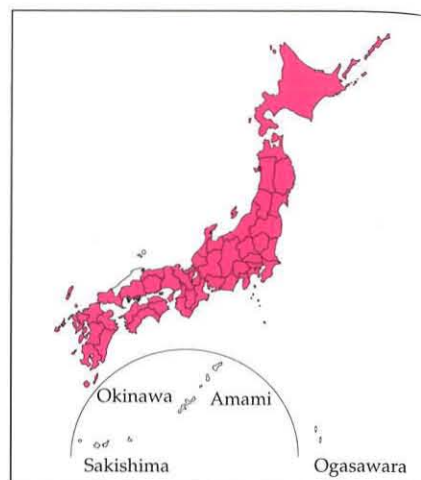
Formica lemani Bondroit



Workers 3.5-5.5 mm. Shining brownish black; mandibles, funiculi, legs brown; scapes, tibiae yellowish. *F. japonica* has different middle-leg tibial length/head width ratio. Erect setae on 1st, 2nd gastral tergites respectively numbering 10, 20, more than in *japonica*. Pronotal setae usually also more abundant. Nests in soil under stones, near grass roots. Flights from mid August.

FORMICINAE

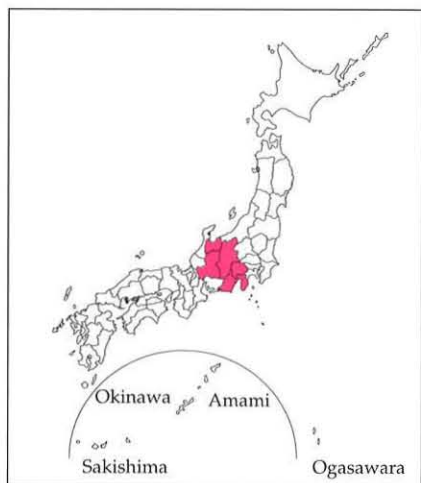
Formica japonica Motschoulsky



Workers 4.5-6 mm. Greyish or brownish black. Similar to *F. hayashi*, but usually with 10+ erect setae on second gastral tergite, and dorsum of first gastral tergite with a few erect setae (averaging 4). Common in lowlands and mountains. Nests in soil. Flights early June to mid September (geographically variable). Pseudogynes in some colonies.

FORMICINAE

Formica gagatoides Ruzsky

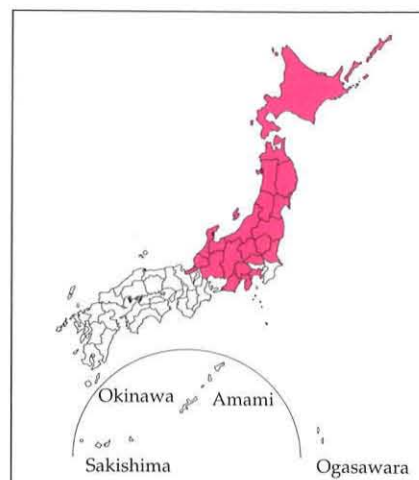


Workers 4-5 mm. Greyish or brownish black. Similar to *F. japonica*: mesosoma more strongly reddish, gaster more polished. Distinguished from *F. candida* by dense pubescence on first gastral tergite, from other species by blackish color, sparsity of pubescence on third gastral tergite.

Distributed at 2700 m. above sea level in central Honshu. Nuptial flights probably after late August.

FORMICINAE

Formica yessensis Wheeler

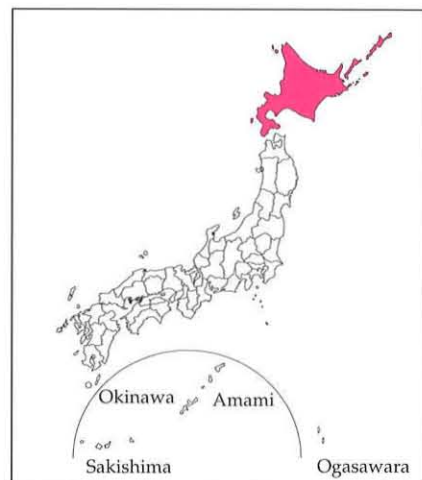


Workers 4.5-7 mm. Head, mesosoma, petiole, legs yellowish red-brown; gaster black, base reddish. Distinguished from *F. truncorum* by near absence of erect setae on extensor surfaces of hind tibiae and scapes. upper petiolar border convex to flat.

Nest mounds of dead grass, conifer needles, ca. 1 m diameter. A supercolony of 45,000 nests, at Ishikari Bay, Hokkaido. Females relatively small. Flights in August.

FORMICINAE

Formica truncorum Fabricius

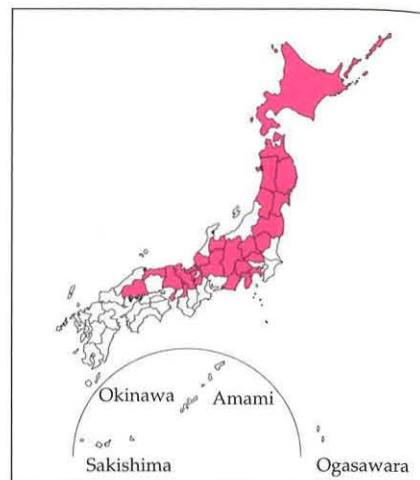
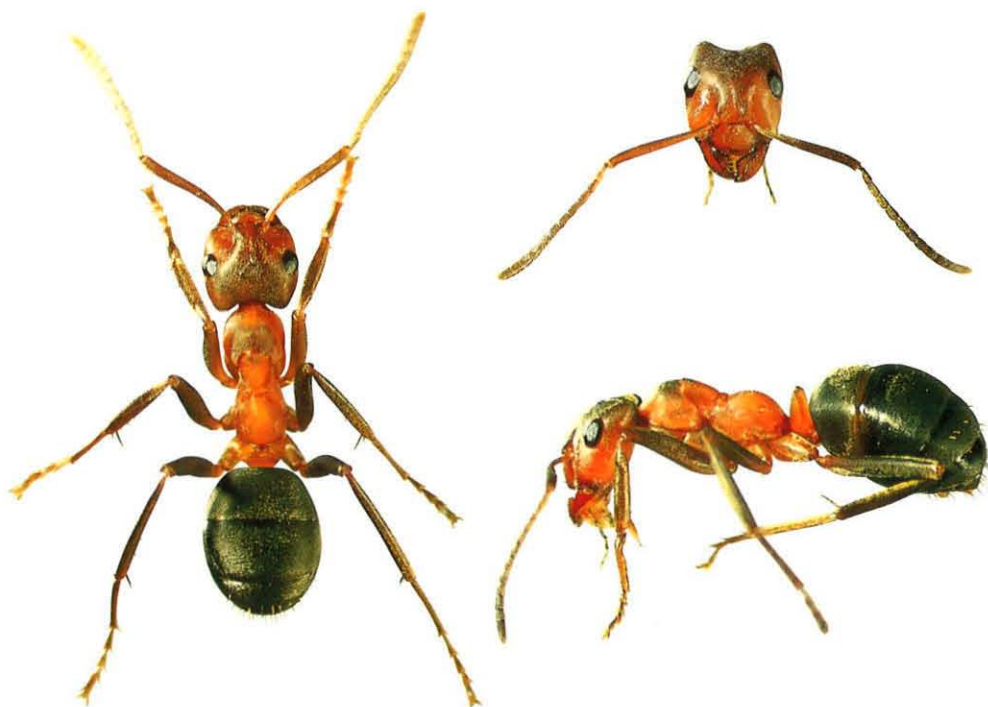


Workers 4.5-7 mm. Color as in *F. yessensis*, sometimes more yellowish. Distinguished from other *Formica* by numerous erect setae on extensor surfaces of hind tibiae, and erect setae on scapes (variable). Erect, dense, frequently long, setae over entire body.

Mounds of dead grass, conifer needles ca. 1 m. diameter.

FORMICINAE

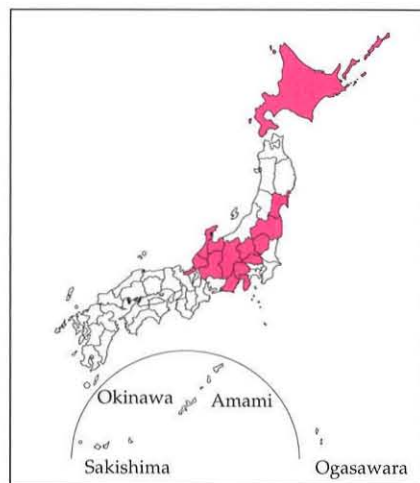
Formica fukaii Wheeler



Workers 4.5-6.5 mm. Head, mesosoma, petiole yellowish to reddish brown; crown of head, median pronotum, antennal scapes, tibiae darker. Distinguishable from other *Formica* by concave posterior cephalic border. Dorsal petiolar border concave at center. No erect hairs on cranium, mesosoma, petiole, gastral tergites I, II. Builds small mounds of dead grass.

FORMICINAE

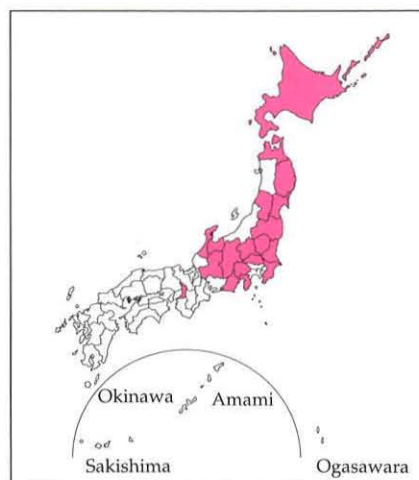
Formica sanguinea Latreille



Workers 6-7 mm. Head dark red to black; mesosoma, petiole, legs red; gaster black. Distinguished by concave median anterior clypeal border. Few erect setae on body. Males: concave anterior clypeal border; mandibles with 5 or more denticles. Does not build mounds. Frequently assembles mixed nests by raiding *F. japonica*, *F. lemani*, *F. candida*, and *F. hayashi*. Nuptial flights July to August.

FORMICINAE

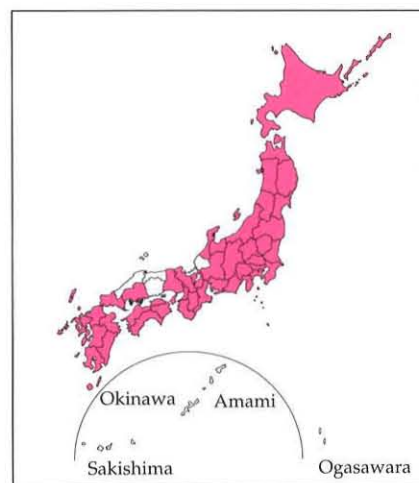
Lasius teranishii Wheeler



Workers 3.0-3.5 mm: smaller than other Japanese (*Dendrolasius*). Black. Petiolar profile an inverted U-shape; scale widest dorsally, dorsal margin almost straight, no median notch. Females: scapes strongly flattened, with numerous decumbent hairs; mesonotal dorsum with decumbent hairs; petiole thick, low, scale with inverted U-shaped profile. Nuptial flights during July.

FORMICINAE

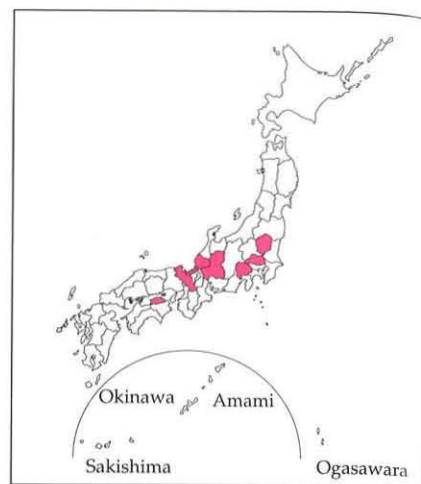
Lasius spathepus Wheeler



Workers 4-5 mm. Black. Petiole with inverted V-shaped profile; anterior margin bluntly angulate below; dorsal margin with shallow median notch. Females: scapes flattened, abundantly hirsute; mesonotal dorsum generally lacking hairs; petiolar profile inverted V-shaped. Nuptial flights June and August.

FORMICINAE

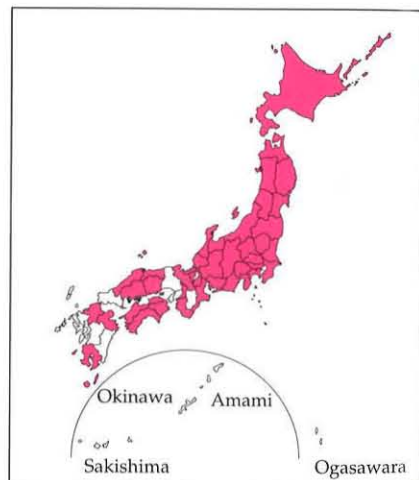
Lasius morisitai Yamauchi



Workers 4.5 mm. Black. Petiole high (+0.6mm), inverted V-shaped profile; lateral margins parallel; dorsal margin with shallow notch. Females: scapes with short decumbent hairs, no erect hairs; mesonotal dorsum with sparse erect hairs; petiole with inverted V-shape profile. Rare. Nuptial flights in July.

FORMICINAE

Lasius nipponensis Forel

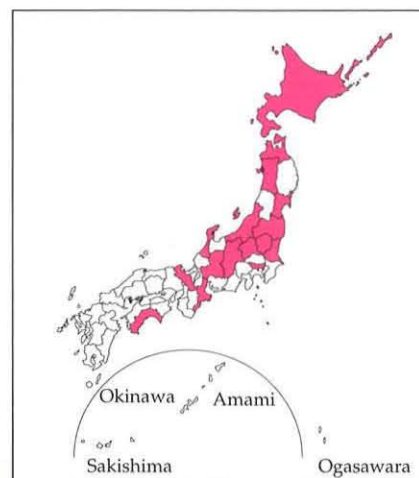


Workers 4-5 mm. Black. Petiole with inverted U-shaped profile; dorsum with median notch. Females: scapes with decumbent, but no erect hairs; petiole with inverted U-shaped profile.

A temporary social parasite of subgenus *Chthonolasius*. Nuptial flights June, July.

FORMICINAE

Lasius capitatus (Kuznetsov-Ugamsky)

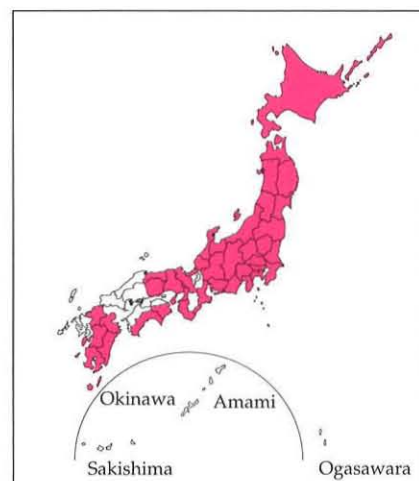


Workers 4-4.5 mm. Black. Petiole with inverted V-shaped profile; scale, broadest at midlength, tapering dorsally, acutely convex above, without median notch. Females: scapes, mesonotal dorsum with abundant erect hairs; petiole thin, high, acute dorsally in profile. Nuptial flights in September.



FORMICINAE

Lasius umbratus (Nylander)

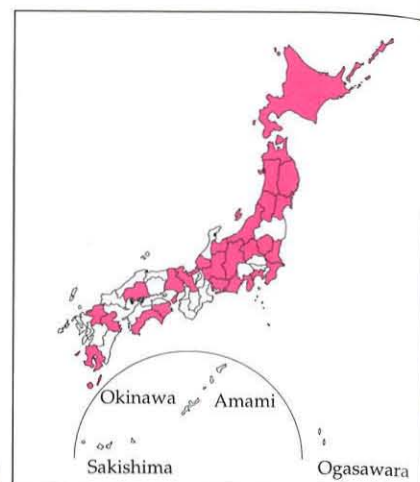


Workers 4-4.5 mm, Yellow. Distinguished from *L. hikosanus* by straight posterior propodeal margin. Females separated from *L. meridionalis* by relatively short scapes, circular in section, lacking erect hairs. Found in forests and at forest margins nesting in tree trunks. Nuptial flights July and August.



FORMICINAE

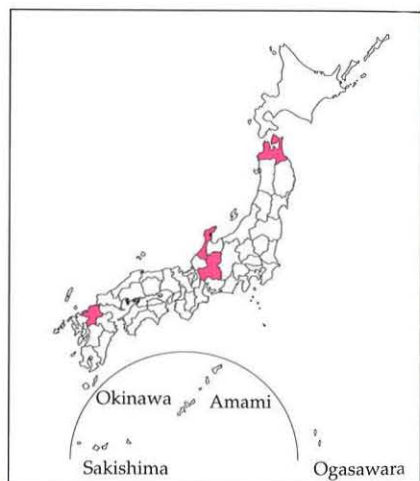
Lasius meridionalis (Bondroit)



Workers 4-4.5 mm. Yellow. Differs from *L. hikosanus* in possessing a straight posterior propodeal margin. Difficult to distinguish from *L. umbratus*, but females have relatively long, flattened scapes, with many long, erect hairs. Found in forests and at forest margins; nests in tree trunks, near the roots. Nuptial flights July to September.

FORMICINAE

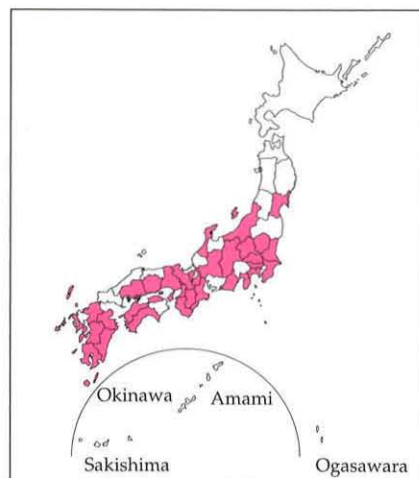
Lasius hikosanus Yamauchi



Workers 4.5 mm. Yellow. Easily distinguished from *L. umbratus* and *L. meridionalis* by convex posterior margin of propodeum in profile. Rare. Nests at forested sites in trunks of standing trees, usually near the roots.

FORMICINAE

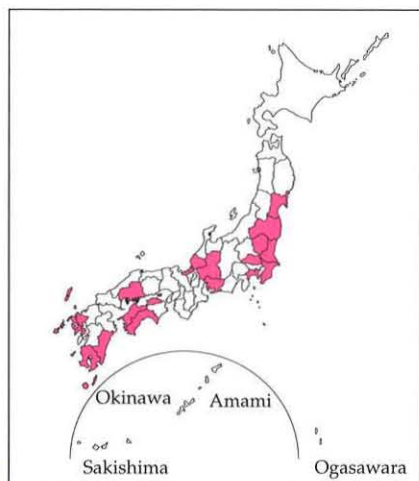
Lasius talpa Wilson



Workers 2-3 mm. Yellow. Scapes, tibiae with many erect hairs. Eyes small, (ca 0.08 mm diameter, 6-17 facets). Often common in southern Japanese forests. Nuptial flights August and September.

FORMICINAE

Lasius sonobei Yamauchi

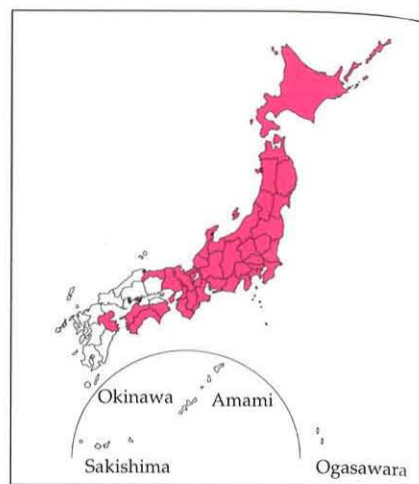


Workers 2.5-3.5 mm. Yellow. Scape length 0.91-0.98x head width (usually exceeding 0.95 times). Eye diameter 0.07-0.10 mm. Scapes, tibiae lacking erect hairs.

Abundant in southern Japan. Nests in soil and under stones. Nuptial flights August and September.

FORMICINAE

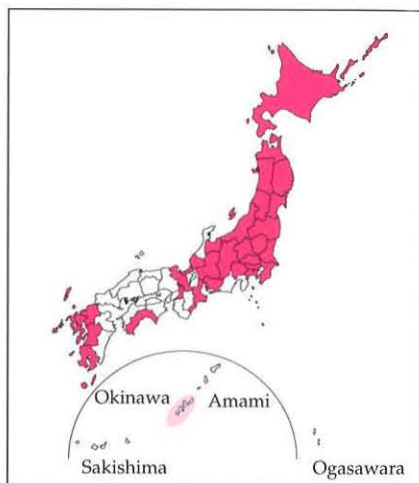
Lasius flavus (Fabricius)



Workers 2-3.5 mm. Yellow to yellowish brown. Scapes short, length 0.85 times head width. Eyes relatively large diameter +0.11 mm. each with more than 20 facets. Scapes, tibiae without erect hairs. Rare in south, common in north (Hokkaido, Tohoku district), especially in mountains, few lowland records. Nests in soil and under stones in grasslands, forest margins. Nuptial flights August and September.

FORMICINAE

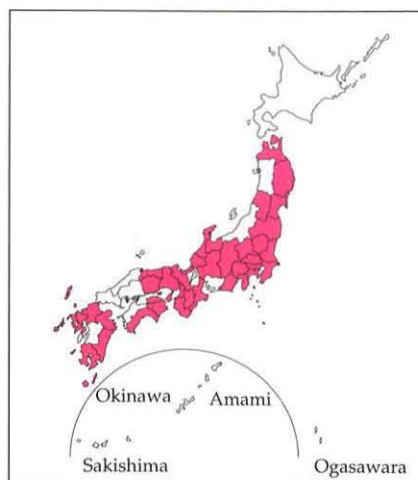
Lasius sakagamii Yamauchi & Hayashida



Workers 2.5-3.5 mm. Brown. Scapes as long as head width, with more than 30 erect hairs. Anterior tibiae: many erect hairs. Petiole thick, low, anterior margin bluntly angulate in lateral view. Nests polygynous and polycalic in soil, dry environments, grasslands at riversides, seashores, multiplication by budding; sometimes with several hundred thousand inmates. Nuptial flights June to October.

FORMICINAE

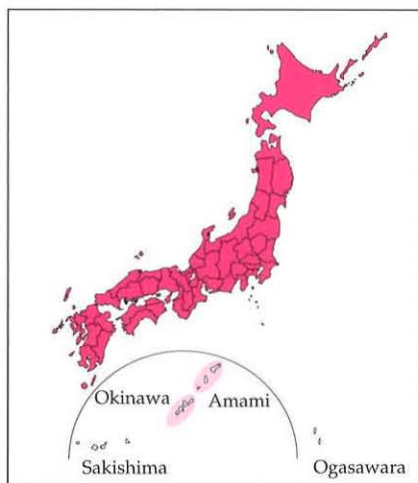
Lasius productus Wilson



Workers 3.5-4.5 mm. Head, gaster dark brown, mesosoma brown. Scapes proportionately long, exceeding 1.12 times head width. Scapes, anterior tibiae usually without erect hairs. Petiole in lateral view with acutely angulate dorsum. Nests in rotting wood, stumps, dead portions of tree trunks in broad-leaved deciduous forests. Nuptial flights August and September.

FORMICINAE

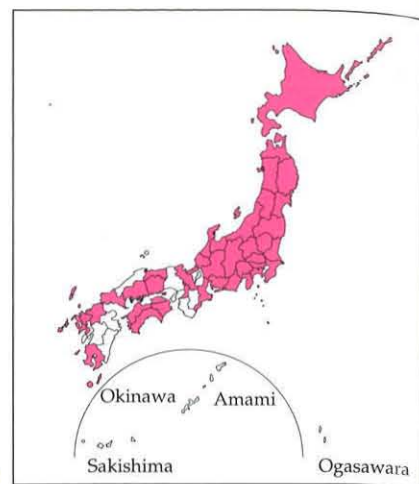
Lasius japonicus Santschi



Workers 2.5-3.5 mm. Blackish brown, mesosoma lighter than remainder. Scapes: 5 to 25 erect hairs. Petiole: dorsal margin bluntly angulate in profile; anterior margin bluntly angulate. Separated from *L. alienus* by erect hairs on scapes and anterior tibiae. Nests in soil, rotting wood in grasslands, forests, lowlands to 2000 m. Nuptial flights July and August.

FORMICINAE

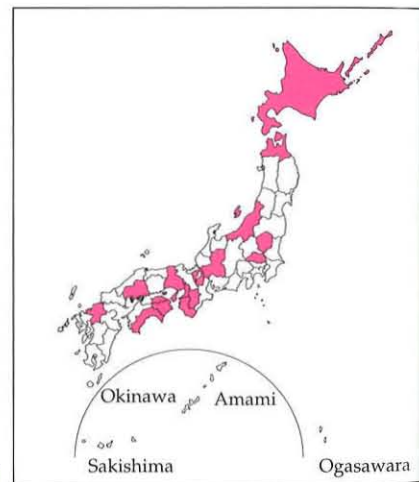
Lasius hayashi Yamauchi & Hayashida



Workers 2-4 mm. Head, mesosoma light brown, gaster darker. Scapes slightly shorter than head width, with erect hairs. Petiole high, tip acutely angulate; anterior scale margin not angulate. Nests in dead portions of tree trunks, near the roots. Nuptial flights July and August.

FORMICINAE

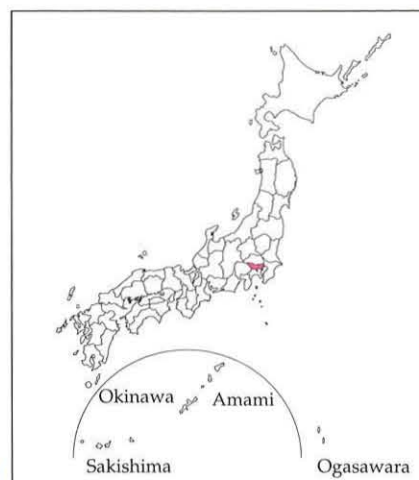
Lasius alienus (Foerster)



Workers 2-2.5 mm. Blackish brown. Resembles *L. japonicus*, distinguished by (1) scapes and anterior tibiae lacking erect hairs or with fewer than 10; (2) dorsal pronotal width less than 0.70 mm. Females: distinguished from *L. japonicus* by absence of erect hairs on antennal scapes and anterior tibiae.

FORMICINAE

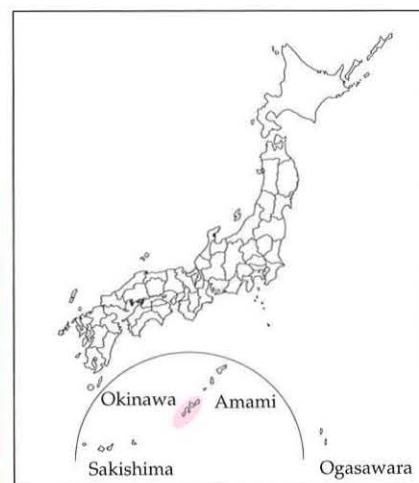
Paratrechina sp. 11



Workers 1-1.5 mm. Shining blackish brown; tibiae light brown. Funicular segments 2-4 wider than long. Mandibles 6-toothed. Scapes exceeding cephalic border; no erect hairs. Ocelli obscure. Mesosoma short. Promesonotal dorsum convex. Metanotal groove shallow. Pronotal, propodeal dorsa: each with 1 pair of erect hairs, none on tibiae.

FORMICINAE

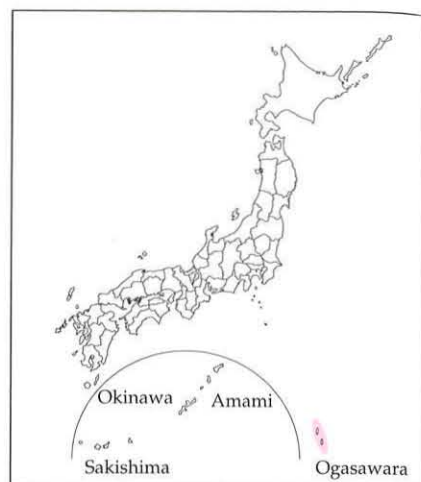
Paratrechina yambaru Terayama



Workers 1.5-2 mm. Head, sides of mesosoma, legs dark brown; mesosomal dorsum, antennae, gaster blackish brown; tarsi whitish. Mandibles 6-toothed. Scapes exceeding cephalic margin by half their length, without hairs. Mesonotal dorsum: a pair of short erect hairs. Propodeum, hind femora, tibiae without erect hairs. Fragile, easily collapsed, cuticle.

FORMICINAE

Paratrechina ogasawarensis Terayama

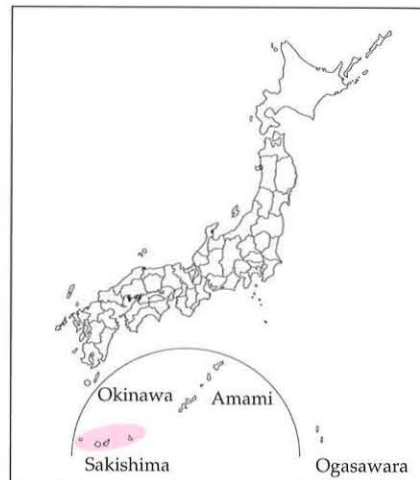


Workers 2 mm. Head, mesosoma yellowish brown; gaster dark brown. Pronotal dorsum: 2 pairs long, erect hairs, 3 pairs short hairs; mesonotal dorsum: 2 pairs long erect hairs; propodeal dorsum lacking hairs. Resembles *P. amia*: the color lighter; mesonotal dorsum with fewer hairs than in *amia*.

Nests in soil, leaf litter and rotting wood in grasslands and forests.

FORMICINAE

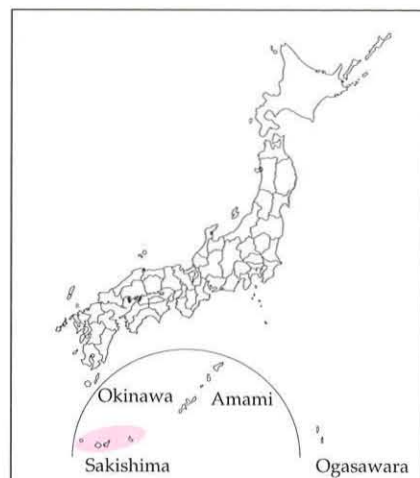
Paratrechina otome Terayama



Workers 1.5-2 mm. Head, sides of mesosoma, gaster brown; antennae, mesosomal dorsum, petiole, legs brownish white. Mandibles 6-toothed. Scapes exceeding cephalic margin by half length; no erect hairs. Eyes small ($< 1/4$ head length). Ocelli distinct. Propodeum, hind femora, tibiae without erect hairs. Distinguished from *P. longicornis* by shorter scapes, hairs; from *P. yambaru* by coloration.

FORMICINAE

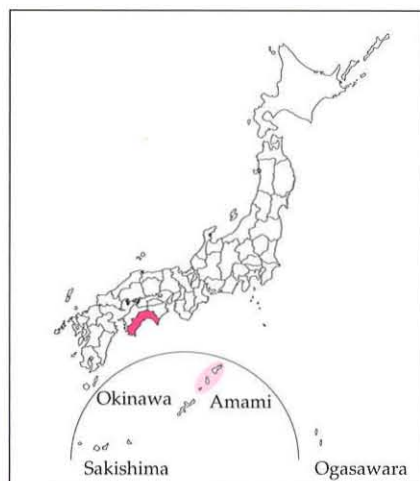
Paratrechina yaeyamensis Terayama



Workers 2 mm. Head, mesosoma, 1st gastral tergite, anterior parts 2nd, 3rd yellowish brown, remaining gaster dark brown; antennae, legs yellowish. Scapes: erect hairs, sparse pubescence. Pronotal, mesonotal dorsa: two pairs erect hairs each, none on propodeal dorsum. Females: head, mesosoma brown; 1st, 3rd gastral tergites partly yellowish; 4th, 5th dark brown. Nests: leaf litter, rotting wood, soil, in forest.

FORMICINAE

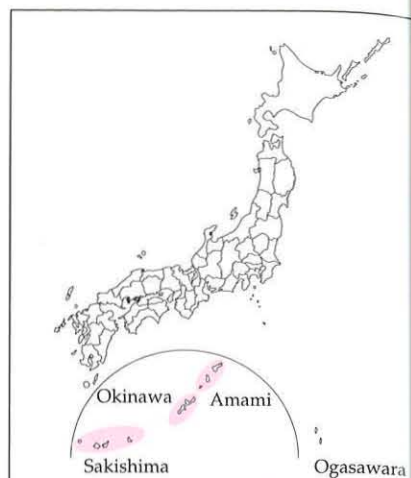
Paratrechina nubatama Terayama



Workers 2 mm. Blackish brown; scapes, legs yellowish. Mandibles 6-toothed. Scapes: exceeding posterior cephalic border by 2/5 length, short erect hairs, subdecumbent pubescence. Funicular segments as long or longer than wide. Pronotal dorsum convex; mesonotal dorsum straight; metanotal groove incised. Head, gaster: erect hairs. Pronotal dorsum: 4 long erect hairs, mesonotal dorsum: 4, none on propodeum. Hind femora, tibiae with suberect hairs.

FORMICINAE

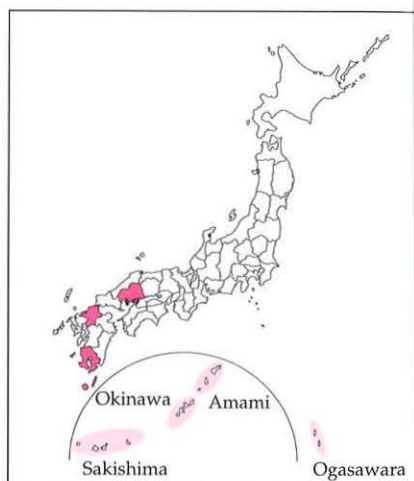
Paratrechina ryukyuensis Terayama



Workers 2 mm. Head, mesosoma, 1st gastral tergite brown; remaining gaster dark brown. Scape: moderate subdecumbent pubescence, erect hairs. Mesosoma darker than *P. flavipes*. Gaster uniformly dark brown except 1st tergite (unlike *P. yaeyamensis*). Erect hairs on scapes longer than *P. flavipes*; pubescence much more abundant than *P. yaeyamensis*. Nests: leaf litter, rotting wood, soil, in grasslands and forests.

FORMICINAE

Paratrechina amia (Forel)



2.5-3 mm. Blackish brown; legs brown. Femora, tibiae lighter. Mandibles 6-toothed. Scape: exceeding posterior cephalic margin by half length, erect hairs. Funicular segments as long as wide. Pronotal dorsum convex; mesonotal dorsum straight; metanotal groove incised. Head, gaster: abundant hairs. Pronotal dorsum: 4 erect, 6 shorter hairs; mesonotal dorsum: 6 erect; none on propodeum. Hind femora, tibiae: erect, suberect hairs.

Formica candida F. Smith

Fig. p 41

Original Reference: Smith, F. (1878)

Synonym(s): *Formica picea* Nylander, 1846

Formica transcaucasica Nasonov, 1889

Formica fusca var. *picea*: Emery, 1909

Formica picea: Bondroit, 1912

Formica fusca picea: Kuznetsov-Ugamsky, 1929

Formica gagates var. *piceogagates* Karavaiev, 1926

Formica picea var. *piceoinplana* Emery, 1925

Formica picea var. *lochmatteri* Starcke, 1935

Formica fusca orientalis Ruzsky, 1915

Distribution: Hokkaido, Honshu (the central part and northwards), Kyushu (Mt. Kiju); northern Eurasia.

Total length of workers around 4 - 5.5 mm. Body generally strongly shining, black; Mesosoma covered with dense pubescence, weakly shining; pronotum, mesonotum and petiole slightly brownish; legs and antennae blackish brown.

This species is distinguished from others in *Formica* by the sparsity of pubescence on the dorsum of its first gastral tergite. Long white hairs are often seen on the ventral side of the head. *F. candida* nests in the soil under stones and near grass roots. Chromosome number $2n=52$ (Imai, 1969) - different from other species of subgenus *Serviformica*, which have $2n=54$. *F. candida* is the first available name of Tsuya-kuroyama-ari formerly identified as *F. picea* or *F. transcaucasica* (Bolton, 1995).

Formica lemani Bondroit

Fig. p 41

Original Reference: Bondroit, J. (1917)

Synonym(s): *Formica lemani* Bondroit 1917b

Formica fusca lemani: Muller, 1923

Formica (Serviformica) lemani: Emery, 1925b

Formica fusca subsp. *borealis* Vashkevich 1924b

Distribution: Hokkaido, Honshu (the central part and northwards; Mt. Misen, Nara Pref.; Mt. Daisen, Tottori Pref.), Shikoku (Mt. Ishizuchi etc.); Korean Peninsula, northern Eurasia.

Total length of workers around 3.5 - 5.5 mm. Body somewhat shining; brownish black; mandibles, funiculi and legs brown; scapes and tibiae yellowish. When indistinguishable by body color from *F. japonica*, the two species can be discriminated by the ratio of middle-leg tibial length to head width, or the density of pubescence on the second gastral tergite. The number of erect setae on the dorsa of the first and second gastral tergites in *F. lemani* average 10 and 20 respectively, and are thus relatively more abundant than in *F. japonica*. This is the case also for setae on the pronotal dorsum, which are more abundant on average in *F. lemani* than in *F. japonica*, though the two species are not readily distinguishable by this character because their separate ranges overlap.

F. lemani nests in the soil under stones and near grass roots. Reproductive alates fly after mid August at Mt. Zao, Miyagi Prefecture.

Formica japonica Motschoulsky

Fig. p 42

Original Reference: Motschoulsky, V. de. (1866)

Synonym(s): *Formica japonica* Motschoulsky, 1866

Formica fusca var. *nipponensis* Forel, 1900

Formica fusca var. *japonica*: Emery, 1909

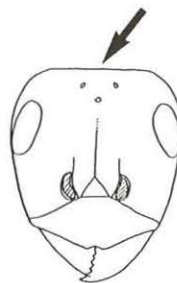
Formica fusca japonica: Emery, 1925

Formica japonica: Dlussky, 1967

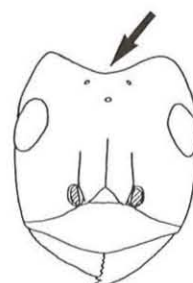
Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Sakhalin, Kuril Is, east Siberia, Mongolia, Mainland China, Korean Peninsula, Taiwan.

Total length of workers 4.5 - 6 mm. Body color greyish black or brownish black. The most dully colored of Japanese *Serviformica* species. Very similar to *Formica hayashi* (Japanese name: Hayashi-kuroyama-ari), but distinguished by the usual presence of 10 or more erect setae on the second gastral tergite (the average 13), and by the dorsum of the first gastral tergite usually bearing a few erect setae (averaging 4, but lacking in some cases).

Common in lowlands and open mountainous regions all over Japan. This species nests in the soil. Its nests open directly at the ground surface and are nearly vertical, with a depth of 1 - 2 m. The number of workers in a colony may reach 16,000 (Kondoh, 1968a; Yamauchi & Suzuki, 1987). Sexual alates fly during early June to mid July in Tokyo (Kawai, 1942) and from August to September in Kochi (Okamoto, 1957). Pseudogynes are found in some colonies (Sonobe, 1974). Known inquiline is a histerid beetle, *Hetaerius gratus* Lewis (Kubota, 1965) and a short-winged mold beetle, *Kigatrodes gracilis* (Sharp) (Sawada, 1974). Chromosome number $2n=54$ (Imai & Yosida, 1964). There are three larval instars in the males (Imai, 1965).



F. japonica



F. fukaii

Formica gagatoides Ruzsky

Fig. p 42

Original Reference: Ruzsky, M. (1904)

Synonym(s): *Formica fusca* var. *gagatoides* Ruzsky 1904a

F. (Serviformica) gagatoides: Emery, 1925b

Formica picea var. *gagatoides*: Emery, 1925b

Formica gagatoides: Holgersen, 1942

Distribution: Central Honshu; northern Eurasia.

Total length of workers 4 - 5 mm. Body color greyish black or brownish black. Similar to *F. japonica*, but distinguished to the experienced naked eye by the mesosoma being strongly reddish (versus almost without reddish color in mature *F. japonica* workers). Gaster more polished than in *F. japonica*. *F. gagatoides* is distinguished from *F. candida* by its first gastral tergite being densely covered with pubescence, and from other species of the genus by its blackish color and relative sparsity of pubescence on its third gastral tergite.

This species was reported for the first time from Japan by Sonobe & Dlussky (1977) and Kondoh (1976). The records are few, but *F. gagatoides* is widely distributed at localities 2700 m. or more above sea level in central Honshu (North, South and Central Alps, Yatsugatake Mountains (Sonobe, 1979)). Nuptial flights probably occur after late August.

Formica yessensis Wheeler

Fig. p 43

Original Reference: Wheeler, W. M. (1913)

Synonym(s): *Formica rufa truncicola* var. *yessensis* Forel, 1901

Formica truncicola var. *yessensis* Wheeler, 1913

Formica truncicola yessensis: Ruzsky, 1926

Formica truncorum var. *yessensis*: Wheeler, 1933

Formica yessensis: Collingwood, 1976

Distribution: Southwest parts of Hokkaido, Honshu (the central part and northwards); Siberia, northeast Mainland China, Korean Peninsula, Taiwan.

Total length of workers 4.5 - 7 mm. Head, mesosoma, petiole and legs yellowish red-brown; head and mesosomal dorsa and legs a little darker; gaster black, its base somewhat reddish. Very similar to *F. truncorum*, but distinguished from it by the near absence of erect setae on the extensor surfaces of the hind tibiae and the scapes. The median portion of the upper petiolar border slightly convex to nearly flat.

This species builds discrete nests at relatively well insulated places. The mounds are up to 1 m in diameter, and constructed from dead grass or conifer needles. A huge supercolony consisting of 45,000 nests, which extend by budding, is present along the coast of Ishikari Bay, Hokkaido (Higashi & Yamauchi, 1979). Females are not particularly large when compared to workers, implying that *F. yessensis* is possibly a temporary social parasite, like *F. fukaii*. Reproductive alates fly in August (Ito & Imamura, 1974). Various studies have been carried out on the ecology of this species (Higashi, 1974, 1978a, 1978b; Imamura, 1974, 1978, 1982). The southernmost known locality in Honshu is Mt. Kintoki, Kanagawa Prefecture (Kondoh, 1961).

Formica truncorum Fabricius

Fig. p 43

Original Reference: Fabricius, J. C. (1804)

Synonym(s): *Formica truncicola* Nylander, 1846

Formica simulata Smith, F. 1878

Formica rufa var. *truncicoloprattensis* Forel, 1874

Formica truncorum var. *menozzii* Stitz, 1939

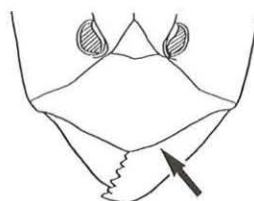
Formica rufa var. *rufotruncicola* Ruzsky, 1896

Formica truncorum ab. *stitzii* Stitz, 1939

Distribution: Northeastern parts of Hokkaido; Sakhalin, central parts of Eurasia and northwards.

Total length of workers 4.5 - 7 mm. Body color very similar to that of *F. yessensis*, but many workers are somewhat more yellowish. *F. truncorum* is distinguished from other species of *Formica* by the numerous erect setae on the extensor surfaces of its hind tibiae, and the presence of erect setae on the scapes. Erect, frequently long setae are densely present all over the body.

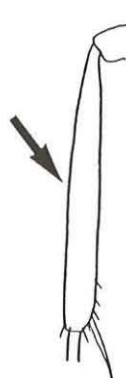
Variation is observed in the abundance of erect hairs on the extensor surfaces of the hind tibiae and scapes. In Japan the known geographical range of *F. truncorum* is nearly separate from that of *F. yessensis*, but further distributional analysis is desirable. This species builds discrete nests in well insulated situations. Mounds are up to 1 m. in diameter and constructed from dead grass or conifer needles. According to Kupianskaja (personal communication) there are differences in nest site preference and nesting habits between *F. truncorum* and *F. yessensis* in the Maritime Province of Siberia.



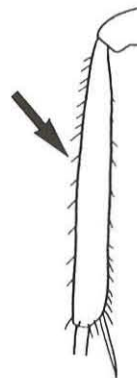
F. yessensis



F. sanguinea



F. yessensis



F. truncorum

Formica fukaii Wheeler

Fig. p 44

Original Reference: Wheeler, W. M. (1914)

Synonym(s): *Formica exsecta* var. *fukaii* Wheeler, W.M., 1914

Formica (Coptoformica) mesasiatica Dlussky, 1964

Formica fukaii: Sonobe & Dlussky, 1977

Distribution: Hokkaido, Honshu; Sakhalin, central Asia (a closely similar form collected in the Maritime Province of Siberia probably represents this species).

Total length of workers around 4.5 - 6.5 mm. Head, mesosoma and petiole yellowish brown to reddish brown; crown of head, median dorsal area of pronotum, antennal scapes, and tibiae darker. Distinguishable from other species of *Formica* by the distinctly concave posterior border of the head. Dorsal border of petiole strongly concave at the center. No erect hairs on the head (except for the mandibles and clypeus), mesosoma, petiole or gastral tergites I and II.

Females usually construct founding nests singly, but in some cases they are temporary parasites of *F. japonica* Motschoulsky (Kubota & Kondoh, 1954; Hayashida, 1963) or *F. lemani* Bondroit (Yamaoka, 1977). *F. fukuii* builds small mounds of dead grass and attends aphids and scale insects (Teranishi, 1934; Kono & Sugihara, 1939). It is the most westerly distributed of the red-colored Japanese *Formica* species, with many records from the Chugoku District. The westernmost collections are from Hiroshima and Tottori prefectures.

Formica sanguinea Latreille

Fig. p 44

Original Reference: Latreille, P. A. (1798)

Synonym(s): *Formica (Raptiformica) sanguinea*: Forel, 1913

Formica dominula Nylander, 1846

Formica sanguinea subsp. *arenicola* Kuznetsov-Ugamksy, 1928

Formica (Raptiformica) sanguinea var. *borea* Santschi, 1925

Formica (Raptiformica) sanguinea var. *clarior* Ruzsky, 1905

Formica sanguinea var. *fusciceps* Emery, 1895

Formica sanguinea var. *flavorubra* Forel, 1909

Distribution: Hokkaido, Honshu (the central part and northwards); northeast Mainland China, Sakhalin, Korean Peninsula, central Eurasia and northwards.

Total length of workers around 6 - 7 mm. Head dark red to black; mesosoma, petiole and legs red; gaster black. Dully shining. This species is distinguished from others in *Formica* by the median anterior border of its clypeus being concave. The body has only a few erect setae. Males of *F. sanguinea* are distinguishable from those of other *Formica* species by their mandibular dentition (the masticatory border has 5 or more prominent denticles) and concave median anterior clypeal border.

F. sanguinea does not build mounds. It is sometimes found in independent nests, but its colonies frequently assemble mixed nests by raiding one or two species from a set comprising *F. japonica*, *F. lemani*, *F. candida*, and *F. hayashi*. Hayashida (1966) observed *F. sanguinea* attacking *Myrmica yessensis* and stealing its larvae. Nuptial flights occur from July to August. The southernmost known locality in Honshu is Mt. Fuji.

Lasius teranishii Wheeler

Fig. p 45

Original Reference: Wheeler, W. M. (1928)

Synonym(s): *Lasius Ouchii* Teranishi (Teranishi, 1940)

Distribution: Hokkaido, Honshu (central Honshu and northwards); Korean Peninsula.

Total length of workers around 3.0 - 3.5 mm; somewhat smaller than the four other Japanese species of subgenus *Dendrolasius*. Color jet black. Petiole with an inverted U-shaped profile; the scale widest near its dorsal margin when viewed frontally; dorsal margin almost straight, without a median notch. In females, scapes very strongly flattened, with numerous decumbent hairs; mesonotal dorsum also with many short decumbent hairs; petiole thick and low, the scale with an inverted U-shaped profile.

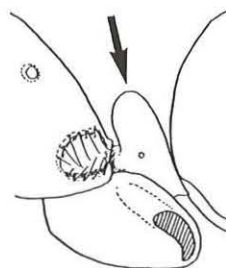
This species is distributed in mountainous areas and might be a temporary parasite of *L. flavus*. Nuptial flights take place during July (Yamauchi et al., 1986).



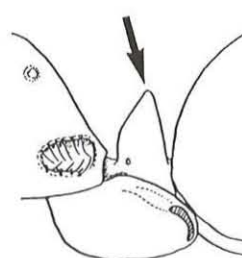
F. teranishii



F. nipponensis



F. teranishii



F. spathepus

Lasius spathepus Wheeler

Fig. p 45

Original Reference: Wheeler, W. M. (1910)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Korean Peninsula.

Total length of workers around 4 - 5 mm. Color jet black. Petiole with an inverted V-shaped profile; anterior margin with a weak, blunt angle at its lower section. Dorsal margin of petiole with a shallow median notch in frontal view. In females, scapes flattened and with abundant hairs; mesonotal dorsum almost or completely lacking hairs; petiole with an inverted V-shaped profile.

This species is found as commonly as *L. nipponensis*. It might be a temporary social parasite of *L. japonicus*. Nuptial flights occur during June and August.

Lasius morisitai Yamauchi

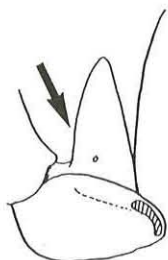
Fig. p 46

Original Reference: Yamauchi, K. (1979)

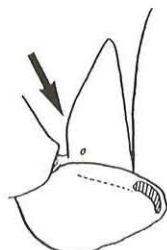
Distribution: Honshu (Tochigi, Gifu, Ishikawa, Nagano, Kyoto).

Total length of workers around 4.5 mm. Color jet black. Petiole high, with an inverted V-shaped profile, more than 0.6 mm in height; lateral margins of scale parallel, dorsal margin with a median shallow notch when viewed frontally. In females, scapes covered with short decumbent hairs but lacking erect hairs; mesonotal dorsum with very sparse erect hairs; petiole with an inverted V-shaped profile.

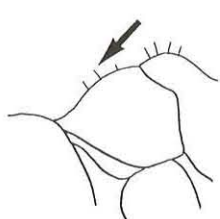
A rare species. Nuptial flights take place during July.



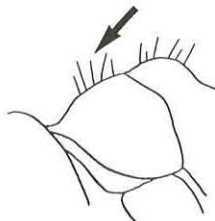
L. morisitai



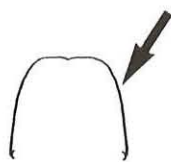
L. spathepus



L. morisitai



L. spathepus



L. morisitai



L. capitatus

Lasius nipponensis Forel

Fig. p 46

Original Reference: Forel, A. (1912)

Synonym(s): *Lasius fuliginosus* (Latreille) (sensu Matsumura, 1898)
Lasius fuliginosus var. *nipponensis* Forel (Forel, 1912)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Korean Peninsula, Far East Russia.

Total length of workers around 4 - 5 mm. Color jet black. Petiole with an inverted U-shaped profile; the dorsal margin with a median notch in frontal view. In females, scapes lacking erect hairs but covered with decumbent hairs; petiole with an inverted U-shaped profile.

This species is a temporary social parasite of species classified in *Lasius* subgenus *Chthonolasius*. In the Kanto district it frequently attends aphids on trees (Kubota, 1988). Nuptial flights occur during June and July.

L. nipponensis was first recorded from Japan by Matsumura (1898). Thereafter, Japanese myrmecologists have consistently used the name *L. fuliginosus* for this relatively common ant. However, recent morphological and biochemical comparisons between European and East Asian populations imply that they represent separate species (Espadaler et al., 2001).

Lasius capitatus (Kuznetsov-Ugamsky)

Fig. p 47

Original Reference: Kuznetsov-Ugamsky, N. N. (1927)

Synonym(s): *Acanthomyops fuliginosus capitatus* Kuznetsov-Ugamsky (Kuznetsov-Ugamsky, 1927)

Lasius (*Dendrolasius*) *fuliginosus capitatus* (Kuznetsov-Ugamsky) (Wilson, 1955)

Lasius (*Dendrolasius*) *crispus* Wilson (Wilson, 1955)

Distribution: Hokkaido, Honshu, Shikoku; Far East Russia, Korean Peninsula, Taiwan.

Total length of workers around 4 - 4.5 mm. Color jet black. Petiole with an inverted V-shaped profile; in frontal view, the scale is broadest at about its midlength and tapers towards its dorsal margin, which is acutely convex, without a median notch. In females, scapes and mesonotal dorsum with abundant erect hairs; petiole thin and high, with an acute dorsal angle in profile.

In one case a female of *L. capitatus* has been found in a nest of *L. productus* (Sonobe, 1984), suggesting that this species is perhaps a temporary social parasite of *productus*. The nuptial flights take place in Gifu Prefecture during September (Yamauchi et al., 1986). *Lasius crispus* Wilson, 1955, was synonymized with this species by Kupianskaya (1989).

Lasius umbratus (Nylander)

Fig. p 47

Original Reference: Nylander, W. (1846)

Synonym(s): *Formica umbrata* Nylander (Nylander, 1846)

Lasius umbratus (Nylander) (Mayr, 1861)

Lasius umbratus var. *mixto-umbratus* Forel (Forel, 1874)

Lasius rabaudi Bondroit (Bondroit, 1917)

Lasius silvestrii Wheeler (Wheeler, 1928)

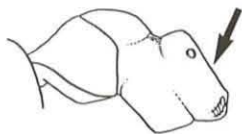
Lasius silvestrii var. *osakana* Santschi (Santschi, 1941)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Europe, central and eastern Asia, North America.

Total length of workers around 4 - 4.5 mm, body color yellow. This species is distinguished from *L. hikosanus* workers by the straight posterior margin of its propodeum, viewed in profile. Its females are separated from those of *L. meridionalis* by their relatively short, scapes, which are circular in section and lack erect

hairs.

L. umbratus is found in forests and at forest margins nesting in tree trunks. It could be a temporary social parasite of *L. japonicus* and *L. hayashi* in Japan. Nuptial flights occur during July and August.



L. umbratus



L. hikosanus

Lasius meridionalis (Bondroit)

Fig. p 48

Original Reference: Bondroit, J. (1920)

Synonym(s): *Formicina meridionalis* Bondroit (Bondroit, 1919)

Lasius umbratus var. *meridionalis* (Bondroit) (Viehmeier in Emery, 1922)

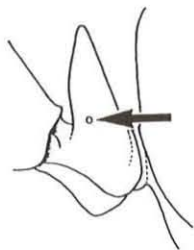
Lasius rabaudi Bondroit (Wilson, 1955)

Lasius meridionalis (Bondroit) (Pisarski, 1975)

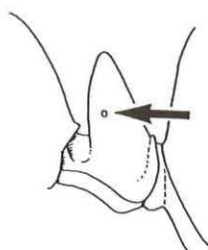
Distribution: Hokkaido, Honshu, Kyushu; Europe.

Total length of workers around 4 - 4.5 mm. Color yellow. This species differs from *L. hikosanus* in possessing a straight posterior margin to the propodeum when viewed in profile. Its workers are difficult to distinguish from those of *L. umbratus*, but the females differ from those of *umbratus* by their relatively long, flattened scapes, which carry many long, erect hairs.

This species is found in forests and at forest margins; it nests in tree trunks, near the roots of standing trees. It might be a temporary social parasite of *L. japonicus* and *L. hayashi*. Nuptial flights occur from July to September.



L. meridionalis



L. sonobei

Lasius hikosanus Yamauchi

Fig. p 48

Original Reference: Yamauchi, K. (1979)

Distribution: Honshu (Aomori, Gifu), Kyushu (Mt. Hiko-san).

Total length of workers around 4.5 mm. Body color yellow. *L. hikosanus* is easily distinguished from *L. umbratus* and *L. meridionalis* by the convex posterior margin of the propodeum in profile.

Nests of this rare species are found at forested sites in the trunks of standing trees, usually near the roots.

Lasius talpa Wilson

Fig. p 49

Original Reference: Wilson, E. O. (1955)

Synonym(s): *Lasius flavus myops* Forel (Wheeler, 1906)

Lasius talpa Wilson (Wilson, 1955)

Distribution: Honshu, Shikoku, Kyushu, Yaku I., Kuchino-erabu I.; Korean Peninsula, Taiwan(?).

Total length of workers around 2 - 3 mm. Color yellow. Scapes and tibiae with many erect hairs. Eyes small, usually 0.08 mm in diameter; each comprising 6-17 facets.

Like *Lasius sonobei*, this species is commonly found in the forests of southern Japan, but it is rare in the Tohoku district. The northernmost distribution record is from Sendai, Miyagi Prefecture. Nuptial flights occur during August and September. There has been a putative record from Taiwan, which needs confirmation.

Lasius sonobei Yamauchi

Fig. p 49

Original Reference: Yamauchi, K. (1979)

Distribution: Honshu, Shikoku, Kyushu, Yaku I.

Total length of workers around 2.5 - 3.5 mm. Color yellow. Length of scapes 0.91 - 0.98 times head width (usually exceeding 0.95 times). Eyes 0.07 - 0.10 mm in diameter. Scapes and tibiae lacking erect hairs.

Lasius sonobei is abundant in southern regions in Japan, but rare in the Tohoku district of northern Honshu. The northernmost distribution record is Sendai, Miyagi Prefecture. Nests are constructed in the soil and under stones. Nuptial flights take place during August and September.

Lasius flavus (Fabricius)

Fig. p 50

Original Reference: Fabricius, J. C. (1782)

Synonym(s): *Formica flava* Fabricius (Fabricius, 1781)

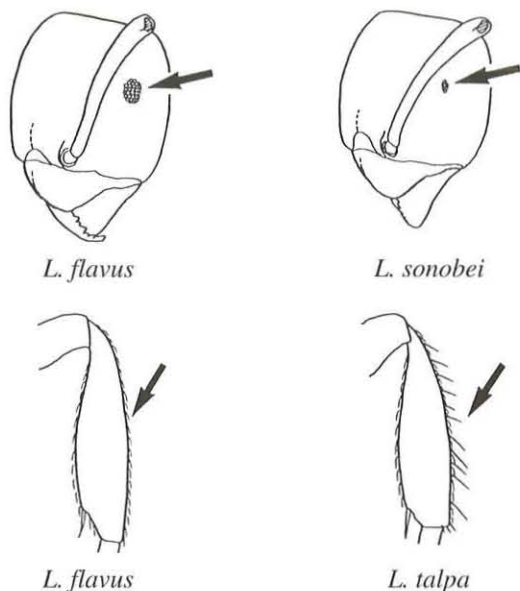
Lasius flavus (Fabricius) (Mayr, 1861)

Lasius flavus var. *myops* Forel (Forel, 1894)

Distribution: Hokkaido, Honshu; NE China, Korean Peninsula, Siberia, central Asia, Europe.

Total length of workers around 2 - 3.5 mm. Color yellow to yellowish brown. Scapes short, their length 0.85 times head width. Eyes more than 0.11 mm in diameter, relatively the largest among Japanese species of this subgenus; each with more than 20 facets. Scapes and tibiae without erect hairs.

This species is rare in southern parts of Japan, but it is found commonly in northern regions such as Hokkaido and the Tohoku district. In the Kanto district it commonly occurs in mountainous regions, and there are a few lowland records. *L. flavus* occurs in grasslands and at forest margins, nesting in the soil and under stones. Nuptial flights take place in August and September.



Lasius sakagami Yamauchi & Hayashida

Fig. p 50

Original Reference: Yamauchi, K. & Hayashida, K. (1970)

Distribution: Hokkaido, Honshu, Kyushu, Yaku I.; Korean Peninsula.

Total length of workers around 2.5 - 3.5 mm. Color brown. Scapes as long as the head is wide, and with more than 30 erect hairs. Anterior tibiae with many erect hairs. Petiole thick and low, anterior margin with a weak, blunt angle in lateral view.

This species nests in the soil in dry environments such as grasslands at riversides or seashores. Nests are polygynous and polycalic, and multiply by budding. The number of contained individuals is large, sometimes reaching several hundred thousand (Yamauchi, 1981; Yamauchi et al., 1981, 1982). The nuptial-flight period is relatively long for a species of subgenus *Lasius* with records from June to October. Collections of *L. sakagami* from Okinawa (Naha City) probably represent an introduction by human commerce. Diploid males are known to occur in this species (Yamauchi et al., 2001).

Lasius productus Wilson

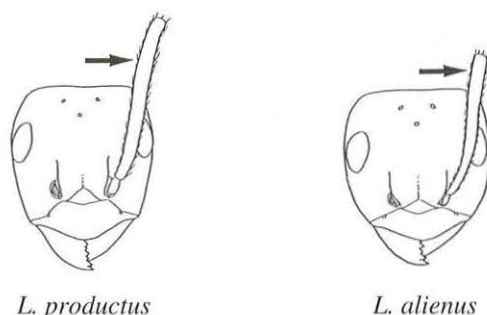
Fig. p 51

Original Reference: Wilson, E. O. (1955)

Distribution: Honshu, Shikoku, Kyushu.

Total length of workers around 3.5 - 4.5 mm. Head and gaster dark brown, mesosoma brown. Scapes proportionately longer than in other Japanese *Lasius* species, each with length exceeding 1.12 times the head width measurement. Scapes and anterior tibiae usually without erect hairs. Petiole in lateral view with an acutely angulate dorsum.

This species nests in rotting wood and stumps, or dead portions of tree trunks in broad-leaved deciduous forests. The nuptial flights take place in August and September.



Lasius japonicus Santschi

Fig. p 51

Original Reference: Santschi, F. (1941)

Synonym(s): *Lasius emarginatus* var. *japonicus* Santschi (Santschi, 1941)

Lasius niger (Linnaeus) (Wilson, 1955)

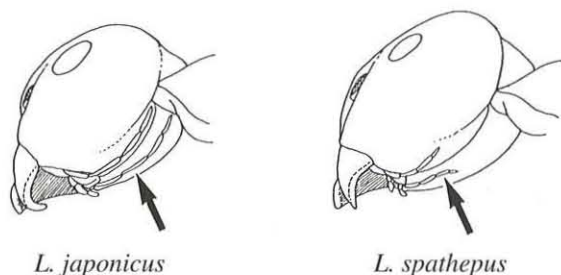
Lasius niger (Linnaeus) (Yamauchi & Hayashida, 1970)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I., Tokara Is.; Korean Peninsula, Taiwan.

Total length of workers around 2.5 - 3.5 mm. Body blackish brown, with the mesosoma often slightly lighter in color than the head and gaster. Scape length similar to head width. Scapes each with 5 to 25 erect hairs. Dorsal pronotal width in workers from mature colonies can exceed 0.70 mm. Petiole in profile with its dorsal margin bluntly angulate; anterior margin with a blunt angle.

The Japanese form has long been represented as *Lasius niger*, a species widely distributed in Eurasia. It was formally identified as *L. japonicus* by Seifert (1992).

Worker specimens from incipient colonies have fewer erect hairs on their scapes than others (fewer than 10), so they are difficult to separate from *L. alienus* workers. However, *L. japonicus* females are separated from those of *L. alienus* by the presence of erect hairs on the scapes and anterior tibiae. This species is most commonly found in grasslands and forests. It has a wide elevational range, from lowlands to mountainous areas in central Japan, up to 2000 m above sea level. A distribution record from Okinawa Island (Naha City) might represent a population introduced by human commerce. Nests are found in the soil and rotting wood. The nuptial flights occur in July and August.



Lasius hayashi Yamauchi & Hayashida

Fig. p 52

Original Reference: Yamauchi, K. & Hayashida, K. (1970)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Kurile Is, Korean Peninsula.

Total length of workers around 2 - 4 mm. Head and mesosoma light brown, gaster dark brown. Antennal scapes usually slightly shorter than the head width, and with erect hairs. Petiole high, its tip acutely angulate; anterior margin of petiolar scale not angulate.

This species nests in dead portions of tree trunks, especially at or near the roots. Nuptial flights occur in July and August.

Lasius alienus (Foerster)

Fig. p 52

Original Reference: Foerster, A. (1850)

Synonym(s): *Formica alienus* Foerster (Foerster, 1850)

Lasius alienus (Foerster) (Mayr, 1861)

Distribution: Hokkaido, Honshu, Shikoku; Korean Peninsula, Eurasia.

Total length of workers around 2 - 2.5 mm. Body blackish brown. This species closely resembles *L. japonicus*, and it is especially difficult to separate specimens of the two if they are derived from incipient colonies. However, when specimens from mature colonies are compared *L. alienus* is distinguished by the following characteristics: (1) scapes and anterior tibiae either lacking erect hairs or with fewer than 10 hairs; (2) body relatively small, dorsal pronotal width less than 0.70 mm. In females, *L. alienus* is easily distinguished from *L. japonicus* by the absence of erect hairs on the antennal scapes and anterior tibiae.

This species is rarely encountered. It has been recorded from Japan since the early 20th century (e.g. Wheeler, 1906; Teranishi 1915, 1930; Morisita, 1945).

Paratrechina sp. 11

Fig. p 53

Distribution: Izu Islands (Aoga-shima island).

Small ants, total length of workers around 1 - 1.5 mm. Body blackish brown and shining; tibiae light brown. Second to 4th funicular segments each wider than long. Mandibles with 6 teeth. Scapes exceeding posterior margin of head; lacking erect hairs. Three ocelli present but obscure. Mesosoma short, about as long as head. Promesonotal dorsum convex in profile, pronotal slope steeper than that of mesonotum. Propodeal dorsum short. Metanotal groove shallow and short. Pronotal and propodeal dorsa each with a pair of erect hairs. Hind femora and tibiae without erect hairs.

Workers are usually taken at well insulated sites on the ground. This species is known only from Aoga-shima island in the Izu Islands.

Paratrechina yambaru Terayama

Fig. p 53

Original Reference: Terayama, M. (1999)

Distribution: Okinawa I. (Northern part).

Total length of workers around 1.5-2 mm. Head and lateral faces of mesosoma dark brown; mesosomal dorsum, antennae and gaster blackish brown; legs largely dark brown, the tarsi whitish. Mandibles each with 6 teeth. Antennal scapes exceeding posterior margin of head by half their length, without hairs. Dorsum of mesonotum with a pair of short erect hairs. Propodeum, hind femora and tibiae without erect hairs. Body with fragile, easily collapsed cuticle.

This species is known only from northern Okinawa.

Paratrechina ogasawarensis Terayama

Fig. p 54

Original Reference: Terayama, M. (1999)

Distribution: Ogasawara Is, Volcano Is.

Total length of workers around 2 mm. Head and mesosoma yellowish brown; gaster dark brown. Pronotal dorsum with two pairs of long, erect hairs and three pairs of short hairs; mesonotal dorsum with two pairs of long erect hairs; hairs lacking on propodeal dorsum. Very similar to *P. amia*: but the head and mesosoma are lighter in color than in that species (which is dark- to blackish brown); mesonotal dorsum with two pairs of erect hairs (more than two pairs in *P. amia*).

This species is found in grasslands and forests, nesting in the soil, leaf litter and rotting wood.

Paratrechina otome Terayama

Fig. p 54

Original Reference: Terayama, M. (1999)

Distribution: Nansei Is (Ishigaki I., Iriomote I.).

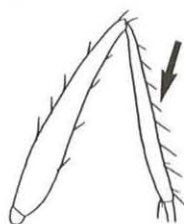
Total length of workers around 1.5-2 mm. Head and lateral surfaces of mesosoma pale brown; antennae, dorsum of mesosoma, petiole and legs brownish white; gaster brown.

Mandibles with 6 teeth. Antennal scapes exceeding posterior margin of head by half their length; without erect hairs. Eyes small; maximum eye length less than the 1/4 head length. Ocelli distinct. Mesosoma relatively long. Metanotal groove incised. Erect hairs on head and gaster shorter and more spaced than in *P. longicornis*. Mesonotal dorsum with a pair of erect hairs. Propodeum, hind femora and tibiae without erect hairs. Body cuticle thin, easily collapsed.

This species resembles *P. longicornis* and *P. yambaru*. It is easily distinguished from *P. longicornis* by its shorter antennal scapes and the 3 pairs of setae on its mesosomal dorsum, and from *P. yambaru* by its distinctive coloration. *P. otome* is found in grasslands and at forest margins.



P. otome



P. longicornis

Paratrechina yaeyamensis Terayama

Fig. p 55

Original Reference: Terayama, M. (1999)

Distribution: Yaeyama Is, Taiwan.

Total length of workers around 2 mm. Head and mesosoma yellowish brown; 1st gastral tergite yellowish brown; anterior half of 2nd tergite and anterior 1/3 of 3rd gastral tergite yellowish brown, the rest of gaster dark brown; antennae and legs yellowish. Antennal scapes with sparse subdecumbent pubescence and erect hairs; the erect hairs longer than the width of a scape. Pronotal dorsum with two pairs of erect hairs; mesonotal dorsum with two pairs; no hairs on propodeal dorsum. Females with head and mesosoma reddish brown; anterior halves of 1st to 3rd gastral tergites yellowish brown; the posterior halves dark brown; 4th and 5th tergites dark brown.

This species is distinguished from its Japanese congeners by the coloration of the gaster in workers and females. It nests in leaf litter, rotting wood and the soil, in forested sites.

Paratrechina nubatama Terayama

Fig. p 55

Original Reference: Terayama, M. (1999)

Distribution: Shikoku (Kochi Pref.), Amami-oshima I.

Total length of workers around 2 mm. Body color uniformly blackish brown; antennal scapes and legs yellowish brown. Mandibles each with 6 teeth. Antennal scapes exceeding posterior margin of head by 2/5 their length; with short erect hairs, which are shorter than the width of a scape shaft, and moderately abundant subdecumbent pubescence. Funicular segments each as long as wide or longer than wide. Eyes moderate in size. Pronotal dorsum convex in profile; mesonotal dorsum straight; metanotal groove incised dorsally. Head and gaster with erect hairs. Pronotal dorsum with four long erect hairs, mesonotal dorsum with four hairs, none on propodeum. Hind femora and tibiae with suberect hairs.

This species resembles *P. flavipes*, *P. ryukyuensis*, and *P. yaeyamensis*. It may be distinguished from the latter by its dark body coloration, the shorter erect hairs and moderately abundant pubescence of the antennal scapes.

Paratrechina ryukyuensis Terayama

Fig. p 56

Original Reference: Terayama, M. (1999)

Distribution: Nansei Is.

Total length of workers around 2 mm. Head, mesosoma and 1st gastral tergite brown; 2nd to terminal gastral segments dark brown. Antennal scapes with moderately abundant subdecumbent pubescence and with erect hairs, which are longer than the width of a scape. Very similar to *P. flavipes* and *P. yaeyamensis*: mesosoma darker than that of *P. flavipes* (where it is usually yellow to yellowish brown - lighter than head and gaster in *P. flavipes*); gaster uniformly dark brown except for the 1st tergite, which is lighter brown (2nd and 3rd tergites each with yellowish brown anterior half and dark brown posterior half in *P. yaeyamensis*). Erect hairs on antennal scapes longer than those of *P. flavipes*; the pubescence much more abundant than in *P. yaeyamensis*. Female with head and mesosoma brown and gaster largely a uniformly dark brown.

The species nests in leaf litter, rotting wood and the soil, in grasslands and forests.

Paratrechina amia (Forel)

Fig. p 56

Original Reference: Forel, H., (1913)

Synonym(s): *Prenolepis* (*Nylanderia*) *bourbonica* var. *amia* Forel (Forel, 1913)

Paratrechina (*Nylanderia*) *bourbonica amia* (Forel) (Emery, 1925)

Paratrechina amia (Forel) (Terayama, 1999)

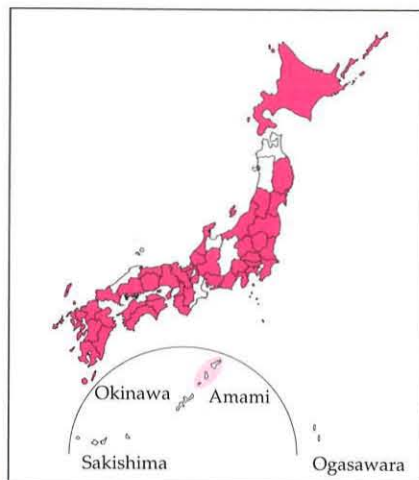
Distribution: Honshu (Hiroshima Pref.), Kyushu, Yaku I., Nansei Is, Ogasawara Is.

Total length of workers around 2.5 - 3 mm. Body dark brown to blackish brown; legs dark brown except for femora and tibiae, which are lighter brown. Mandibles each with 6 teeth. Antennal scapes each exceeding posterior margin of head by half its length, and with relatively abundant erect hairs. Each funicular segment as long as wide or longer than wide. Eyes moderately large. Mesosoma slightly longer than head length; pronotal dorsum convex in profile; mesonotal dorsum almost straight; metanotal groove deeply incised. Head and gaster with abundant erect hairs. Pronotal dorsum with two pairs of long erect hairs and three pairs of shorter hairs; mesonotal dorsum with three pairs; none on propodeum. Hind femora and tibiae with erect or suberect hairs.

This species is found in rather dry habitats and nests in leaf litter and rotting wood or in the soil of grassland, or at forest margins. *P. amia* occurs distributed in Japan and Taiwan, and is commonly found in the Ogasawara and Nansei Islands. It has been recently collected in city parks and at road sides in Kagoshima and Hiroshima cities. It has also been found in plant pots at a Tokyo aquarium.

FORMICINAE

Paratrechina sakurae (Ito)

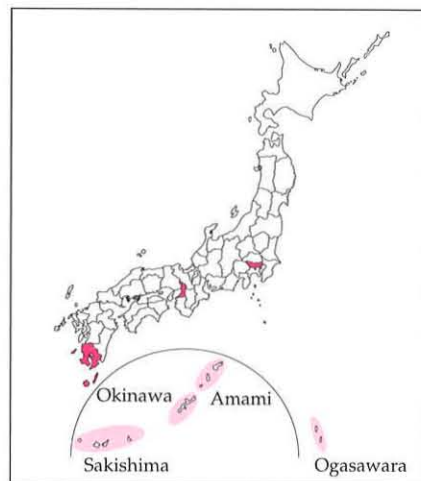


Workers 1-1.5 mm. Brown. Antennae, legs yellowish. Funiculi distinctively short, 2nd-4th segments wider than long. Mandibles 6-toothed. Scapes exceeding occiput by 2x width, no erect hairs. Promesonotal profile convex. Propodeal dorsum short. Metanotal groove shallow. Pronotal, propodeal dorsa each with a pair of erect hairs. Hind femora, tibiae without erect hairs.

Nests: rotting wood, leaf-litter. Nuptial flights October/November.

FORMICINAE

Paratrechina longicornis (Latreille)



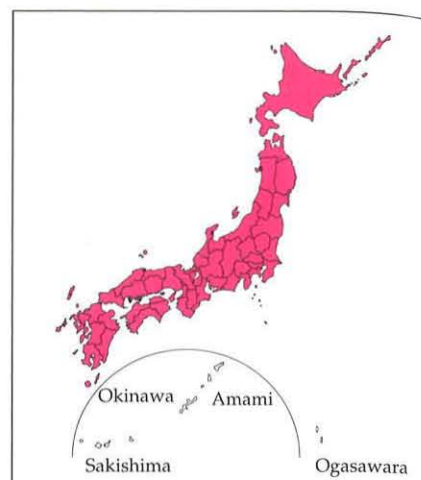
Workers 2.5-3 mm. Brown to black. Head elongate. Mandibles narrow, 5-toothed. Scapes distinctively long, exceeding occiput by 2/5 length, lacking erect hairs. Eyes large, 0.3 times head length. Mesosoma slender, dorsal profile almost straight, pro-mesonotal dorsum weakly convex. Metanotal groove slight. Propodeal spiracles distinct. Head, gaster: abundant whitish, long erect hairs; none on propodeum. Petiole low. Legs long. Commonly distributed in tropics, often invades houses.

FORMICINAE

Paratrechina flavipes (F. Smith)



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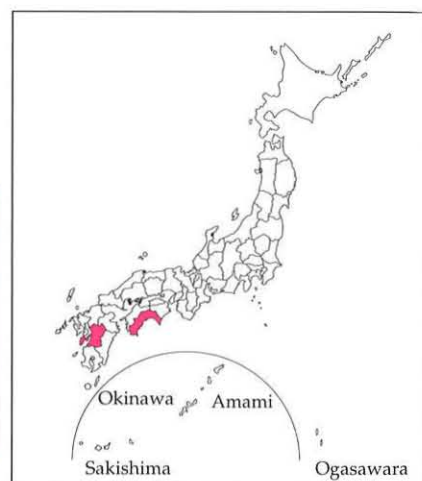
Workers 2-2.5 mm. Head, gaster blackish brown; mesosoma, legs yellowish. Mandibles 6-toothed. Scapes exceeding occiput by 1/3 length, with suberect hairs. Pronotal profile convex; mesonotal straight, posterior margin angulate. Metanotal groove deep. Head, gaster: abundant hairs. Pronotal, mesonotal dorsa: several hairs; none on propodeum. Hind femora, tibiae: erect/suberect hairs. Nests in leaf litter, soil, in grasslands, forests. Nuptial flights May to June.

FORMICINAE

Prenolepis sp.



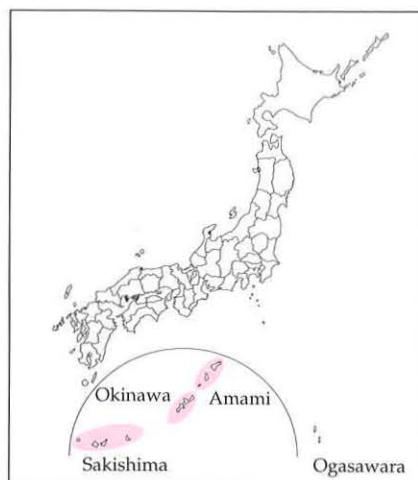
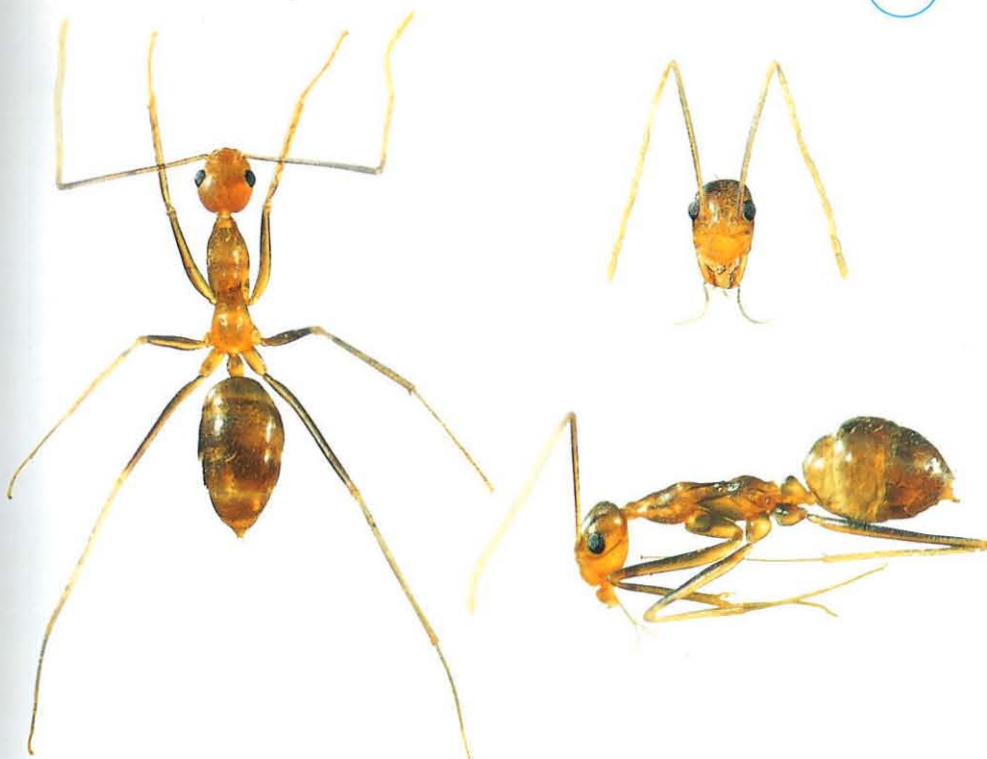
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Workers 2 mm. Blackish brown. Long, fine, suberect hairs everywhere abundant. Eyes large, about 1/4 head length; anterior margins at midlength of head. Petiole low, long, inclined anteriorly. 1st gastral segment anteriorly concave, receiving petiole. Mesothoracic constriction relatively weak. Rare.

FORMICINAE

Anoplolepis gracilipes (F. Smith)

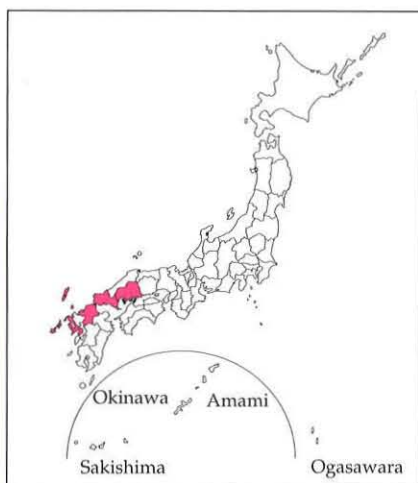


Workers 4 mm. Yellow, gaster brownish. Antennae, legs remarkably long. Antennae 11-segmented, length of 2nd to terminal segments 3+x their width; scapes 2x head length. Pronotal profile almost straight. Propodeal profile convex. Petiole thick, crest an inverted-U-shape. Erect hairs on head, gaster; lacking on mesosomal dorsum.

This well-known tropical pest protects aphids and coccids injurious to crops.

FORMICINAE

Plagiolepis flavescens Collingwood



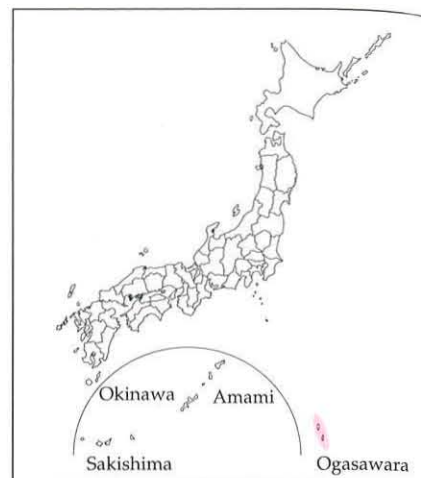
Workers ca. 2 mm. Pale to darker yellow. Scapes exceeding occiput by ca. 1/2 length of 2nd antennal segment. Pronotum: paired short erect hairs, serrate when viewed by scanning electron microscopy.

Nests under stones, woodland margins to open land.

FORMICINAE

Plagiolepis alluaudi Emery

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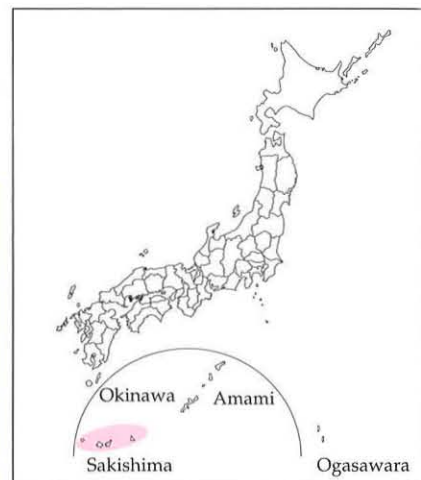


Workers 1.5-2 mm. Yellow to light red-dish. Scapes exceeding occiput by the length of second antennal segment. Pronotum without erect hairs.

FORMICINAE

Acropyga kinomurai Terayama & Hashimoto

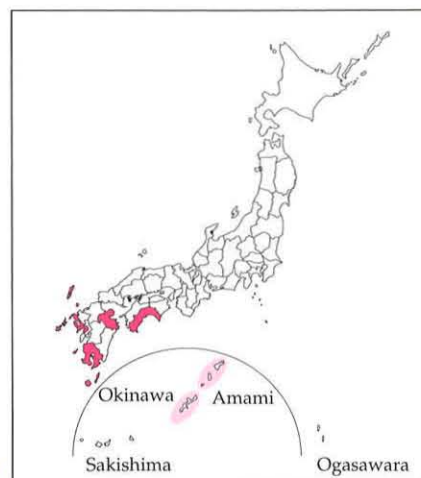
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Workers 2 mm. Yellow. Head wider than long. Mandibles 4-toothed. Antennae 11-segmented; scapes not reaching occiput. Eyes small (5 or 6 indistinct facets). Promesonotal profile almost straight. Metanotal groove absent. Propodeal profile straight, posterodorsal corner broadly rounded. Dorsa of head, mesosoma with abundant short erect hairs. Rare.

FORMICINAE

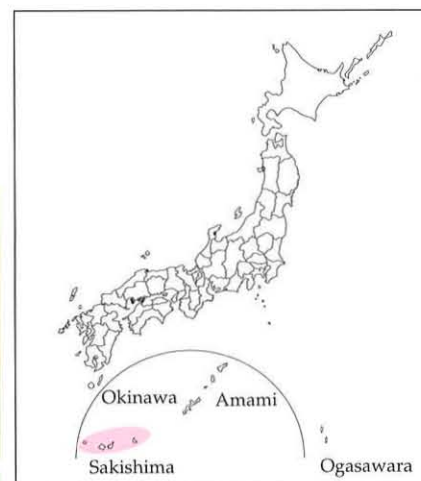
Acropyga nipponensis Terayama



Workers 2 mm. Pale yellow. Head ca. square frontally, slightly longer than wide. Mandibles 5-toothed, basalmost tooth largest. Eyes small (1-2 facets). Palpal formula 2:3. Antennae 11-segmented; scapes not reaching occiput. Promesonotal and propodeal dorsal profiles convex. Petiolar scale thinner, higher than *A. sauteri*, *A. yaeyamensis*. Nests in soil under stones or rotting wood in broad-leaved forests.

FORMICINAE

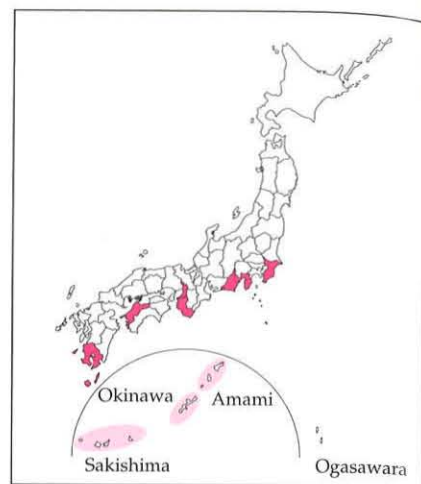
Acropyga yaeyamensis Terayama & Hashimoto



Workers 1.5-2.0 mm. Yellow. Head almost square in frontal view. Mandibles: with 4 relatively large, triangular teeth. Antennae 10-segmented; scapes not reaching posterior cephalic border. Eyes 1-faceted. Promesonotal, propodeal profiles convex. Petiolar profile subtriangular.

FORMICINAE

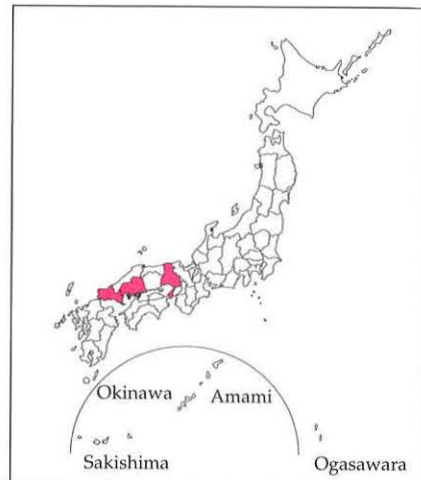
Acropyga sauteri Forel



Workers 2-2.5 mm. Yellow. Head almost square frontally. Mandibles: 3 well-developed teeth. Antennae 11-segmented; scapes reaching occiput. Eyes 1-faceted. Promesonotal, propodeal profiles convex. Mesosoma: numerous short erect dorsal hairs. Nests under stones or directly in soil, in grasslands.

DOLICHODERINAE

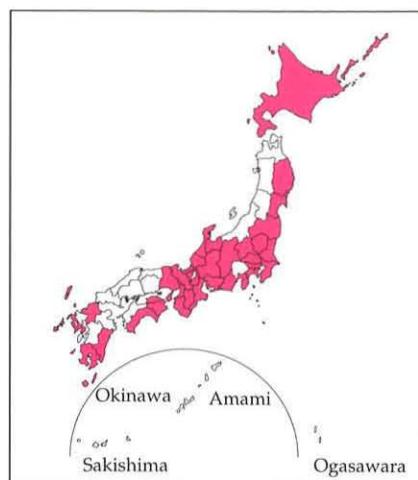
Linepithema humile (Mayr)



Workers 2.5 mm. Dark brown. Eyes located anteriorly on dorsal surface of head. Promesonotum weakly raised. Petiolar scale apex below level of propodeal spiracle. Integument thin, easily collapsed. This is the notoriously pestiferous Argentine ant, native to South America, distributed throughout much of the world by human commerce.

DOLICHODERINAE

Technomyrmex gibbosus Wheeler

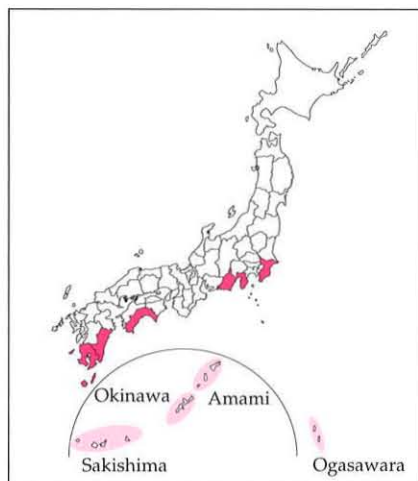


Workers 2.5 mm. Head, mesosoma reddish to brown; gaster dark brown; mandibles, antennae, legs yellowish brown. Head longer than wide; eyes more anterior than *T. albipes*. Mandibles with ca. 15 serrate teeth, apicalmost largest, basalmost smallest. Scares slightly exceeding occiput. Head, mesosoma microreticulate, gaster weakly microreticulate. Mesosoma, gaster without erect hairs.

Nests in dead twigs and dead bamboo stems. Nuptial flights in September.

DOLICHODERINAE

Technomyrmex albipes (F. Smith)

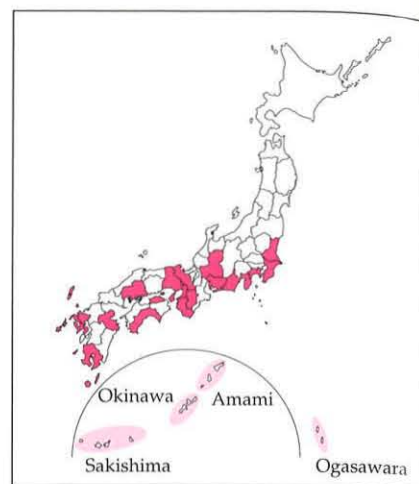


Workers 2.5 mm. Black to blackish brown; funiculi, tarsi yellowish white. Head as long as wide. Ca. 15 serrated mandibular teeth, apical two largest. Eyes near cranial midlength. Scares relatively long, microreticulate. Pronotum, mesonotum, propodeum each with a pair of erect hairs.

Polycalic nests in rotting wood, stumps, twigs, in grasslands, forest margins, populations up to several millions. Reproductives include ergatoid females and males. Alates present March/June.

DOLICHODERINAE

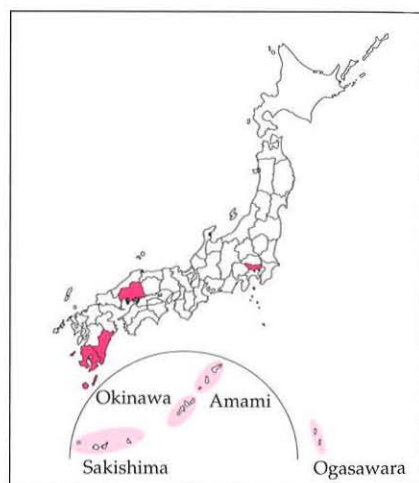
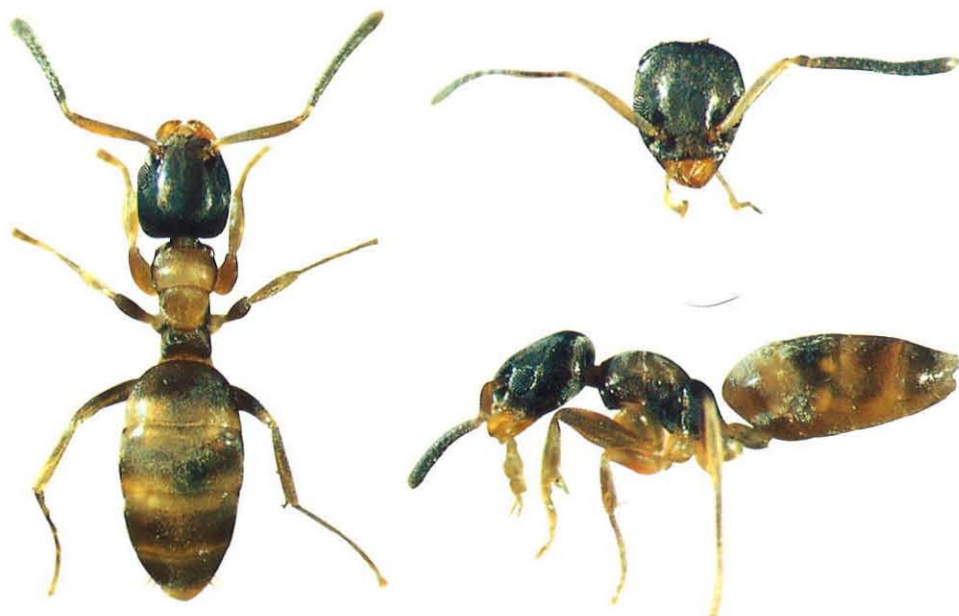
Tapinoma sp. 3



Workers ca. 1.5 mm. Pale yellow to yellow. Scapes short, just reaching posterior cephalic border. Clypeal border almost straight medially. Eyes smaller than *T. melanocephalum*, each with about 6 facets spanning long axis. No erect setae on mesosoma. Nests soil or hollow twigs.

DOLICHODERINAE

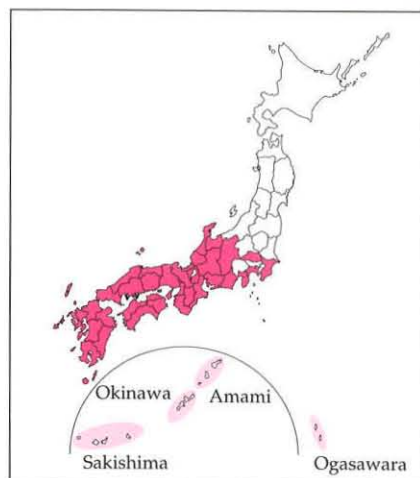
Tapinoma melanocephalum (Fabricius)



Workers ca. 1.5 mm. Bicolored: funiculi, sides of pro- and mesonota, propodeum, gaster brown (some variation); remainder pale yellow. Scapes long, surpassing occiput. First funicular segment longer than second plus third. Eyes: 9-10 facets spanning long axes. Anterior clypeal margin slightly concave medially. No erect mesosomal setae. Nests in soil, under stones, logs, tree bark etc. A tropical domestic pest.

DOLICHODERINAE

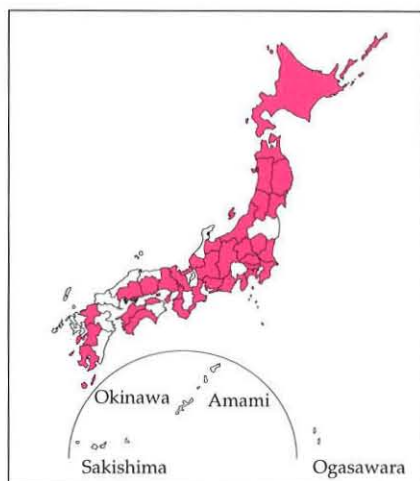
Ochetellus glaber (Mayr)



Workers 2 mm. Black, metallic gastral reflections. Legs, antennae brownish. Head longer than wide; sides converging anteriorly. Mandibles: 4 large apical, ca. 10 smaller teeth. Scapes not reaching cephalic border. Metanotal groove deep. Posterodorsal propodeal corner angulate; declivity concave to straight. Node, 2.5 x as high as long. Head (excluding clypeus, vertex), mesosoma, almost hairless, weakly microreticulate; gaster shining. Nests in dead twigs, rotting wood, under stones in grasslands, forest margins.

DOLICHODERINAE

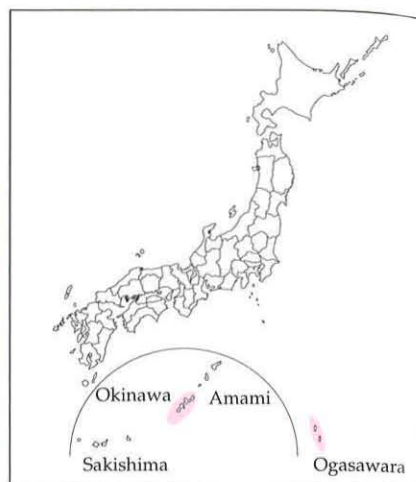
Dolichoderus sibiricus Emery



Workers 3 mm. Head, gaster black; remainder reddish brown. two bilateral pairs of yellowish-white gastral spots. Legs, antennae, mandibles yellowish brown. Head, mesosoma, petiole: large dense punctures. Anterior clypeal margin convex medially. 2 apical mandibular teeth, 7-8 denticles. Scapes exceeding occiput. Pro-, mesonota convex; metanotal groove distinct; propodeum produced posterodorsally, posterior margin convex. Node tilted anteriorly. Head, gaster: scattered hairs; mesosoma hairless.

MYRMICINAE

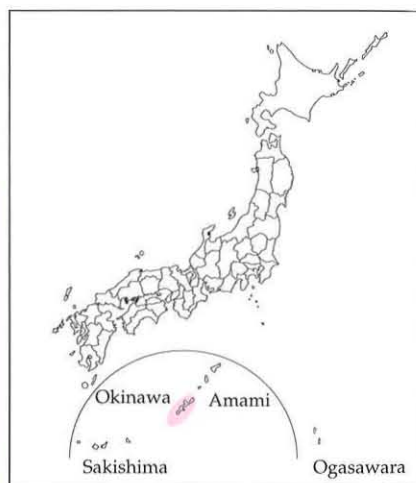
Strumigenys emmae (Emery)



Workers 1.5 mm. Yellowish brown. Apical mandibular fork: 2 spiniform teeth, 1 or 2 intercalary denticles. Spiniform preapical tooth at apical third of mandible. Pronotum anteriorly rounded. Metanotal groove absent. Propodeal spines small, with propodeal lamellae. Hairs on head, mesosoma, petiole scale-like or orbicular. Uniquely distinguished by 4-segmented antennae.

MYRMICINAE

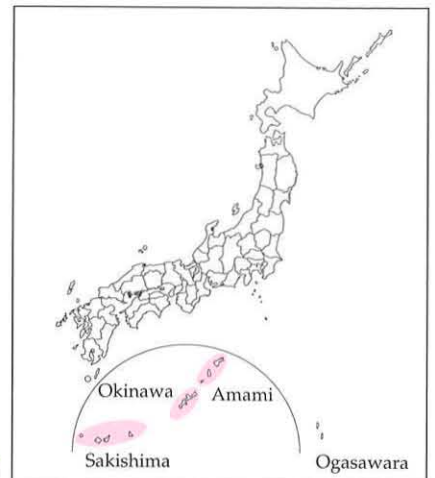
Strumigenys lacunosa Lin & Wu



Workers 2 mm. Reddish brown. Mandibles almost straight, no subapical teeth. Infradental lamellae weak. Mesopleuron, lateral parts of propodeum finely punctate. Body hairs abundant, some long, flagellate. The lack of subapical mandibular teeth is unique among Japanese *Strumigenys*.

MYRMICINAE

Strumigenys minutula Terayama & Kubota



Workers 1.5-2 mm. Brown. Outer mandibular borders strongly convex; one intercalary apical denticle. Propodeal infradental lamellae strong, convex; propodeal spines relatively weak. Most of mesothorax, propodeum smooth, shining. Distinguished by relatively short, strongly convex mandibles; well-developed infradental propodeal lamellae. Nests in soil, grassland, sugarcane fields. Polygynous.

MYRMICINAE

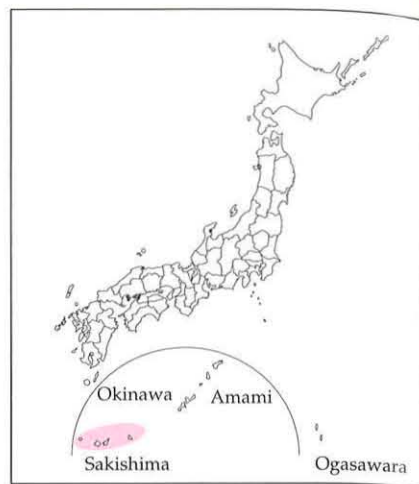
Strumigenys exilirhina Bolton



Workers 2 mm. Brown. Mandibles short, stout, < half as long as head; outer margins weakly convex. Head ventrally strongly convex. Most of mesothorax, propodeum smooth. Infradental propodeal lamellae thin, ca. half as broad as propodeal spine length, lacking spongiform appendage. Nests in soil, open land, sugar-cane fields.

MYRMICINAE

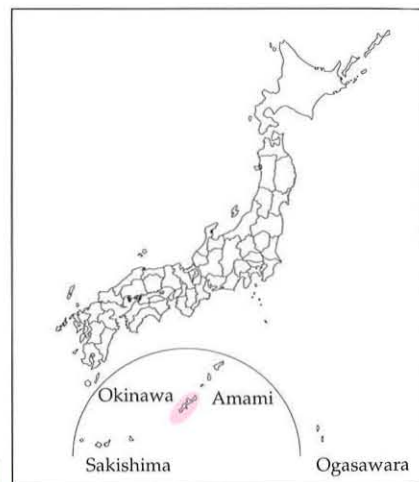
Strumigenys stenorhina Bolton



Workers 2 mm. Yellow-brown. Eyes: ca. 20 facets. Mandibles elongate, half as long as head, stout, straight, subapical teeth stout, no intercalary denticles. Head weakly convex ventrally. Infradental lamellae thin, half as broad as propodeal spine length, without spongiform appendage. Mesopleuron, propodeal sides unsculptured, shining. Distinguished from *S. exilirhina* by long, straight mandibles. Nests under stones, decayed wood. Polygynous.

MYRMICINAE

Strumigenys strigatella Bolton

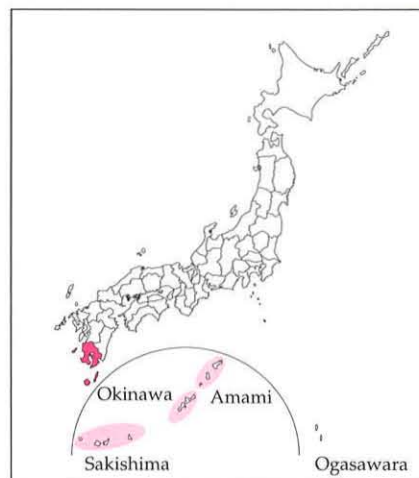


Workers 2 mm. Brown. Head not distinctly constricted anteriorly, frontally trapezoidal. Distance between apical fork and subapical mandibular teeth short. Dorsal mesosomal outline straight. Infradental lamellae with widely concave outer margins.

Distinguished from *S. lewisi* by fine punctures on mesopleuron and lateral surfaces of propodeum, and shape of head. Rare.

MYRMICINAE

Strumigenys sp. 9

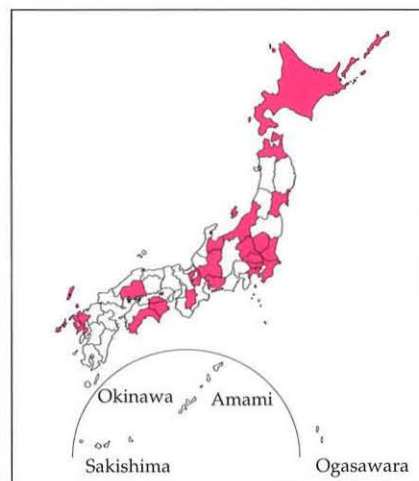


Workers 2 mm. Brown, difficult to distinguish from *S. lewisi* and *S. sp. 4*. Dorsal portion of postpetiole with spongiform appendage relatively long compared to *lewisi*.

Females: Separable from *S. lewisi* and *sp. 4* by thick mesonotum (thin in *lewisi*); posterior ocelli small, indistinct (large, distinct in *sp. 4*). Nests under stones, decayed wood in woodland. Polygynous.

MYRMICINAE

Strumigenys sp. 4

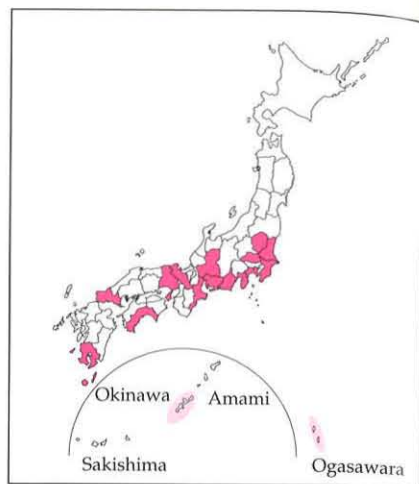
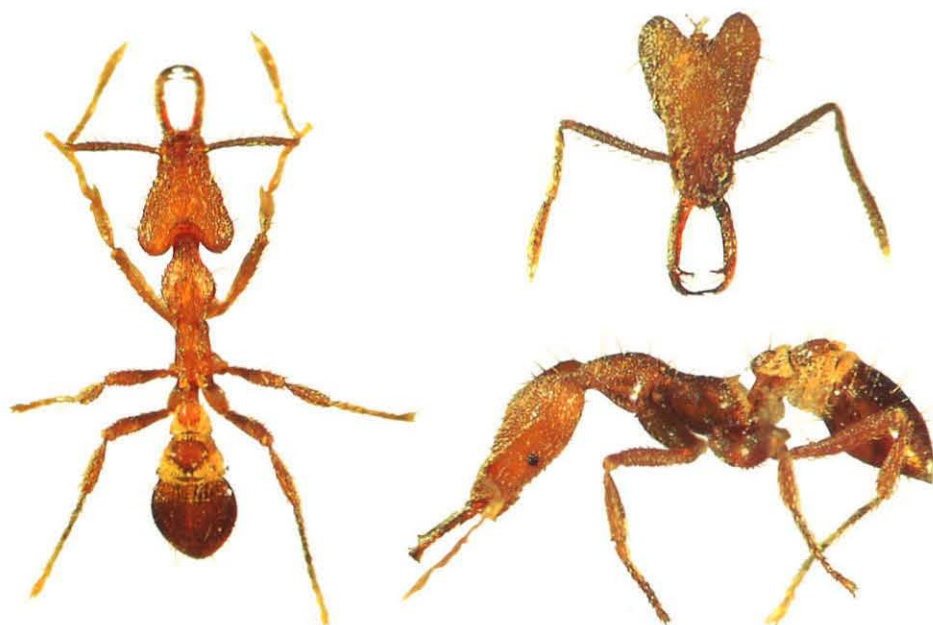


Workers 2-2.5 mm. Yellowish brown. Almost indistinguishable from *S. lewisi* and *S. sp. 9*. Dorsal portion of postpetiole with spongiform appendage long compared to *lewisi*. Female: posterior paired ocelli well developed, distinctly margined with dark-colored spots; eyes large; mesonotum thick.

Distinguished by large posterior ocelli and eyes in females. Nesting as in *S. lewisi*. Generally monogynous.

MYRMICINAE

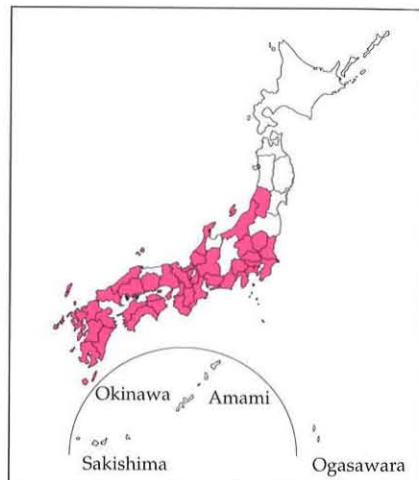
Strumigenys solifontis Brown



Workers 2.5-3 mm. Yellowish brown. Distinguished *S. lewisi* by longer head, less convex in profile; mandibles relatively long, elongate subapical teeth; Scapes, funiculi relatively long; mesosoma slender; dorsal mesosomal outline somewhat concave; infradental lamellae strongly concave. Females: eyes large, mesonotum relatively raised. Nests under stones in woodland, usually polygynous with < 200 colony workers.

MYRMICINAE

Strumigenys lewisi Cameron



Workers 2 mm. Yellow-brown. Outer mandibular margins feebly convex; apical fork: 2-3 intercalary denticles, subapical tooth on each shaft. Only 4-8 hairs on mesosoma, metanotal groove shallow. Spongiform lamella below propodeal spine. Most of mesothorax, propodeum shining. Females: mesonotum relatively low, ocelli, eyes relatively small. Nests under stones, logs, in soil, decayed stumps, bamboo stems. Alates in August. Colonies polygynous, small, common.

MYRMICINAE

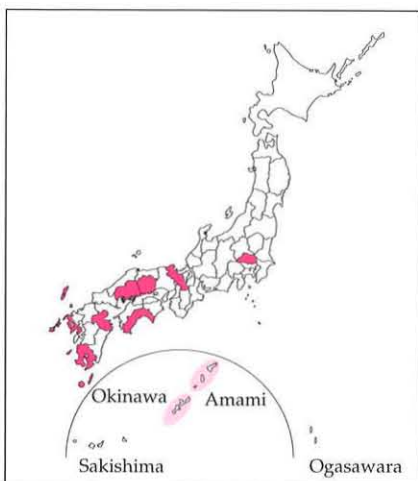
Pyramica terayamai Bolton



Workers 2mm. Yellowish brown. Mandibles subtriangular. Eyes very small. Scapes elbowed at basal third. Cephalic dorsum: simple short hairs. Pronotal humeri without flagellate hairs. Parts of mesopleuron smooth. Propodeal spines vestigial. Spongiform appendages developed on sides of petiole, postpetiole. Known only from Mt. Yamizo, Tochigi Prefecture.

MYRMICINAE

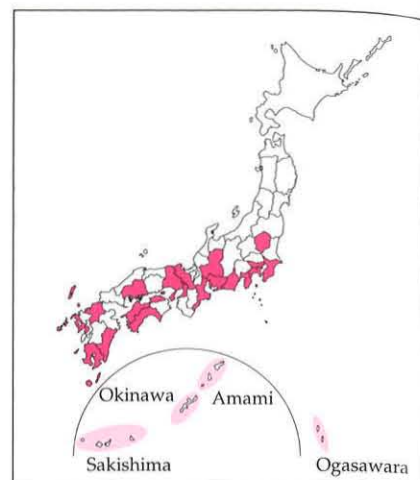
Pyramica hirashimai (Ogata)



Workers 1 mm. Smaller than *P. hexamera*. Yellowish brown. Mandibular shafts without preapical teeth; dorsal apical tooth less distinct than *P. hexamera*. Anterior clypeal margin with scale-like hairs. Mesonotum not overhanging propodeum. Propodeal spines absent. Spongiform appendages on posterolateral portion of propodeum. Rarer than *P. hexamera*. Nests in soil, broadleaf forests.

MYRMICINAE

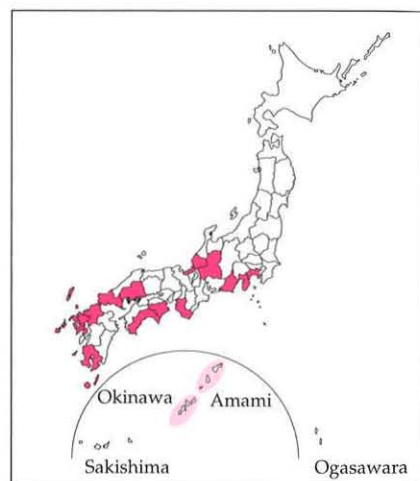
Pyramica hexamera (Brown)



Workers 2 mm. Yellowish brown. Mandibles: 2 pairs of preapical teeth; apical dentition with distinct dorsal tooth. Anterior clypeal margin without peculiar hairs. Mesosomal dorsum horizontal from pronotum to mesonotum, which overhangs propodeum. Propodeal spine distinct. Spongiform appendages on postero-lateral propodeum relatively weak. Rare. Nests in soil, broadleaf forest.

MYRMICINAE

Pyramica mutica (Brown)



Workers 1.5 mm. Reddish brown. Body surfaces from head to postpetiole finely reticulate. Paired scale-like hairs on head, mesonotum. Propodeum without teeth or lamellae. Spongiform material relatively weak on petiole, postpetiole. Rare. Found at forest margins and nearby open situations, nests in soil, decaying wood.

Paratrechina sakurae (Ito)

Fig. p 65

Original Reference: Ito, T. (1914)

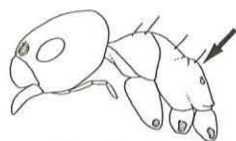
Synonym(s): *Prenolepis sakurae* Ito (Ito, 1914)

Paratrechina sakurae (Ito) (Emery, 1925)

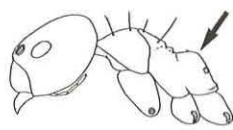
Distribution: Hokkaido, Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Nansei Is (Tokunoshima I. and northwards); Korean Peninsula.

Small ants, total length of workers around 1 - 1.5 mm. Body color brown; antennae and legs yellowish brown. Easily separated from other Japanese *Paratrechina* species by the short antennal funiculi (with 2nd to 4th segments each wider than long). Mandibles with 6 teeth. Scapes exceeding posterior margin of head by twice their individual width; lacking erect hairs. Three ocelli present but obscure. Mesosoma short, about as long as head. Promesonotal dorsum convex in profile, the slope of pronotal dorsum steeper than that of mesonotum. Propodeal dorsum short. Metanotal groove shallow and short. Pronotal and propodeal dorsa each with a pair of erect hairs. Hind femora and tibiae without erect hairs.

Nests are found in rotting wood, leaf-litter and under stones in drier habitats than *P. flavipes*. Nuptial flights occur in October and November. A widely distributed species.



P. sakurae



P. flavipes

Paratrechina longicornis (Latreille)

Fig. p 65

Original Reference: Latreille, P. A. (1802)

Synonym(s): *Formica longicornis* Latreille (Latreille, 1802)

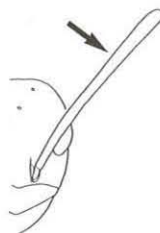
Prenolepis longicornis (Latreille) (Roger, 1863)

Paratrechina longicornis (Latreille) (Emery, 1925)

Distribution: Kyushu, Yaku I., Nansei Is, Ogasawara Is, Volcano Is; pantropical.

Total length of workers around 2.5 - 3 mm. Color brown to black. Easily separated from Japanese congeners by the long, slender antennal scapes and the shape of the mesosoma. Head elongate. Mandibles narrow, each with 5 teeth. Antennae very long: scapes each exceeding posterior margin of head by 2/5 its length and lacking erect hairs. Eyes large, maximum diameter 0.3 times head length. Ocelli small but distinctly recognizable. Mesosoma slender, dorsum almost straight from anterior portion of pronotum to propodeal dorsum, the pro- and mesonotal dorsa weakly convex in profile. Metanotal groove slightly incised. Propodeal spiracles distinct. Head and gaster with abundant whitish, long erect hairs. Propodeum without erect hairs. Petiole low. Legs long. Hind femora and tibiae bearing suberect hairs with length almost equal to the width of the femora.

This species is commonly distributed in the tropics and often invades houses. The workers are fast-moving.



P. longicornis



P. flavipes

Paratrechina flavipes (F. Smith)

Fig. p 66

Original Reference: Smith, F. (1874)

Synonym(s): *Tapinoma flavipes* F. Smith (F. Smith, 1874)

Prenolepis flavipes (F. Smith) (Mayr, 1886)

Paratrechina flavipes (F. Smith) (Emery, 1925)

Distribution: Hokkaido, Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Kuchino-erabu I., Tokara Is; Mainland China, Korean Peninsula, Taiwan (?), United States (introduced).

Total length of workers around 2 - 2.5 mm. Head and gaster blackish brown; mesosoma and legs yellow to yellowish brown (mesosoma blackish brown in some specimens - a matter of unknown possible taxonomic significance). Mandibles each with 6 teeth. Scapes longer than in *P. sakurae*; each exceeding posterior margin of head by 1/3 its length, and with several suberect hairs. Funiculi longer than wide. Eyes relatively small. Ocelli small and rather obscure, but 3 are recognizable. Mesosoma slightly longer than head length; pronotal dorsum convex in profile; mesonotal dorsum straight, posterior margin angulate. Metanotal groove deeply incised. Head and gaster with abundant erect hairs. Pronotal dorsum with several erect hairs, mesonotal dorsum with four, none on propodeum. Hind femora and tibiae with erect or suberect hairs.

This species nests in leaf litter, rotting wood, and in the soil of grasslands and forests. It feeds on plant nectar and small dead animals. On mainland Japan newly emerged queens overwinter in their mother nests. Nuptial flights occur from May to June.

Prenolepis sp.

Fig. p 66

Distribution: Shikoku (Kochi Pref.: Usa, Cape Ashizuri and Cape Muroto [Masaaki Morisita leg.]), Kyushu (Kumamoto Pref.: Amakusa [Masaaki Morisita leg.]).

Total length of workers about 2 mm. Whole body blackish brown. Long, fine, suberect hairs everywhere abundant. Eyes large, about 1/4 as long as head; their anterior margins situated at midlength of head. Petiole low and long, strongly inclined anteriorly. Anterior surface of 1st gastral segment concave, so as to receive the petiole. Mesothoracic constriction less conspicuous than in other

Prenolepis species.

In the field this species looks like a blackish *Paratrechina*. Workers are active on the ground. A rare species, with only a few collection records.

Anoplolepis gracilipes (F. Smith)

Fig. p 67

Original Reference: Smith, F. (1857)

Synonym(s): *Formica longipes* Jerdon (Jerdon, 1851)

Plagiolepis longipes (Jerdon)(Emery, 1887)

Anoplolepis (*Anoplolepis*) *longipes* (Jerdon) (Emery, 1925)

Distribution: Nansei Is, Volcano Is; tropical and subtropical areas, essentially worldwide; North America.

Total length of workers around 4 mm. Body color yellow, gaster brownish (it can be greenish in some non-Japanese specimens). Antennae and legs remarkably long. Head oval. Clypeus produced medially, with convex anterior margin. Eyes relatively large and produced. Mandibles with 8 teeth. Antennae 11-segmented; scapes twice as long as the length of the head, or longer; their second to terminal segments each more than three times as long as wide. Mesosoma slender. Pronotum narrow, with almost straight dorsum in profile. Anterior portion of mesonotal dorsum, back to the propodeum, gently concave in profile. Propodeal dorsum convex in profile. Petiole thick, with an inverted-U-shaped crest. Erect hairs present on head and gaster, lacking on dorsum of mesosoma.

This species is commonly found in grasslands, and at woodland margins and road sides in Okinawa Prefecture. It is also seen frequently foraging on tree trunks. *Anoplolepis gracilipes* (= *A. longipes*) might be native to tropical Africa (Wilson & Taylor, 1967) or tropical Asia (Kempf, 1972). Its distribution has clearly been expanded by human commerce, so that it is now widespread in tropical and subtropical regions of the globe. It is a well-known pest species, because it protects aphids and coccids which injure tropical crops. In this role it has been rated a secondary agricultural pest (Reimer et. al., 1990, etc.).

Plagiolepis flavescens Collingwood

Fig. p 67

Original Reference: Collingwood, C. A. (1976)

Distribution: Kyushu (northern part), Tsushima I.(southern part); Korean Peninsula.

Total length of worker ca 2 mm. Body color pale to darker yellow. Antennal scapes relatively shorter than in *P. alluaudi*; exceeding posterior margin of head by around half the length of the 2nd antennal segment. Pronotum with paired short erect hairs, which are serrate when viewed using scanning electron microscopy.

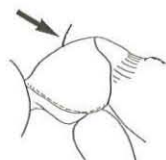
Found in woodland margins ranging to open land, nesting under stones. Workers sometimes forage on plants to collect honeydew. *P. flavescens* is rather common on Tsushima I., but rare on mainland Kyushu (Ogata, 1986).



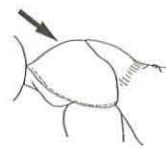
P. flavescens



P. alluaudi



P. flavescens



P. alluaudi

Plagiolepis alluaudi Emery

Fig. p 68

Original Reference: Emery, C. (1894)

Synonym(s): *Plagiolepis alluaudi* Emery, 1894

Plagiolepis augusti Emery, 1921

Plagiolepis foreli Mann, 1920

Plagiolepis mactavishi Wheeler, 1908

Plagiolepis foreli var. *ornata* Santschi, 1920

Plagiolepis alluaudi var. *ornata*: Emery, 1921

Distribution: Ogasawara Is; Oceania, Southern part of Mainland China, West Indies, Africa.

Total length of workers around 1.5 - 2 mm. Body color yellow to light reddish yellow. Antennal scapes exceeding posterior margin of head by the length of second antennal segment. Pronotum without erect hairs.

Found in open land. In Japan, this species is known from the Ogasawara Islands (Shindo, 1979; Masuko & Terayama, 1984), but it has not been recorded from the Nansei Islands. *P. alluaudi* is widespread in tropical and subtropical regions of the world. It is considered to be Afrotropical in origin and spread by human commerce (Wilson & Taylor, 1967).

Acropyga kinomurai Terayama & Hashimoto

Fig. p 68

Original Reference: Terayama, M. & Hashimoto, Y. (1996)

Distribution: Ishigaki I.

Total length of workers around 2 mm. Body color yellow. Head wider than long. Mandibles each with 4 acute teeth. Antennae 11-segmented; scapes not reaching posterior margin of head. Eyes small, each consisting of 5 or 6 indistinct facets. Promesonotal

dorsum almost straight in profile. Metanotal groove absent. Propodeum with straight dorsal outline and broadly rounded posterodorsal corner in profile. Dorsa of head and mesosoma with abundant short erect hairs.

A. kinomurai belongs to subgenus *Rhizomyrma*. It is known only from Ishigaki Island, and a single collection was taken under a stone on the ground together with ant-attended mealybugs, *Eumyrmococcus kinomurai*. A rare species.

Acropyga nipponensis Terayama

Fig. p 69

Original Reference: Terayama, M. (1985b)

Distribution: Honshu (Mikura-jima I., Izu Is), Shikoku, Kyushu, Yaku I., Nansei Is.

Total length of workers around 2 mm. Body color pale yellow. Head nearly square in frontal view, slightly longer than wide. Mandibles each with 5 teeth, the apical 4 triangular; the basalmost largest rectangular and apically truncated. Eyes small, each of 1 or 2 facets. Palpal formula 2:3. Antennae 11-segmented; scapes not reaching posterior margin of head. Promesonotum convex in profile; propodeal dorsum also convex. Petiolar scale thinner and higher than those of *A. sauteri* and *A. yaeyamensis*.

A. nipponensis belongs to subgenus *Atopodon*. The nests are found in soil under stones or rotting wood in broad-leaved forests. A myrmecophilous mealy bug, *Eumyrmococcus nipponensis*, lives in the nests, and the ants feed on its honeydew (Terayama, 1985, 1986).



A. nipponensis



A. yaeyamensis



A. sauteri

Acropyga yaeyamensis Terayama & Hashimoto

Fig. p 69

Original Reference: Terayama, M. & Hashimoto, Y. (1996)

Distribution: Nansei Is (Ishigaki I., Iriomote I.).

A small species; total length of workers around 1.5 - 2.0 mm. Body color yellow. Head almost square in full face view. Mandibles with 4 relatively large, triangular teeth. Antennae 10-segmented; scapes short, not reaching posterior margin of head. Eyes each a single facet. Promesonotum convex in profile; propodeal dorsum also convex. Petiolar scale subtriangular in profile.

A. yaeyamensis belongs to subgenus *Rhizomyrma*. It is known only from the Yaeyama Islands, collections are from litter in broad-leaved forest. A relatively rare species.

Acropyga sauteri Forel

Fig. p 70

Original Reference: Forel, A. (1912)

Distribution: Honshu (southern part), Shikoku, Kyushu, Nansei Is; Mainland China (southern part), Taiwan.

Total length of workers around 2-2.5 mm. Body color yellow. Head almost square in full face view; mandibles with 3 well-developed teeth. Antennae 11-segmented; scape reaching posterior margin of head. Eyes minute, each a single facet. Promesonotum gently convex and propodeum convex in profile. Mesosoma with numerous short erect dorsal hairs.

This species is assigned to *Acropyga* subgenus *Rhizomyrma*. The symbiont mealy bug *Eumyrmococcus smithi* is tended in its nests. Nuptial flights may be observed from late March to June. Each alate female leaves the parent nest with a gravid female *Eumyrmococcus* in her mandibles (Uye, 1928, 1933; Teranishi, 1929). *A. sauteri* is found in grasslands or at the margins of woods. It nests under stones or directly in the soil.

Subfamily DOLICHODERINAE

Linepithema humile (Mayr)

Fig. p 70

Original Reference: Mayr, G. (1868b)

Synonym(s): *Hypoclinea humilis* Mayr, 1868

Hypoclinea (Iridomyrmex) humilis: Mayr, 1870

Iridomyrmex humilis: Emery, 1888

Linepithema humile: Shattuck, 1992

Total length of workers around 2.5 mm. Body color dark brown. Eyes distinct located anteriorly on the dorsal surface of the head. Promesonotum weakly raised. Petiolar scale present, its apex situated below the level of the propodeal spiracle. Integument thin and easily collapsed.

This is the notoriously pestiferous Argentine ant, formerly known as *Iridomyrmex humilis*. Its colonies are large and polygynous, sometimes comprising hundreds of queens and many thousands of workers. New nests are founded by migration or budding. The Argentine ant commonly infests houses and other premises, contaminating and spoiling stored food and other products. It tends homopterous agricultural and horticultural insect pests, and severely damages and depletes populations of native ant species in infested areas. An overview of the pest status of *L. humile* in the United States was published by Thompson (1990).

L. humile is native to parts of South America (Brazil and Argentina) and has been distributed throughout much of the world by human commerce. There have been no former Asian records, but Sugiyama (1999) recently reported collections from Hatsukaichi city dating from 1993.

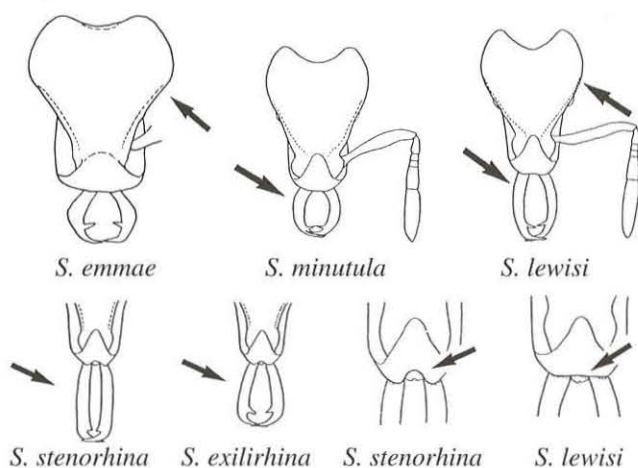
Quadristurma emmae (Emery): Brown, 1949

Strumigenys emmae (Emery): Bolton, 1999

Distribution: Ogasawara Is, Nansei Is (Minami Daito I.); pantropical and subtropical.

Total length of workers around 1.5 mm. Body color yellowish brown. Apical fork of mandible consisting of 2 spiniform teeth: intercalary denticles between them numbering 2 on the left mandible and 1 or 2 on the right. A spiniform preapical tooth situated at about the apical third of the length of each mandible. Eyes very small, situated at ventral margin of antennal scrobes. Pronotum anteriorly rounding into the sides. Metanotal groove absent. Propodeal spines small, partly incorporated below into posterolateral propodeal lamellae. Hairs on head, mesosoma and petiole mostly scale-like or orbicular.

S. emmae is easily distinguished from other Japanese ants by its 4-segmented antennae. A pantropical species, dispersed by human commerce (Brown, 1949b) and natural dispersal (Taylor in Kubota, 1976). Detailed biology is unknown. For recent taxonomic information see Bolton (1983, 1999, 2000). Formerly known as *Quadristurma emmae*. The genus *Quadristurma* was synonymized with *Strumigenys* by Bolton (1999). This species has been recorded in Japan only from the Ogasawara Islands (Kubota, 1976; Shindo, 1979).



Strumigenys lacunosa Lin & Wu

Fig. p 74

Original Reference: Lin, C.-C. & Wu, W.-J. (1996)

Distribution: Okinawa I. (Mt. Nishime-dake); Taiwan.

Total length of workers around 2 mm. Body color reddish brown. Mandibles almost straight, without subapical teeth. Infradental lamellae almost lacking. Mesopleuron and lateral parts of propodeum with fine punctures. Body hairs abundant, some of them long and flagellate.

The absence of subapical teeth on the mandibles is unique to this species among Japanese *Strumigenys*, so that it is easily distinguished from the others. Rare in Japan - with only one record to data, from the floor of broadleaf forest in northern Okinawa Island.

Strumigenys minutula Terayama & Kubota

Fig. p 75

Original Reference: Terayama, M. & Kubota, S. (1989)

Distribution: Tokuno-shima I., Okinawa I., Iriomote I.; Taiwan.

Total length of workers around 1.5 - 2 mm. Body color brown. Outer border of mandibles rather strongly convex; apical fork with one intercalary denticle. Infradental lamellae of propodeum well developed, convex; propodeal spine relatively poorly developed. Most parts of mesothorax and propodeum unsculptured, smooth and shining.

The species is easily distinguished by its relatively short and strongly convex mandibles, and well-developed infradental propodeal lamellae. Nests are found under stones or in the soil of grassland or sugarcane fields. Polygynous.

Strumigenys exilirhina Bolton

Fig. p 75

Original Reference: Bolton, B. (2000)

Distribution: Okinawa I.

Total length of workers around 2 mm. Body color brown. Mandibles rather short and stout, less than half as long as head; their outer margins weakly convex. Ventral outline of head rather strongly convex. Most parts of mesothorax and propodeum smooth. Infradental lamellae of propodeum thin, about half as broad as propodeal spines, lacking spongiform appendage. Nests in the soil of open land and sugar-cane fields.

Strumigenys stenorrhina Bolton

Fig. p 76

Original Reference: Bolton, B. (2000)

Distribution: Ishigaki I., Iriomote I., Yonaguni I.

Total length of workers around 2 mm. Body color yellow to brown. Eyes large, each consisting of around 20 facets. Mandibles elongate, almost half as long as head; shafts stout and almost straight; apical forks without intercalary denticles; subapical teeth stout. Ventral outline of head weakly convex in profile. Infradental lamellae of propodeum thin, about half as broad as propodeal spines, without spongiform appendage. Mesopleuron and lateral portion of propodeum unsculptured, smooth and shining.

The species is similar to *Strumigenys exilirhina*, but distinguished by its long, straight mandibles. Nests under stones or decayed wood. Polygynous.

Strumigenys strigatella Bolton

Fig. p 76

Original Reference: Bolton, B. (2000)

Distribution: Northern part of Okinawa I. (Yona, River Fukugawa, Mt. Terukubi).

Total length of workers around 2 mm. Body color brown. Anterior portion of head at the level of antennal insertions not distinctly constricted, so that the head is somewhat trapezoidal in full-face view. Distance between dorsal tooth of apical fork and subapical tooth on mandibles rather short. Dorsal outline of mesosoma from posterior half of mesonotum to base of propodeal spine almost straight. Infradental lamellae of propodeum with widely concave outer margins.

This species is similar to *S. lewisi* in general appearance, but separable in having fine punctures on the mesopleuron and lateral surfaces of the propodeum, and by the shape of its head. A rare species, found on several occasions in big chinquapin tree trunks at a wood-chipping factory, and from natural forests.

Strumigenys sp. 9

Fig. p 77

Distribution: Amami Is, Okinawa I., Ishigaki I., Iriomote I.

Total length of workers around 2 mm. Body color brown. Very similar to *S. lewisi* and *Strumigenys* sp. 4, but the workers difficult to distinguish. Dorsal portion of postpetiole surrounded by spongiform appendage relatively long compared to that of *S. lewisi*.

The females of this species are separable from *S. lewisi* and *Strumigenys* sp. 4 by the following combination of characters: mesonotum thick (thin in *S. lewisi*); posterior paired ocelli small and indistinct (larger and more distinct in *S. sp. 4*). Nests under stones or decayed wood in woodland. A polygynous species.

Strumigenys sp. 4

Fig. p 77

Distribution: Hokkaido (southern part), Honshu, Kyushu; Korea.

Total length of workers around 2 - 2.5 mm. Body color yellowish brown to brown. Very similar to *S. lewisi* and *Strumigenys* sp. 9 [Minami-uroko-ari]; the workers almost indistinguishable. The dorsal portion of the postpetiole surrounded by spongiform appendage is relatively long compared to that of *S. lewisi*. In female: posterior paired ocelli well developed, distinctly margined with dark-colored spots; eyes relatively large; mesonotum relatively thick.

The species is distinguished by its females having relatively large posterior ocelli and eyes. The shape of the mesosoma is similar to that of *Strumigenys* sp. 9. Nesting sites are almost the same as for *S. lewisi* (Masuko et al., 1985). Colonies are in general monogynous (Masuko et al., 1985). *Strumigenys* sp. 4 material from Hokkaido (Matsumae-kojima Island) was misidentified as *S. lewisi* by Munakata (1972).

Strumigenys solifontis Brown

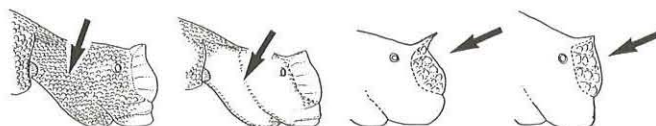
Fig. p 78

Original Reference: Brown, W. L., Jr. (1949)

Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu, Nansei Is (Okinawa I.), Ogasawara Is; Taiwan.

Total length of workers around 2.5 - 3 mm. Body color yellowish brown to brown. Similar to *S. lewisi*, but distinguished by the following characters: head proportionally longer and less convex in profile; mandibles relatively long, with elongate subapical teeth; antennal scapes and funiculi relatively long; mesosoma more slender; dorsal outline of mesosoma from pronotum to base of propodeal spine rather concave; infradental lamellae of propodeum quite strongly concave.

The females of this species have large eyes and a relatively raised mesonotum. Nests are found under stones or in cavities of stones in woodland margins (Masuko, 1980). Colonies are usually polygynous comprising over 200 workers (Masuko, 1980). Rather rare in Honshu, but common on Okinawa Island.



S. strigatella

S. lewisi

S. stenorhina

S. solifontis

Strumigenys lewisi Cameron

Fig. p 78

Original Reference: Cameron, P. (1886)

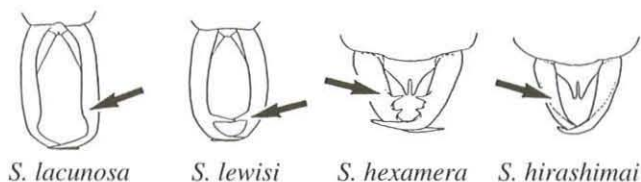
Synonym(s): *Strumigenys godeffroyi* var. *lewisi* Mayr (Mayr, 1887)

Strumigenys lewisi Brown (Brown, 1949)

Distribution: Honshu, Shikoku, Kyushu, Tsushima I., Yaku I.; Mainland China, Korean Peninsula, Hawaii, India, Sri Lanka, Myanmar.

Total length of workers around 2 mm. Body color yellow to brown. Outer margin of mandibles feebly convex in full-face view; apical fork with 2 or 3 small intercalary denticles. A subapical tooth present on each mandibular shaft, each as long as the space between the mandibular shafts. Standing hairs on mesosoma not abundant, numbering only 4 to 8. Dorsal outline of mesosoma only weakly interrupted by metanotal groove, which is shallow. Spongiform lamella developed below propodeal spine. Most parts of mesothorax and propodeum unsculptured, smooth and shining.

Very similar to *Strumigenys* sp. 4 and *Strumigenys* sp. 9. It can be difficult to separate the workers, but *S. lewisi* is marked by its females, which have the mesonotum relatively low, and have relatively small posterior ocelli and eyes. Nests are found under stones or logs, in the soil, decayed stumps or bamboo stems. Winged forms appear in August. Details of predatory behavior were reported by Masuko (1984, 1985). The workers prey on Collembola (Okamoto, 1953, Masuko, 1984). Colonies are small, usually with between tens and 100 workers (Teranishi, 1929). The species is polygynous. It is one of the most common soil-inhabiting ants of Japan. Most former records of "*S. lewisi*" might have confused it with *Strumigenys* species 4 or *Strumigenys* species 9 of this account, and thus need reassessment.



Pyramica terayamai Bolton

Fig. p 79

Original Reference: Bolton, B. (2000)

Distribution: Mt. Yamizo, Tochigi Pref.

Total length of workers around 2mm. Body color yellowish brown. Mandibles subtriangular. In full-face view, anterior margin of the clypeus slightly produced in the middle. Eyes very small. Leading margin of antennal scape forming an angulate elbow at basal 1/3. Dorsal surface of head with simple short hairs. Pronotal humeri without long and flagellate hairs. Parts of the mesopleuron smooth. Propodeal spines almost vestigial. Spongiform appendages developed on the lateral surfaces of the petiole and postpetiole.

This species was described by Bolton (2000) and corresponds to *Pyramica* sp. 12 of Terayama (2000). Murata (1990) reported it as *Smithistruma rostrataeformis*. *Pyramica terayamai* is similar to *P. masukoi* (Terayama, 2000), but distinguishable by the following character: dorsal surface of mesosoma with simple and club-shaped hairs in *P. terayamai* vs. with simple and flagellate hairs in *P. masukoi*. It is known only from Mt. Yamizo in Tochigi Prefecture.

Pyramica hirashimai (Ogata)

Fig. p 79

Original Reference: Ogata, K. (1990)

Synonym(s): *Epitritus hirashimai* Ogata, 1990

Pyramica hirashimai (Ogata): Bolton, 1999

Distribution: Honshu, Shikoku, Kyushu, Nansei Is.

Total length of workers around 1 mm. Smaller than *Pyramica hexamera*. Body color yellowish brown. Mandibles without small teeth on their shafts; dorsal spiniform tooth of apical dentition less distinct than in *P. hexamera*. Anterior margin of clypeus fringed with scale-like hairs. Mesonotum not overhanging propodeum. Propodeal spines absent. Spongiform appendages on posterolateral portion of propodeum developed.

Rarer in Japan than *P. hexamera*. Nests in the soil of broadleaf forests.

Pyramica hexamera (Brown)

Fig. p 80

Original Reference: Brown, W. L., Jr. (1958)

Synonym(s): *Epitritus hexamerus* Brown, 1958

Strumigenys hexamera (Brown): Baroni Urbani & De Andrade, 1994

Epitritus hexamerus: Bolton, 1995

Pyramica hexamera (Brown): Bolton, 1999

Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu, Ogasawara Is, Nansei Is; Korean Peninsula, Taiwan.

Total length of workers around 2 mm. Body color yellowish brown. Mandibles with 2 pairs of preapical teeth; apical dentition including a distinct dorsal spiniform tooth. Anterior margin of clypeus without peculiar hairs. Dorsal outline of mesosoma horizontal from pronotum to mesonotum; the latter overhanging the propodeum. Propodeal spine distinct. Spongiform appendages on posterolateral portion of propodeum relatively weakly developed.

A rare species nesting in the soil of broadleaf forests.

Pyramica mutica (Brown)

Fig. p 80

Original Reference: Brown, W. L., Jr. (1949)

Synonym(s): *Kyidris mutica* Brown, 1949

Kyidris nuda Brown, 1949

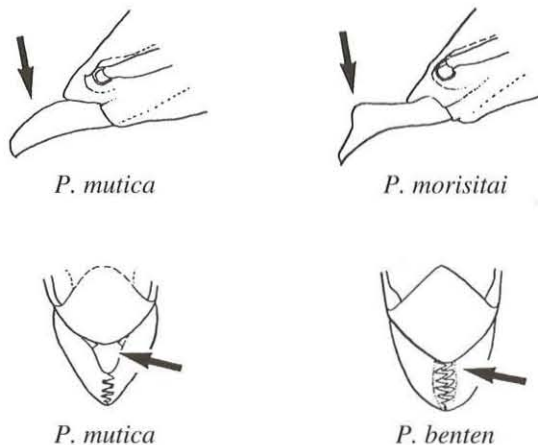
Polyhomoa itoi Azuma, 1950

Pyramica mutica (Brown): Bolton, 1999

Distribution: Honshu, Shikoku, Kyushu; Korean Peninsula, Taiwan, Indonesia (Bogor).

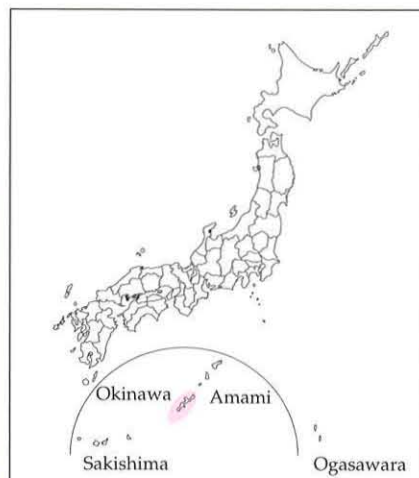
Small ants: total length of workers around 1.5 mm. Body color reddish brown. Body surfaces from head to postpetiole finely reticulate. Paired scale-like hairs present on head and mesonotum. Posterior portion of propodeum simple, without teeth or lamellate structures. Spongiform material on petiole and postpetiole relatively weakly developed.

A rare species. The full synonymy of *Pyramica mutica* was given by Wilson & Brown (1965) and Bolton (2000). Imai et al. (1985) reported this species from Indonesia. Its full distribution could extend widely in tropical Asia. *P. mutica* is found at forest margins extending to more open situations, nesting in soil or decaying wood.



MYRMICINAE

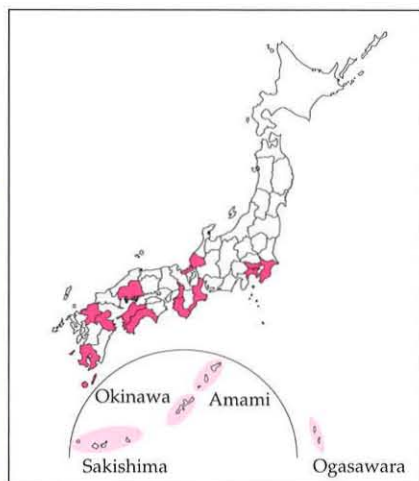
Pyramica morisitai (Ogata & Onoyama)



Workers 1 mm. Brownish yellow. Mandibles as long as clypeus; anterior third bent strongly downwards. Antennae 6-segmented. Scapes broad basally, not elbowed; apical funicular segment as long as scape. Head twice as long as wide. Anterior clypeal margin narrowly convex. Pronotal humeri not angulate; mesosomal profile gently convex; propodeum with lamellate appendages, spiniform processes. Spongiform appendage on petiole, postpetiole. Hairs narrow, scale-like, appressed. Rare.

MYRMICINAE

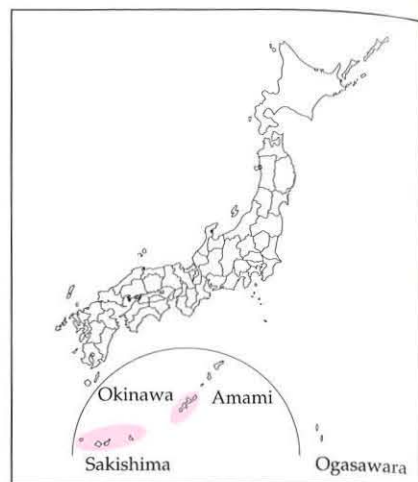
Pyramica membranifera (Emery)



Workers 2 mm. Yellowish brown. Pilosity almost lacking, a pair of erect scale-like hairs posteriorly on head. An accomplished pantropical tramp species.

MYRMICINAE

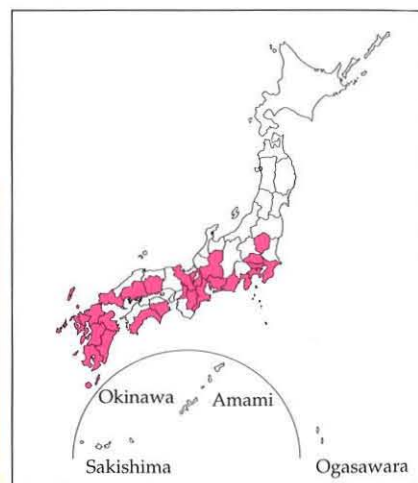
Pyramica sauteri (Forel)



Workers 2 mm. Yellowish brown. Distinguished from *P. canina* by smaller size; shorter mandibles, which teeth almost even in size; anterior corners of clypeus more rounded; anterior clypeal margin more deeply concave. A rare species found on the floor of broadleaf forests.

MYRMICINAE

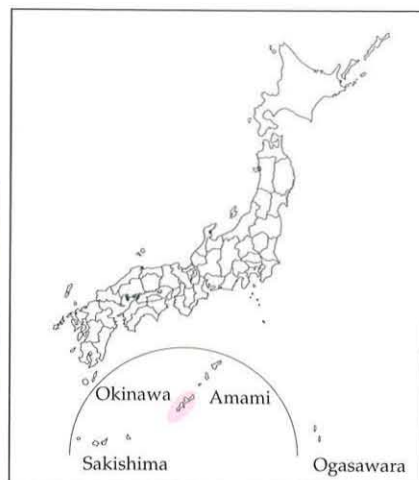
Pyramica canina (Brown & Boisvert)



Workers 2.5-3 mm. Yellowish brown. Mandibles long, 1.5 times as long as preapical (5th) antennal segment or longer; largest tooth at mid-length of masticatory margin. Clypeus anteriorly angulate, anterior border slightly concave. Preapical (5th) antennal segment longer than length of 3rd and 4th together. Rare, found on the floor of broadleaf forests.

MYRMICINAE

Pyramica kichijo (Terayama, Lin & Wu)



Workers 2 mm. Reddish brown. Clypeus about as wide as long; anterior margin produced medially. Leading margin of scape not an angulate elbow. Head and mesosoma covered with long flagellate hairs and irregular reticulation. Rare. Distinguished from *S.masukoi* by clypeal shape.

MYRMICINAE

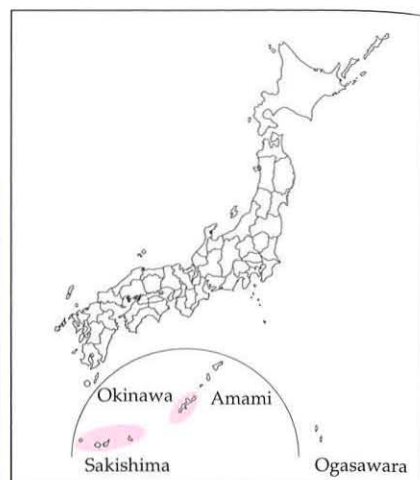
Pyramica hirosheimensis (Ogata & Onoyama)



Workers 2 mm. Reddish brown. Clypeus: fringed with spatulate hairs; anterior margin straight, corners rounded. Scapes broadened at basal third,肘bowed. Head, mesosoma covered with suborbicular hairs. Distinguished from *S. circothrix*, by larger size, relatively long mandibles; well developed postpetiolar spongiform appendage. Rare. Nests in soil in broadleaf forests.

MYRMICINAE

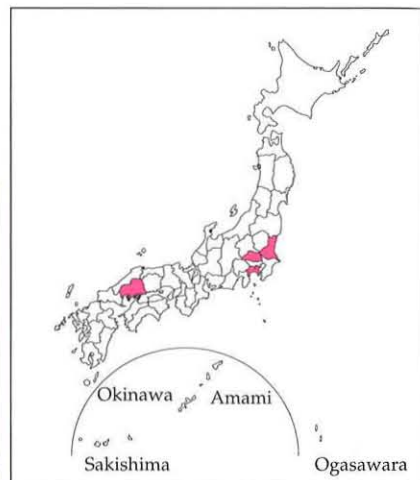
Pyramica circothrix (Ogata & Onoyama)



Workers 1.5 mm. Reddish brown. Clypeus: straight anterior margin, rounded corners, a fringe of spatulate hairs. Leading margins of Scapes angulate. Head, mesosoma covered with suborbicular hairs. Rare. Nests in soil in broadleaf forests.

MYRMICINAE

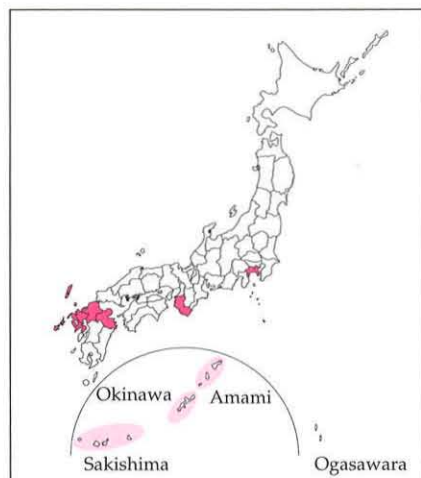
Pyramica masukoi (Ogata & Onoyama)



Workers 1.5 mm. Yellowish brown. Head generally elongate. Clypeus longer than broad, anterior margin projecting, without fringing spatulate hairs. Eyes small. Promesonotum not raised. Body hairs abundant, those on head and mesosoma long and flagellate. Very rare. Nests in soil in broadleaf forest.

MYRMICINAE

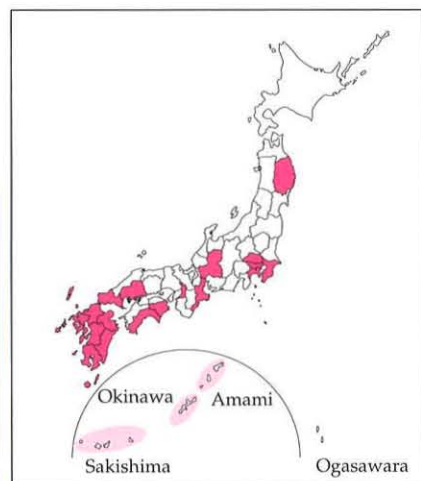
Pyramica mazu (Terayama, Lin & Wu)



Workers 1.5 mm. Yellowish brown. Leading margins of scapes not angulate. Clypeus not fringed with spatulate hairs, anterior margin almost straight. Head posteriorly, mesosoma dorsally, unsculptured, smooth, shining. Mesosomal profile roundly convex, with long hairs. Propodeum: without spines, well developed spongiform appendage posteriorly. Rare. Nests in soil, broadleaf forest.

MYRMICINAE

Pyramica benten (Terayama, Lin & Wu)

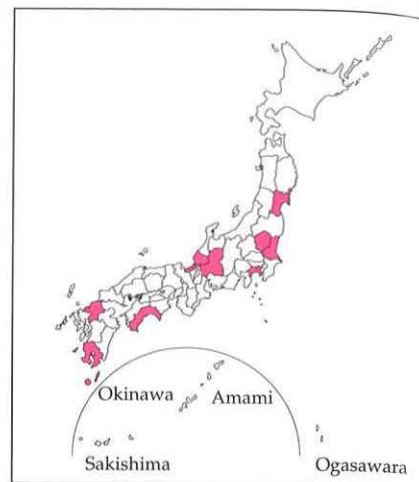


Workers 1.5 to 2 mm. Clypeus broad; anterior margin convex, not fringed with spatulate hairs. Leading margins of scapes not angulate. Promesonotal region not raised.

Distinguished from *P. leptothrix* by pilosity: hairs on head shorter, more sparse and clavate; those anteriorly, in particular, depressed. Nests in broadleaf forest margins and adjacent open land.

MYRMICINAE

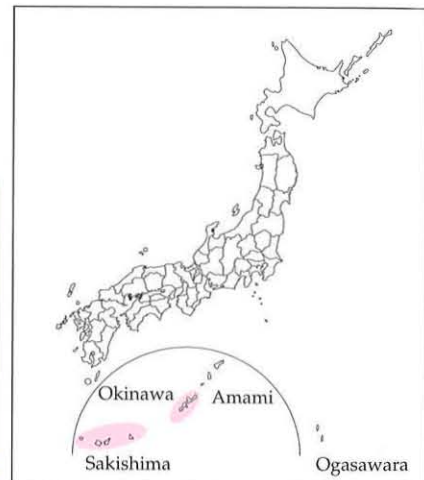
Pyramica rostrataeformis (Brown)



Workers 1.5 mm. Clypeus fringed with spatulate hairs, anterior margin straight, without emargination or projection. Scapes angulate at basal third. Promesonotum raised. Pronotal humeri lacking flagellate hairs; a scale-like pair anterolaterally on mesonotum. The scale-like pronotal hairs distinguished *rostrataeformis* from the more common *P. incerta*.

MYRMICINAE

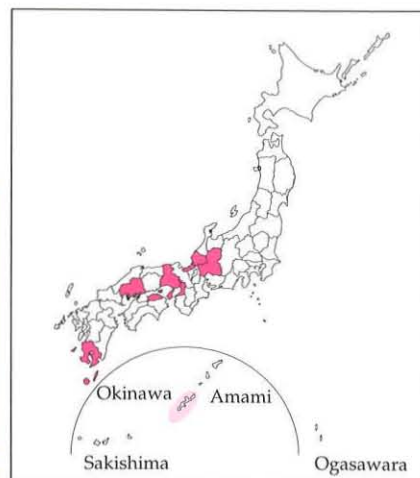
Pyramica leptothrix (Wheeler)



Workers 1.5 mm. Clypeus broad, not fringed with spatulate hairs, anterior margin projecting. Promesonotum not raised. The hairs of *P. leptothrix* are simple, longer, more dense than *P. benten*; those on the head and mesosoma erect. Found in broadleaf forests.

MYRMICINAE

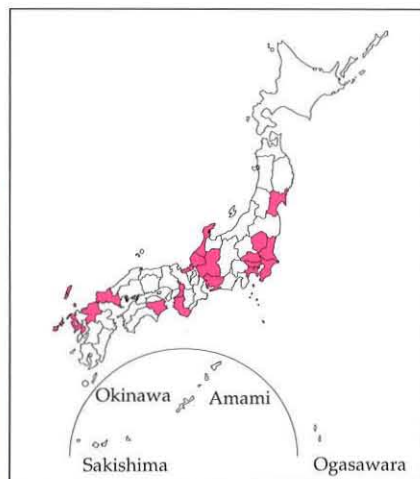
Pyramica japonica (Ito)



Workers 2 mm. Yellowish to reddish brown. Head slender, posterior corners angulate. Clypeus ca. as long as broad, without fringe of spatulate hairs; anterior margin projecting medially. Eyes large, diameter exceeding length of apical antennomere. Scapes flattened, not angulate. Promesonotal area not raised. Propodeal spines distinct. Dorsal surfaces of head, pronotum, with dense scale-like hairs, lacking standing hairs.

MYRMICINAE

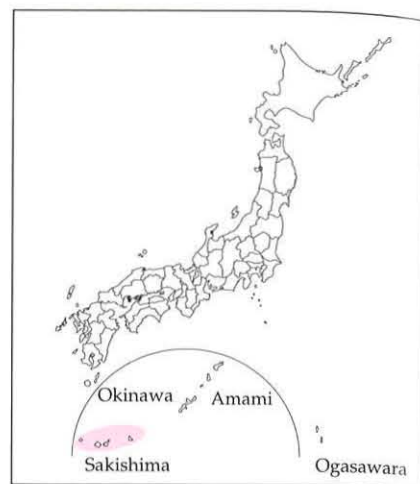
Pyramica incerta (Brown)



Workers 1.5 mm. Yellowish to reddish brown. Lateral cephalic margins roundly convex. Clypeus: fringed with spatulate hairs, anterior margin slightly concave. Scapes angulate at basal third. Promesonotum convex. Mesosomal dorsum: numerous standing hairs. Pronotal humeri: elongate paired flagellate hairs. Distinguished from *S. rostrataeformis* by shape of anterior clypeal margin; mesosomal pilosity. Nests: rotting wood, leaf litter, broadleaf forests.

MYRMICINAE

Crematogaster suehiro Terayama

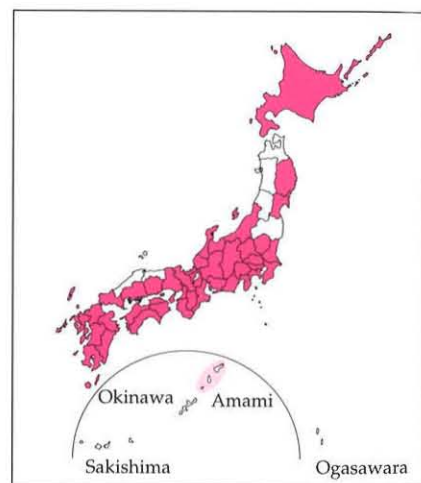


Workers 2 mm. Yellow. Antennae: clubs 2-segmented, scapes surpassing occiput. Eyes slightly protrusive. Promesonotal suture indistinct. Sides of pronotum, mesonotum smooth. Metanotal groove distinct. Propodeal spines, long, acute, raised ca. 45 degrees. Petiole: paired long hairs on posterolateral, posterior borders. Postpetiolar dorsum without median furrow.

Distinguished from *C. osakensis*, by posteriorly widened postpetiole; protrusive eyes, smooth mesonotal sides.

MYRMICINAE

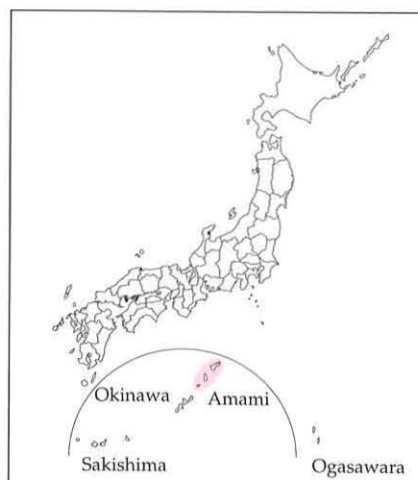
Crematogaster osakensis Forel



Workers 2-3 mm. Yellow, cephalic dorsum, gastral tergites posteriorly, darker. Antennae: club 2-segmented, scapes surpassing occiput. Promesonotal suture indistinct. Pronotal sides, mesonotal dorsum smooth. Mesonotal sides punctate, rough. Metanotal groove impressed. Propodeal spines long, acute, raised < 45 degrees. Petiole: slightly narrowed posteriorly, one pair of long hairs. Postpetiolar dorsum without median furrow.

MYRMICINAE

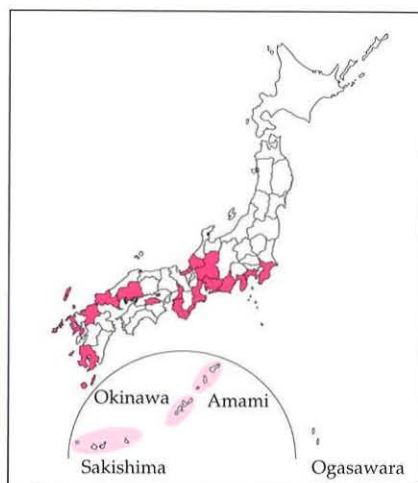
Crematogaster sp. 5



Workers 3 mm. Brown. Club 3-segmented. Fine, longitudinal clypeal striae. Promesonotal suture indistinct/distinct. Pronotal, mesonotal dorsa smooth. Mesonotal sides punctured. Metanotal groove impressed. Propodeal spine slender, 3.5-4 x as long as basal width. Petiole wider than long, narrowed posteriorly. Subpetiolar process undeveloped. Postpetiolar dorsum with median furrow. Distinguished from *C. vagula* by smooth pronotal dorsum; slender, long propodeal spines.

MYRMICINAE

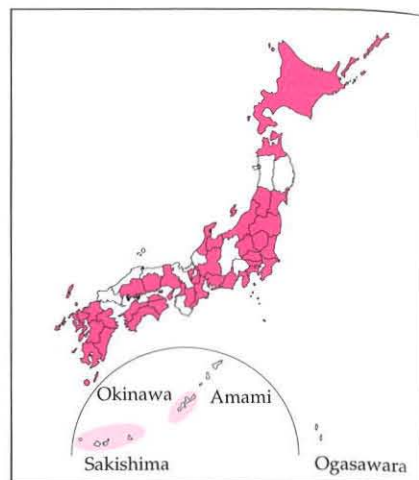
Crematogaster vagula Wheeler



Workers 2-3 mm. Brown to blackish. Club 3-segmented. Fine longitudinal clypeal striae. Pronotum: dorsum longitudinally striate, sides smooth. Mesonotum: dorsum without longitudinal median carina, sides punctured. Metanotal groove impressed. Propodeal spines, slender, 2x longer than basal width. Petiole wider than long, sides narrowed posteriorly. Subpetiolar process triangular, projecting anteriorly. Postpetiolar dorsum furrowed medially. Distinguished from *C. teranishii*, by smooth pronotal sides, concave posterior mesonotal dorsum.

MYRMICINAE

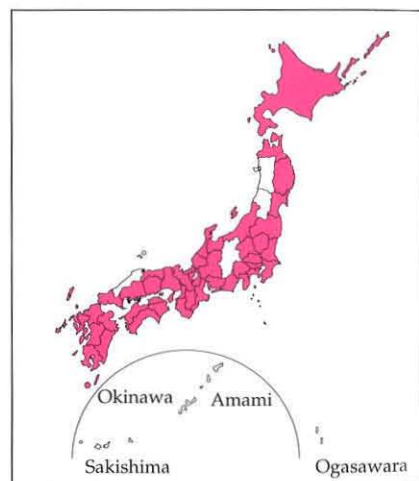
Crematogaster teranishii Santschi



Workers 2-4 mm. Brown to blackish. Club 3-segmented. Fine longitudinal clypeal striae. Promesonotal suture indistinct/distinct. Pronotum: sides and dorsum longitudinally striate, weak longitudinal median carina. Mesonotal pleuron punctured. Metanotal groove distinct. Propodeal spines slender, ca. 3 times as long as basal width. Petiole wider than long, sides narrowed posteriorly. Subpetiolar process weak. Postpetiolar dorsum with median furrow. Arboreal, nests in dead twigs, bamboo stems.

MYRMICINAE

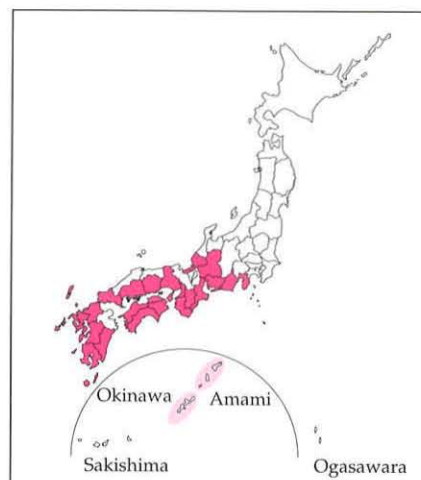
Crematogaster matsumurai Forel



Workers 2-3.5 mm. Yellowish to blackish brown, dorsum of head, gastral tergites posteriorly darker. Club 3-segmented. Pronotal, mesonotal dorsa smooth or finely striate. Propodeal spines short, triangular. Subpetiolar process weak. Petiole wider than long, sides narrowed posteriorly. Postpetiolar dorsum sometimes with shallow median furrow. Distinguished from other Japanese species by short, stout propodeal spines. Nests under bark. Flights late July-September.

MYRMICINAE

Crematogaster nawai Ito

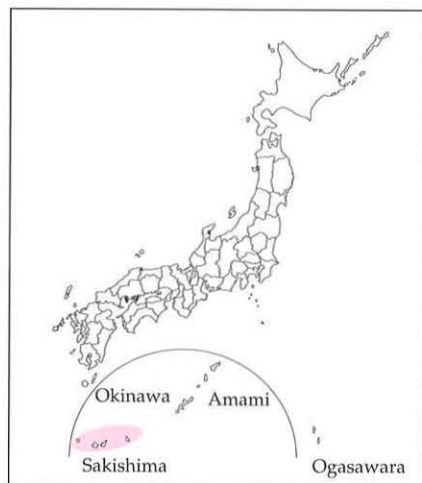


Workers 4-5.5 mm. brown to blackish, Frons, gastral tergites posteriorly, sometimes darker. Club 3-segmented. Promesonotal suture indistinct. Mesonotal sides posteriorly punctured. Metanotal groove impressed. Propodeal spines, slenderly triangular. Subpetiolar process small, denticulate, produced anteriorly. Petiole longer than wide, sides narrowed posteriorly. A median dorsal postpetiolar furrow.

Distinguished by convex thoracic dorsum, unmarginated laterally; petiole longer than wide.

MYRMICINAE

Pristomyrmex yaeyamensis Yamane & Terayama

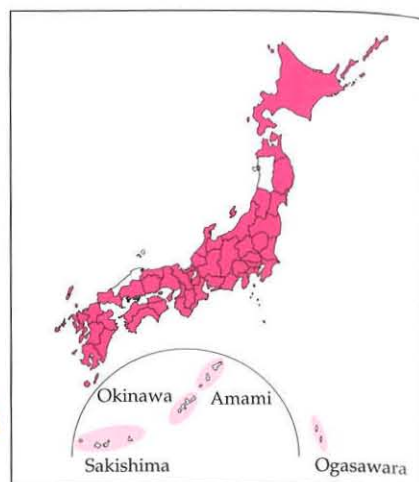


Workers 2.5-3 mm. Yellowish/reddish. Head rounded, occiput straight. Clypeus: carinate medially; 3-toothed. Mandibles 5-toothed. Scapes shorter than *P. pungens*. Pronotum: profile straight, shoulders spinose. Propodeal spines short. Petiolar node: anterior profile convex; dorsum convex, sloping posteriorly; posterodorsal border not angulate. Head, mesosomal dorsum punctate. Mesonotum laterally, propodeum, petiolar peduncle, postpetiole, gaster smooth, shining.

Nests < 20 workers, in rotting wood, under stones, forests. Ergatoid females present.

MYRMICINAE

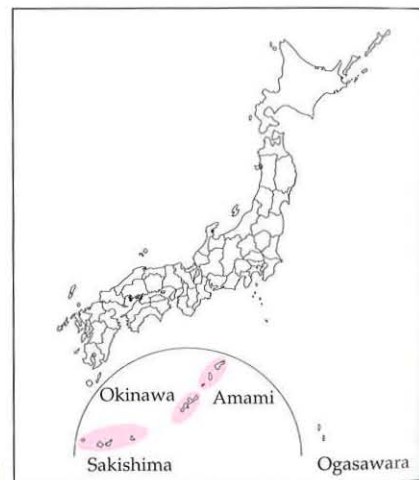
Pristomyrmex pungens Mayr



Workers 2.5 mm. Brown/reddish, legs yellowish, gaster blackish. Head rounded, occiput straight. Clypeus medially carinate; 7-toothed. Mandibles: 2 apical, 2 smaller basal teeth. Antennal scapes exceeding occiput. Mesosoma short. Pronotal profile straight, anterior border marginate. Dorsa of mesonotum, propodeum, straight. Propodeal spines long, acute, reaching midlength of petiole. Node subtriangular; subpetiolar process absent. Sculpture of head, mesosoma reticulate; gaster smooth. Queenless. Reproduction by worker thelytoky. Males rarely produced.

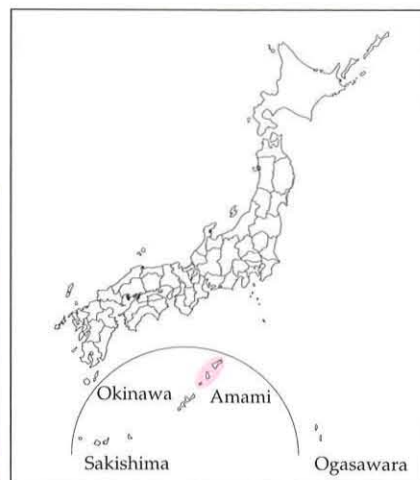
MYRMICINAE

Myrmecina ryukyuensis Terayama



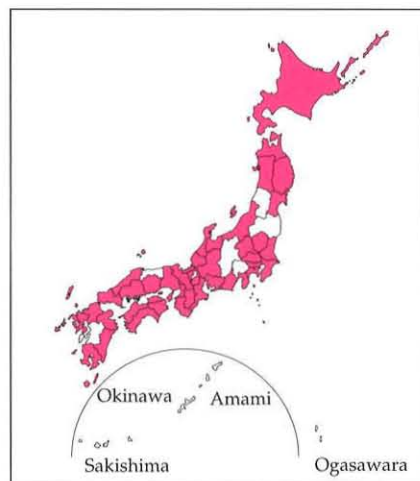
Workers 2-2.5 mm. Black; mesopleuron, petiole, mandibles, clypeus, antennae reddish, legs yellowish. Eyes ca. 5-faceted, longest diameter shorter than 10th antennomere. Scapes basally simple, without basal covering lamellae. Median anterior clypeal process low. Propodeal spines directed backwards, longer than wide. Subpetiolar process generally directed forwards. Head, mesosoma longitudinally obscurely rugulose, interspaces punctate. Areas laterad of eyes punctate. Nests under stones, broadleaf forests.

MYRMICINAE

Myrmecina amamiana Terayama

Workers 3 mm. Black; mesopleuron, petiole, postpetiole reddish; legs, antennae, mandibles yellowish. Eyes convex, 10+ facets; longer than 10th antennal segment. Scapes basally simple, no covering lamellae. Small median clypeal process. Propodeal spines upwardly curved. Subpetiolar process rounded. Rugulae on head, mesosoma broad, longitudinal; interspaces shining; several longitudinal rugulae laterad of eyes. Distinguished from *M. nipponica* by longitudinal rugulae on head, mesosoma; convex eyes.

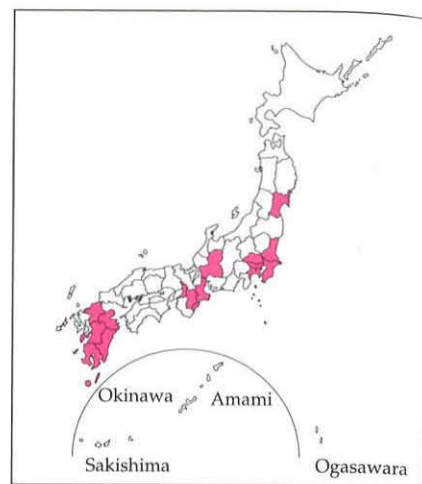
MYRMICINAE

Myrmecina nipponica Wheeler

Workers 3 mm. Black; mesopleuron, petiole, postpetiole reddish; legs, antennae, mandibles yellowish brown. Eyes: 10+ facets; as long/longer than 10th antennomere. Scapes simple, no covering basal lamellae. Anterior clypeal margin with small median process. Propodeal spines upwardly curved. Subpetiolar process obscure. Head, mesosoma irregularly longitudinally rugulose, interspaces smooth, shining; areas below eyes smooth, shining. Nests: soil, fallen twigs, under stones, woodland.

MYRMICINAE

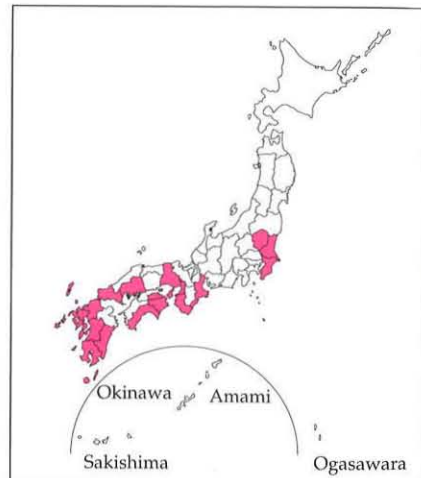
Myrmecina flava Terayama



Workers 2.5 mm. Yellow/yellowish brown; gaster darker; legs yellow. Eyes small, several facets; diameter far less than length of 10th antennomere. Semibulbous lamellae covering antennal articulations. No median anterior clypeal process. Propodeal spines directed backwards. Subpetiolar process distinct, acute, pointed forwards. Head, mesosoma irregularly longitudinally rugulose, interspaces punctate. Areas lateral to eyes punctate, not rugulose.

MYRMICINAE

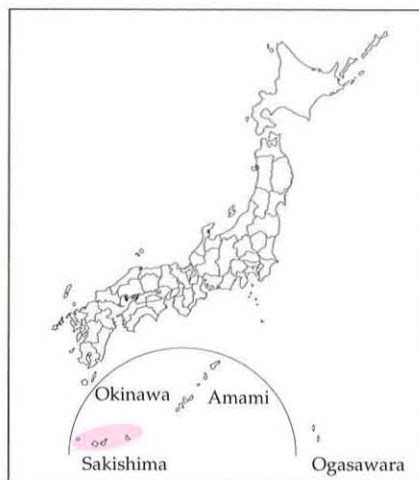
Lordomyrma azumai (Santschi)



Workers 3 mm. Yellowish/reddish brown. Eyes below antennal scrobes. Scrobes extending to cephalic corners. Anterior median clypeal projection angulate. Scapes almost reaching posterior corners of head. Metanotal groove deep. Propodeal spines acute. Petiolar profile subtriangular; subpetiolar process small. Body hairs erect, abundant. Head, mesosoma, petiole, postpetiole irregularly striate, with small punctures. Gaster obscurely, finely sculptured. Rare. Nests under stones, fallen twigs, broadleaf forests.

MYRMICINAE

Rhopalomastix omotoensis Terayama



Workers 2 mm. Yellowish brown. Antennae 10-segmented. Scapes ca. half as long as head width. Apical funicular segment large, flattened, twice as long as wide, almost as long as remaining funiculus. Eyes small. Mesosomal dorsal profile straight. Promesonotal suture absent dorsally, obscure laterally. Legs short, trochanters, tibiae flattened. Petiole high, peduncle short; subpetiolar process obtusely triangular. Postpetiole higher than long. Very rare.

MYRMICINAE

Recurvidris recurvispinosa (Forel)



Workers 2 mm. Yellow, gaster darker. Head 1.1 x as long as wide; occiput concave. Clypeal broadly convex anteriorly. Mandibles 4-toothed. Scapes exceeding occiput; club 3-segmented. Eyes small, ca. 25 facets, pointed anteriorly. Propodeal spines curved, pointing forwards. Petiolar peduncle long. Subpetiolar process acutely triangular. Erect hairs on pronotal, mesonotal dorsa; petiole, postpetiole. Head, mesonotum, petiole, postpetiole microreticulate; remainder smooth, shining. Rare. Nests in soil, under stones, forests.

MYRMICINAE

Vollenhovia nipponica Kinomura & Yamauchi



A social parasite of the short winged form of *V. emeryi*, which occurs in and near riverside forests. Females easily distinguished from *V. emeryi* by: postpetiole smooth, shining (shagreened in *emeryi*); head broader than mesosoma in dorsal view (almost equally wide in *emeryi*); body size distinctly smaller.

MYRMICINAE

Vollenhovia yambaru Terayama



Workers indistinguishable from *Vollenhovia okinawana*. However, all known females are wingless ergatoids. Those of *V. okinawana* are winged. Known only from native forests in northern Okinawa.

Pyramica morisitai (Ogata & Onoyama)

Fig. p 89

Original Reference: Ogata, K. & Onoyama, K. (1998)

Synonym(s): *Smithistruma morisitai* Ogata & Onoyama, 1998

Pyramica morisitai (Ogata & Onoyama): Bolton, 1999

Distribution: Okinawa I.

Total length of workers around 1 mm. Body color brownish yellow. Mandibles elongate, as long as clypeus; the anterior third of each shaft bent strongly downwards to form an obtuse but distinct angled corner when viewed laterally; the subapical portion slightly concave in lateral view, and forming a shallow space in frontal view, when the mandibles are closed. Antennae 6-segmented. Scapes broadened at the basal third, and not forming an angulate elbow; apical funicular segment elongate, as long as the scape or the remaining funicular segments together. Head twice as long as wide. Clypeus longer than broad; anterior margin narrowly convex. General shape of mesosoma similar to that of *Pyramica incerta*, but without angulate pronotal humeri; dorsal outline gently convex; posterior margin of propodeum with thin bilateral lamellate appendages and dorsal spiniform processes. Spongiform appendage present on petiole and postpetiole. Body hairs narrow, scale-like and appressed.

A rare species, known only from 2 records of specimens taken under stones in a rather open situation. *P. morisitai* was assigned to an "unnamed genus" in "A List of the Ants of Japan with Common Japanese Names" (1988) and "A Guide for the Identification of Japanese Ants (III)" (1992) by Myrmecological Society of Japan Editorial Committee. This corresponds to the "unnamed new genus?" of Onoyama (1976). The peculiarly curved mandibles of this species resemble those of *Asketogenys*, a monotypic genus described by Brown (1972) from Malaysia. But the dentition, the shape of the clypeus and mesosoma and the pilosity are quite different.

Pyramica membranifera (Emery)

Fig. p 89

Original Reference: Emery, C. (1869)

Synonym(s): *Strumigenys* (*Trichoscapa*) *membranifera* Emery, 1869

Strumigenys membranifera var. *simillima* Emery, 1890

Strumigenys membranifera var. *santschii*, Forel, 1904

Strumigenys (*Cephaloxys*) *membranifera* Emery: Emery, 1916

Strumigenys (*Cephaloxys*) *vitiensis* Mann, 1921

Strumigenys (*Cephaloxys*) *silvestriana* Wheeler, 1928

Strumigenys (*Cephaloxys*) *foochowensis* Wheeler, 1928

Strumigenys (*Cephaloxys*) *membranifera* var. *marioni* Wheeler, 1933

Strumigenys (*Cephaloxys*) *membranifera* var. *williamsi* Wheeler, 1933

Trichoscapa membranifera (Emery): Brown, 1948

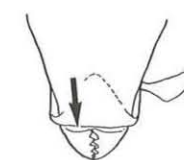
Pyramica membranifera (Emery): Bolton, 1999

Distribution: Honshu (Kanto District and southwards), Shikoku,

Kyushu, Ogasawara Is, Nansei Is; Mainland China, Taiwan, Samoa, Hawaii, Fiji, Africa, S Europe (Italy), N America, W Indies.

Total length of workers around 2 mm. Body color yellowish brown. Pilosity almost lacking except for a pair of erect scale-like hairs on posterior portion of head.

P. membranifera is an accomplished tramp species. It has been recorded widely from tropical and warm temperate regions of the world. Brown & Wilson (1959) suggested an African origin, but this was questioned by Bolton (1983). This species is found in the soil of rather open habitats. Japanese records are generally from the south, ranging northwards to southern Honshu. The most northern record is from Tokyo (Kubota & Terayama, 1988). Wilson (1954) reported *P. membranifera* feeding on a wide range of small soft-bodied arthropods.



P. membranifera



P. canina

Pyramica sauteri (Forel)

Fig. p 90

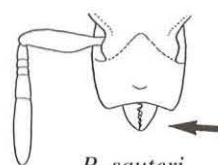
Original Reference: Forel, A. (1912)

Synonym(s): *Pentastruma sauteri* Forel, 1912a

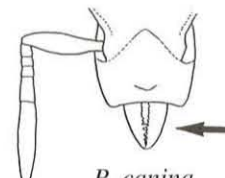
Pyramica sauteri (Forel): Bolton, 1999

Distribution: Nansei Is (Okinawa I., Ishigaki I.); Taiwan.

Total length of workers around 2 mm. Body color yellowish brown. Very similar to *Pyramica canina* but with the following differences: smaller size; shorter mandibles, which have the teeth on their masticatory margins almost even in size; anterior corners of clypeus more rounded and anterior clypeus margin more deeply concave.



P. sauteri



P. canina

Pyramica canina (Brown & Boisvert)

Fig. p 90

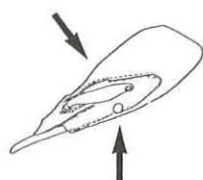
Original Reference: Brown, W. L., Jr. & Boisvert, R. G. (1979)

Synonym(s): *Pentastruma canina* Brown & Boisvert, 1979

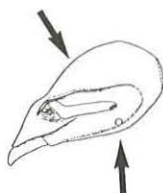
Pyramica canina (Brown & Boisvert): Bolton, 1999

Distribution: Honshu (Kanto District and southwards), Shikoku, Kyushu.

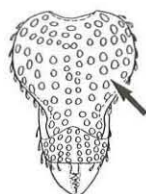
Total length of workers around 2.5 - 3 mm. Body color yellowish brown. Mandibles rather long, 1.5 times as long as preapical (5th) antennal segment or longer; largest tooth present at about mid-length of masticatory margin. Anterior portion of clypeus rather angulate, with slightly concave anterior border. Preapical (5th) antennal segment longer than length of 3rd and 4th segments together.



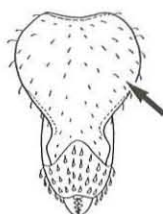
P. canina



P. incerta



P. circothrix



P. incerta

Pyramica kichijo (Terayama, Lin & Wu)

Fig. p 91

Original Reference: Terayama, M., Lin, C.-C. & Wu, W.-W. (1996)

Synonym(s): *Smithistruma kichijo* Terayama, Lin & Wu, 1996

Pyramica kichijo (Terayama, Lin & Wu): Bolton, 1999

Distribution: Okinawa I.; Taiwan

Total length of workers around 2 mm. Body color reddish brown. Clypeus almost as wide or slightly wider than long; anterior margin produced in the middle. Leading margin of antennal scape not forming an angulate elbow. Head and mesosoma covered with long flagellate hairs and irregular reticulation. A rare species.

Pyramica hirosimensis (Ogata & Onoyama)

Fig. p 91

Original Reference: Ogata, K. & Onoyama, K. (1998)

Synonym(s): *Smithistruma hirosimensis* Ogata & Onoyama, 1998

Pyramica hirosimensis (Ogata & Onoyama): Bolton, 1999

Distribution: Honshu (Hiroshima Pref.)

Total length of workers around 2 mm. Body color reddish brown. Clypeus fringed with spatulate hairs and with a straight anterior margin and rounded corners. Leading margin of antennal scape broadened at basal third to form an angulate elbow. Head and mesosoma covered with suborbicular hairs, like those of other *Pyramica* species formerly assigned to *Epitritus* and *Quadristuma*.

This species resembles *Smithistruma circothrix*, but is distinguished by its larger size, relatively long mandibles and well developed spongiform appendage on the postpetiole.

Pyramica circothrix (Ogata & Onoyama)

Fig. p 92

Original Reference: Ogata, K. & Onoyama, K. (1998)

Synonym(s): *Smithistruma circothrix* Ogata & Onoyama, 1998

Pyramica circothrix (Ogata & Onoyama): Bolton, 1999

Distribution: Okinawa I., Ishigaki I.

Total length of workers around 1.5 mm. Body color reddish brown. Clypeus with straight anterior margin, rounded corners, and a fringe of spatulate hairs. Leading margins of antennal scapes angulate. Head and mesosoma covered with suborbicular hairs, similar to those of species formerly assigned to *Epitritus* and *Quadristuma*.

Pyramica masukoi (Ogata & Onoyama)

Fig. p 92

Original Reference: Ogata, K. & Onoyama, K. (1998)

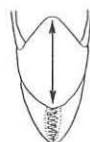
Synonym(s): *Smithistruma masukoi* Ogata & Onoyama, 1998

Pyramica masukoi (Ogata & Onoyama): Bolton, 1999

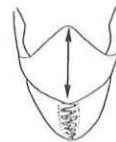
Distribution: Honshu (Manazuru, Kanagawa Pref.; Kaketsu-yama, Geihoku-cho, Hiroshima Pref.)

Total length of workers around 1.5 mm. Body color yellowish brown. Head generally somewhat elongate. Clypeus distinctly longer than broad, anterior margin projecting, without fringing spatulate hairs. Eyes small. Promesonotum not raised. Body hairs abundant, those on head and mesosoma long and flagellate.

The species is similar to the *Smithistruma* species *S. japonica*, *S. leptothrix* and *S. benten*, but easily distinguished from them by the smaller eyes, elongate head, and distinctive pilosity. It is very rare and is found on the floor of broadleaf forest, nesting in the soil. *Pyramica masukoi* corresponds to *S. sp. 7* of the Myrmecological Society of Japan Editorial Committee (1992).



P. masukoi



P. benten

Pyramica mazu (Terayama, Lin & Wu)

Fig. p 93

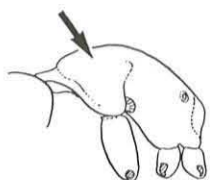
Original Reference: Terayama, M., Lin, C.-C. & Wu, W.-W. (1996)

Synonym(s): *Smithistruma mazu* Terayama, Lin & Wu, 1996

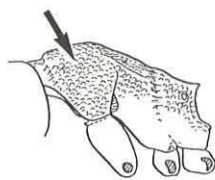
Pyramica mazu (Terayama, Lin & Wu): Bolton 1999

Distribution: Honshu, Shikoku, Kyushu, Nansei Is.

Total length of workers around 1.5 mm. Body color yellowish brown. Leading margins of antennal scapes not angulate. Clypeus not fringed with spatulate hairs, its anterior margin almost straight. Posterior part of head and dorsal surface of mesosoma unsculptured, smooth and shining. Dorsal profile of mesosoma roundly convex, with rather long hairs. Propodeum without spines, but with well developed spongiform appendage posteriorly.



P. mazu



P. incerta

Pyramica benten (Terayama, Lin & Wu)

Fig. p 93

Original Reference: Terayama, M., Lin, C.-C. & Wu, W.-W. (1996)

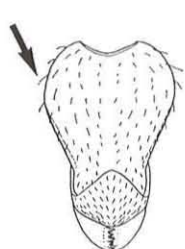
Synonym(s): *Smithistruma benten* Terayama, Lin & Wu, 1996

Pyramica benten (Terayama, Lin & Wu): Bolton, 1999

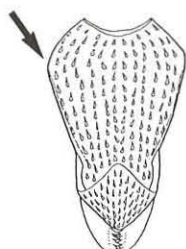
Distribution: Honshu, Shikoku, Kyushu, Nansei Is.

Total length of workers around 1.5 to 2 mm. Clypeus broad; anterior margin convex, not fringed with spatulate hairs. Leading margins of antennal scapes not angulate. Promesonotal region not raised.

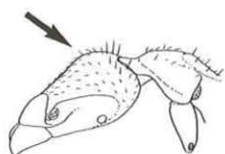
The species is similar to *Pyramica leptothrix*, but distinguished by its pilosity: the hairs on the head of *Pyramica benten* are shorter, more sparse and somewhat clavate, and those on the anterior portion, in particular, are depressed. It should be noted that the pilosity of *P. benten* is variable. Samples from the Kanto District tend to have shorter, more sparse hairs on the head than those from Kyushu, where the hairs are longer and more dense. The first gastral segment sometimes lacks hairs. The species nests at the mar-



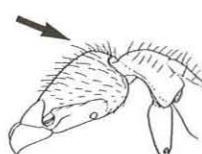
P. benten



P. japonica



P. benten



P. leptothrix

gins of broadleaf forests and adjacent open land. It is most common in the southern part of Honshu south to Kyushu.

Touyama (1998) reported that hairs on the vertex may be often lacking in *P. benten*. Bolton (2000) described the hairless form as a separate new species named *P. alecto*. We believe the separate specific status of "*alecto*" from *P. benten* to be questionable, requiring further study. For this reason we do not recognize *P. alecto* at this time.

Pyramica rostrataeformis (Brown)

Fig. p 94

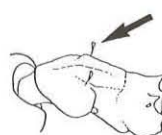
Original Reference: Brown, W. L., Jr. (1949)

Synonym(s): *Smithistruma rostrataeformis* Brown, 1949

Pyramica rostrataeformis (Brown): Bolton, 1999

Distribution: Honshu, Shikoku, Kyusyu

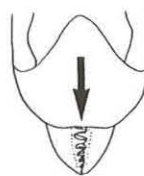
Total length of workers around 1.5 mm. Clypeus fringed with spatulate hairs, anterior margin straight, without median emargination or projection. Antennal scapes with angulate leading edges at the basal third. Promesonotum more or less raised. Elongate flagellate hairs absent on pronotal humeri, but a pair of scale-like hairs present on anterolateral areas of the mesonotum.



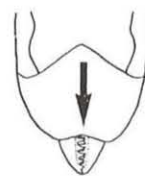
P. rostrataeformis



P. incerta



P. rostrataeformis



P. incerta

Pyramica leptothrix (Wheeler)

Fig. p 94

Original Reference: Wheeler, W. M. (1929)

Synonym(s): *Strumigenys* (*Cephaloxys*) *leptothrix* Wheeler, 1929

Smithistruma (*Weberistruma*) *leptothrix* (Wheeler): Brown, 1948b

Weberistruma leptothrix (Wheeler): Brown, 1949

Smithistruma leptothrix (Wheeler): Terayama & Kubota, 1989

Pyramica leptothrix (Wheeler): Bolton, 1999

Distribution: Okinawa I., Iriomote I.; Taiwan

Total length of workers around 1.5 mm. Clypeus broad, not fringed with spatulate hairs; anterior margin projecting. Promesonotum not raised.

The species is similar to *Pyramica benten*, but distinguished by its pilosity: the hairs of *P. leptothrix* are simple, longer and more

dense than in *P. benten*, and those on the head and mesosoma, in particular, are erect. *P. leptothrix* is found on the floor of broadleaf forests.

Pyramica japonica (Ito)

Fig. p 95

Original Reference: Ito, T. (1914)

Synonym(s): *Strumigenys japonica* Ito, 1914

Strumigenys (*Cephaloxys*) *japonica* Ito; Emery, 1924

Smithistruma (*Smithistruma*) *japonica* (Ito); Brown, 1948

Weberistruma japonica (Ito); Brown, 1953

Smithistruma japonica (Ito); Bolton, 1983

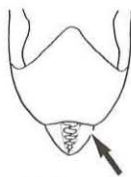
Pyramica japonica (Ito); Bolton, 1999

Distribution: Kyoto, Miyajima (Hiroshima Pref.), Nagato (Yamaguchi Pref.), Okinawa I.; Korea.

Total length of workers around 2 mm. Body color yellowish to reddish brown. Head somewhat slender in general shape, its posterior corners rather angulate. Clypeus almost as long as broad, not fringed with spatulate hairs; anterior margin projecting in the middle. Ventral margin of antennal scrobes reaching as far as eyes. Eyes large, maximum diameter greater than the length of the apical antennal segment. Antennal scapes flattened, without angulate leading edges. Promesonotal area not raised. Propodeal spines distinct. Dorsal surfaces of head and pronotum without standing hairs, but with dense depressed, scale-like hairs.



P. japonica



P. incerta

Pyramica incerta (Brown)

Fig. p 95

Original Reference: Brown, W. L., Jr. (1949)

Synonym(s): *Smithistruma incerta* Brown, 1949

Smithistruma habei Azuma, 1951

Pyramica incerta (Brown); Bolton, 1999

Distribution: Honshu, Shikoku, Kyushu.

Total length of workers around 1.5 mm. Body color yellowish to reddish brown. Lateral margins of head roundly convex. Clypeus fringed with spatulate hairs, and with a slightly concave anterior margin. Leading edges of antennal scapes angulate at the basal third. Promesonotum more or less convex. Dorsal surface of mesosoma with numerous standing hairs. Pronotal humeri with elongate paired flagellate hairs.

This species is similar to *S. rostrataeformis*, but can be distinguished by the shape of the anterior margin of its clypeus and the mesosomal hairs. Found on the floor of broadleaf forests, and nests in rotting wood or leaf litter.

Crematogaster suehiro Terayama

Fig. p 96

Original Reference: Terayama, M. (1999)

Distribution: Ishigaki I.

Total length of workers around 2 mm. Body color wholly bright yellow. Antennal club 2-segmented. Antennal scape long, distinctly surpassing posterior border of head. Eyes a little protrusive, their anterior borders situated at the midlength of the sides of the head. Promesonotal suture indistinct, the dorsal margin in lateral view nearly straight. Pronotal pleuron and mesonotal dorsum and pleuron smooth. Metanotal groove distinctly impressed, but obstructed by a lamella at the lateral border of its dorsum. Propodeal spines slender and rather long, acutely pointed and raised at an angle of slightly more than 45 degrees in lateral view. Subpetiolar process small, projecting anteriorly. Petiolar sides in dorsal view slightly widened posteriorly. Petiole with a pair of hairs on posterolateral border and another pair on posterior border. These hairs longer than the petiole. Postpetiolar dorsum without a median furrow.

This species resembles *C. osakensis*, but is easily distinguished because its postpetiole is progressively widened posteriorly; its eyes are protrusive and its mesonotal pleuron is smooth. It nests in dead trees in forests.



P. suehiro



P. osakensis

Crematogaster osakensis Forel

Fig. p 96

Original Reference: Forel, A. (1900)

Synonym(s): *Crematogaster sordidula* var. *osakensis* Forel, 1900

Crematogaster sordidula subsp. *osakensis*: Emery, 1912

Crematogaster sordidula var. *japonica* Forel, 1912

Crematogaster osakensis: Collingwood, 1976

Distribution: Hokkaido (Sapporo), Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Tanegashima I., Nakanoshima I., Amami-oshima I.; Mainland China, Korean Peninsula.

Total length of workers around 2 - 3 mm or slightly more. Body color yellow, dorsum of head and posterior half of gastral tergites a little darker. Antennal club 2-segmented. Antennal scape slightly surpassing the posterior border of head. Promesonotal suture indistinct, the dorsum in lateral view forming a curve. Pronotal pleuron and mesonotal dorsum smooth. Mesonotal pleuron punctured and rough. Metanotal groove distinctly impressed, but obstructed by a lamella at the lateral border of its dorsum. Propodeal spines slender and rather long, acutely pointed; raised at an angle of less than 45

degrees in lateral view. Subpetiolar process small, projecting anteriorly. Petiolar sides in dorsal view slightly narrowed posteriorly, and with a pair of hairs, each about as long as the petiole. Postpetiolar dorsum without a median furrow.

This species nests under stones and in the soil of grasslands or forests. Colonies are polygynous. Reproductive alates fly at evening in September and are attracted to light.

Crematogaster sp. 5

Fig. p 97

Distribution: Kuchinoerabu-jima I., Amami-oshima I.

Total length of workers around 3 mm. Body color brown. Antennal club 3-segmented. Clypeus with fine, longitudinal striae. Promesonotal suture indistinct or distinct; in the latter case the anterior border of the mesonotal dorsum is triangular. Pronotal and mesonotal dorsa smooth. Anterior half of mesonotal dorsum nearly flat, posterior third depressed, but only a little concave in the middle; margined posterolaterally. Mesonotal pleuron wholly punctured. Metanotal groove distinctly impressed, the lateral borders of the dorsum not lamellate. Propodeal spines slender and long, each 3.5 to 4 times as long as the width of its base. Petiole wider than long, the sides in dorsal view abruptly narrowed posteriorly. Subpetiolar process undeveloped. Postpetiolar dorsum with a median furrow.

This species resembles *C. vagula*, but is distinguishable because its pronotal dorsum is smooth and the propodeal spines slender and long.



C. sp. 5



C. vagula

Crematogaster vagula Wheeler

Fig. p 97

Original Reference: Wheeler, W. M. (1928)

Synonym(s): *Crematogaster (Acrocoelia) matsumurai* subsp. *vagula* Wheeler, W.M., 1928

Crematogaster vagula: Onoyama, 1998

Distribution: Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Kuchierabujima I., Tairajima I., Amami-oshima I., Okinawa I., Miyakojima I., Ishigaki I., Iriomote I., Yonaguni I.

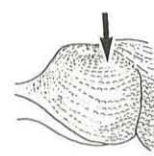
Total length of workers around 2 - 3 mm. Body color brown to blackish brown. Antennal club 3-segmented. Clypeus with fine longitudinal striae. Pronotal dorsum finely, longitudinally striate; the sides smooth. Mesonotal dorsum nearly flat at the anterior half and lowered at the posterior half; the middle part concave and strongly margined posterolaterally so that it appears to be

depressed. Mesonotal dorsum without a longitudinal median carina. Mesonotal pleuron wholly punctured. Metanotal groove distinctly impressed, barely closed by a small lamella at the lateral border of its dorsum. Propodeal spines rather slender and long, each about twice as long as the width of its base. Petiole wider than long, the sides in dorsal view abruptly narrowed posteriorly. Subpetiolar process in lateral view acutely triangular, projecting anteriorly. Postpetiolar dorsum with a median furrow.

This species resembles *C. teranishii*, but is distinguishable because the pronotal sides are smooth and shining, and the posterior half of the mesonotal dorsum is concave.



C. vagula



C. teranishii

Crematogaster teranishii Santschi

Fig. p 98

Original Reference: Santschi, F. (1930)

Synonym(s): *Crematogaster (Acrocoelia) brunnea* st. *teranishii* Santschi, 1930

Crematogaster (Acrocoelia) brunnea st. *ruginota* var. *azumai* Santschi, 1941

Crematogaster teranishii: Onoyama, 1998

Distribution: Honshu, Shikoku, Tsushima I., Kyushu, Okinawa I., Ishigaki I.; Korean Peninsula.

Total length of workers around 2 - 4 mm. Body color brown to blackish brown. Antennal club 3-segmented. Clypeus rough, with fine longitudinal striae or punctures. Promesonotal suture indistinct to distinct; in the latter case the mesonotal border in dorsal view is triangular anteriorly. Pronotum laterally and dorsally finely, longitudinally striate. Mesonotal dorsum nearly flat at the anterior half and lowered at the posterior half; margined posterolaterally. Mesonotal dorsum with a faint, longitudinal median carina. Mesonotal pleuron wholly punctured. Metanotal groove distinctly impressed, barely closed by a small lamella at the lateral border of its dorsum. Propodeal spines slender and long, each about 3 times as long as the width of its base. Petiole wider than long, the sides in dorsal view abruptly narrowed posteriorly. Subpetiolar process barely developed. Postpetiolar dorsum with a median furrow.

Arboreal, nesting in dead twigs or dead bamboo stems.

Crematogaster matsumurai Forel

Fig. p 98

Original Reference: Forel, A. (1901)

Synonym(s): *Crematogaster laboriosa* var. *matsumurai* Forel 1901

Crematogaster (Acrocoelia) matsumurai: Emery, 1922

Crematogaster matsumurai: Wheeler, 1928

Crematogaster brunnea subsp. *matsumurai*: Wheeler, W.M. 1929

Crematogaster (Acrocoelia) matsumurai var. *iwatensis*, Santschi 1937

Crematogaster matsumurai: Onoyama, 1998

Distribution: Hokkaido, Honshu, Shikoku, Tsushima I., Kyushu; Korean Peninsula.

Total length of workers around 2 - 3.5 mm. Body color yellowish brown to blackish brown, dorsum of head and posterior half of gastral tergites sometimes a little darker. Antennal club 3-segmented. Mesonotal dorsum flat at the anterior half and lowered at the posterior half; margined posterolaterally. The whole of the pronotum and the mesonotal dorsum almost smooth, or with fine striae. Mesonotal pleuron wholly punctured. Metanotal groove distinctly impressed, not obscured by a lamella at the lateral border of its dorsum. Propodeal spines short, triangular in lateral view, each as long as the width of its base. Subpetiolar process hardly developed, not produced or spine-like. Petiole wider than long, the sides in dorsal view abruptly narrowed posteriorly. Postpetiolar dorsum essentially without, but sometimes with, a very shallow median furrow.

Nests under bark or rotting parts of trees and forages for honey dew. Reproductive alates fly from late July to September.



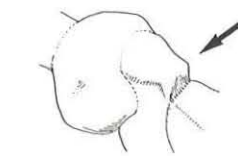
C. teranishii



C. matsumurai



C. nawai



C. matsumurai

Crematogaster nawai Ito

Fig. p 99

Original Reference: Ito, T. (1914)

Synonym(s): *Crematogaster auberti* var. *nawai* Ito 1914

Crematogaster (Acrocoelia) nawai: Emery, 1922e

Crematogaster laboriosa nawai: Santschi, 1930d

Crematogaster laboriosa Smith, F. 1874

Crematogaster nawai: Onoyama, 1998

Distribution: Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Tanegashima I., Amami Is, Okinawa I.; Korea, Taiwan(?).

Total length of workers around 4 - 5.5 mm. Body color brown to blackish brown, dorsum of head and posterior half of gastral tergites sometimes slightly darker. Antennal club 3-segmented. Promesonotal suture indistinct. Thoracic dorsum in lateral view raised at anterior border of mesonotum. The whole of the pronotum and the mesonotal dorsum smooth. Mesonotal dorsum convex and not margined laterally and with a faint, longitudinal median carina. Posterior half of mesonotal pleuron punctured. Metanotal groove distinctly impressed, not closely by a lamella at the lateral border of its dorsum. Propodeal spines rather long, slenderly triangular in lateral view. Subpetiolar process small, denticulate and produced anteriorly. Petiole a little longer than wide, the sides in dorsal view narrowed posteriorly. Postpetiolar dorsum with a median furrow.

This species abundant near sea shores and nests under stones.

Pristomyrmex yaeyamensis Yamane & Terayama

Fig. p 99

Original Reference: Yamane, S. & Terayama, M. (1999)

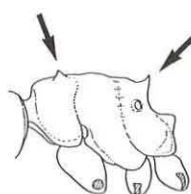
Synonym(s): *Pristomyrmex brevispinosus sulcatus* var. *formosae* Forel (Myrmecological Society of Japan Editorial Committee, 1988)

Pristomyrmex brevispinosus sulcatus Emery (Ogata, 1991)

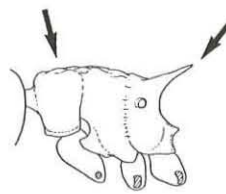
Distribution: Iriomote I.

Total body length of workers around 2.5 - 3 mm. Body yellowish brown to reddish brown. Head largely rounded, with a relatively straight posterior margin in full face view; posterolateral corners round, not forming angles. Clypeus with a median carina; its anterior margin with 3 teeth. Mandibles with 5 teeth, the apical 3 larger than the others. Antennal scapes proportionately shorter than in *P. pungens*, slightly exceeding posterior margin of head. Dorsal margin of pronotum straight in profile, its dorsolateral corners each with a short spine. Propodeal spines short, their tips turned upwards; seen from the side the spines do not reach the level of the posterior end of the propodeum. Anterior margin of petiolar node weakly convex; dorsal outline convex, sloping posteriorly; the posterodorsal border not forming an angle. Head and dorsum of mesosoma with moderately large punctures; lateral surfaces of mesonotum and propodeum, petiolar peduncle, postpetiole and gaster smooth and shining.

Colony size is small in *Pristomyrmex yaeyamensis*, with less than 20 workers per nest. Ergatoid females are present. Found in rotting wood or under stones in forested habitats. Related species occurs in Taiwan and southern China, but it has normal alate queens and no ergatoids.



P. yaeyamensis



P. pungens

Pristomyrmex pungens Mayr

Fig. p 100

Original Reference: Mayr, G. (1866)

Synonym(s): *Pristomyrmex japonicus* Forel (Viehmeier, 1922)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima I., Nansei Is; Mainland China, Korea, Taiwan, E India to Malacca and Borneo.

Total length of workers around 2.5 mm. Body color brown to reddish brown; legs yellowish; gaster blackish brown. Head rounded, posterolateral corners not angulate in full face view; posterior margin straight. Eyes prominent. Clypeus with a median carina; anterior margin with 7 blunt teeth. Mandibles each with 2 large apical and 2 smaller basal teeth. Antennal scapes long, exceeding posterior margin of head in full face view. Mesosoma relatively short. Pronotal dorsum straight in profile; anterior border marginate in dorsal view. Dorsa of mesonotum and propodeum almost straight in profile. Propodeal spines long and acute, exceeding the posterior extensions of the propodeum, and reaching the midlength of the petiole. Petiolar node subtriangular in profile; subpetiolar process absent. Sculpture of head and mesosoma strongly reticulate, gaster smooth, subopaque.

This species is queenless. The workers produce further workers by thelytoky. Males are rarely produced, if so they are found in summer. *P. pungens* is commonly found in Japan, but is less common and sometimes rare in other areas.

Myrmecina ryukyuensis Terayama

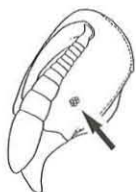
Fig. p 100

Original Reference: Terayama, M. (1996)

Distribution: Nansei Is.

Total length of workers around 2 - 2.5 mm. General body color black; mesopleuron, petiole, mandibles, clypeus and antennae reddish brown; legs yellowish brown. Eyes small, each consisting of around 5 facets; the longest diameter shorter than the length of the 10th antennal segment. Bases of antennal scapes simple in structure, without covering lamellae. Median process on anterior margin of clypeus low. Propodeal spines directed backwards, each longer than its width. Subpetiolar process variously developed, but generally directed forwards. Head and mesosoma longitudinally rugulose, but the rugulae somewhat slender and obscure, their interspaces punctate; the spaces between the eyes and the ventral extensions of the longitudinal carinae extending from the occipital region punctate.

Found on the floor of broadleaf forests, nesting under stones.



M. ryukyuensis



M. nipponica

Myrmecina amamiana Terayama

Fig. p 101

Original Reference: Terayama, M. (1996)

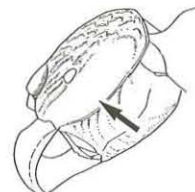
Distribution: Amami-oshima I., Tokunoshima I.

Total length of workers around 3 mm. General body color black; mesopleuron, petiole and postpetiole reddish brown; legs, antennae and mandibles yellowish brown. Eyes rather large and convex, each consisting of over 10 facets; the longest diameter as long as or longer than the length of the 10th antennal segment. Bases of antennal scapes simple in structure, without covering lamellae. Anterior margin of clypeus with a small median process which may vary in size. Propodeal spines more or less upwardly curved. Subpetiolar process with rounded apex pointing forwards. Rugulae on head and mesosoma broad, longitudinal, with smooth, shining interspaces; the spaces between the eyes and the ventral extensions of the longitudinal carinae running from the occipital region on each side with several longitudinal rugulae.

The species is similar to *M. nipponica* in size and coloration, but distinguished by the broad longitudinal rugulae on the head and mesosoma, and the convex eyes. Found on the floor of broadleaf forests, nesting in the soil or under stones.



M. amamiana



M. nipponica

Myrmecina nipponica Wheeler

Fig. p 101

Original Reference: Wheeler, W. M. (1906c)

Synonym(s): *Myrmecina graminicola nipponica* Wheeler, 1906c

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.: Korean Peninsula.

Total length of workers around 3 mm. General body color black; mesopleuron, petiole and postpetiole reddish brown; legs, antennae and mandibles yellow to yellowish brown. Eyes rather large, each consisting of over 10 facets; the longest diameter as long as or longer than the length of the 10th antennal segment. Bases of antennal scapes simple in structure, without covering lamellae. Anterior margin of clypeus with a small median process which varies in size. Propodeal spines more or less upwardly curved. Subpetiolar process obscure. Head and mesosoma irregularly longitudinally rugulose, with smooth, shining interspaces; the spaces between the eyes and the ventral extensions of the longitudinal carinae extending from the occipital region smooth and shining, almost without sculpture.

Found on the floor of woodland or its margins, nesting in the soil, or fallen twigs, or under stones.

Myrmecina flava Terayama

Fig. p 102

Original Reference: Terayama, M. (1985a)

Distribution: Honshu, Shikoku, Kyushu.

Total length of workers around 2.5 mm. Body color yellow to yellowish brown; gaster darker; legs yellow. Eyes small, consisting of several facets; their greatest diameter far less than the length of the 10th antennal segment. Basal portion of each antennal scape with a semibulbous lamella covering the articulation condyle. No median process on anterior margin of clypeus. Propodeal spines directed backwards. Subpetiolar process more or less distinct, with acute apex, pointed forwards. Head and mesosoma irregularly longitudinally rugulose, with punctate interspaces; the spaces between the eyes and the ventral extensions of the longitudinal carinae extending from the occipital region punctuate, not rugulose.

Lordomyrma azumai (Santschi)

Fig. p 102

Original Reference: Santschi, F. (1941)

Synonym(s): *Rogeria (Rogeria) azumai* Santschi, 1941

Lordomyrma nobilis Yasumatsu, 1950

Lordomyrma azumai: Brown, 1952

Distribution: Honshu, Shikoku, Kyushu.

Total length of workers around 3 mm. Body color yellowish brown to reddish brown. Eyes convex, situated beneath the antennal scrobes at the midlength of the head. Antennal scrobes deep, extending to posterior corners of head. Anterior median projection of clypeus rather angulate. Antennal scapes almost reaching posterior corners of head. Metanotal groove deeply impressed. Propodeal spines acute. Petiole subtriangular in profile; subpetiolar process small. Body hairs erect, abundant. Head, mesosoma, petiole and postpetiole covered with irregular striation and small punctures. Surface of gaster obscurely, finely sculptured.

Found in the soil of broadleaf forests, nesting under stones or in the hollow cores of fallen twigs. A rather rare species.

Rhopalomastix omotoensis Terayama

Fig. p 103

Original Reference: Terayama, M. (1996)

Distribution: Ishigaki I.

Total length of workers around 2 mm. Body color yellowish brown. Antennae 10-segmented. Scares about half as long as the head width. Apical funicular segment large and flat, twice as long as wide, almost equal in length to the remaining funiculus. Eyes small. Dorsum of mesosoma straight in profile. Promesonotal suture absent dorsally, and obscure laterally. Legs short, trochanters and tibiae flattened. Petiole high, with short peduncle; subpetiolar process forming an obtuse triangle. Postpetiole higher than long in side view, posterior surface attached to first gastral tergite.

Recurvidris recurvispinosa (Forel)

Fig. p 103

Original Reference: Forel, A. (1890)

Synonym(s): *Recurvidris recurvispinosa* (Forel) (Bolton, 1992)

Trigonogaster recurvispinosus Forel (Forel, 1890)

Distribution: Ishigaki I., Iriomote I.; Taiwan, China, Myanmar, Nepal, India.

Total length of workers around 2 mm. Body color yellow, gaster somewhat darker. Head rectangular, 1.1 times as long as wide, with weakly concave posterior margin in full face view. Anterior margin of clypeus broadly convex. Mandibles each with 4 teeth; the apical tooth largest; basal tooth subrectangular, with 2 acute angles. Antennal scapes slightly exceeding dorsal margin of head; apical 3 funicular segments forming a club, which is slightly longer than the preceding funicular segments together. Eyes relatively small, each with about 25 facets and tear-drop shaped, with an acutely angulate anterior corner. Propodeal spines strongly curved, with the tips pointing forwards. Petiole with a long, slender peduncle. Subpetiolar process triangular, with an acute ventral angle. Postpetiole with very gently convex dorsal margin. Postpetiole trapezoidal, broadest posteriorly; its maximum width 1.4 times the minimum width. Erect hairs present on pronotal dorsum (3 pairs), mesonotal dorsum (a single hair), petiole (2 pairs), and postpetiole (2 pairs). Head, mesonotal dorsum, petiole and postpetiole microreticulate; other parts smooth and shining.

Vollenhovia nipponica Kinomura & Yamauchi

Fig. p 104

Original Reference: Kinomura, K. & Yamauchi, K. (1992)

Distribution: Honshu (Gifu), Kyushu (Kumamoto).

A social parasite of the short winged form of *Vollenhovia emeryi*, which occurs in and near riverside forests. *V. nipponica* females are easily distinguished from those of *V. emeryi* as follows: (1) postpetiole smooth and shining (shagreened in *V. emeryi*); (2) head broader than mesosoma in dorsal view (the two almost equally wide in *V. emeryi*); (3) body size distinctly smaller than in *V. emeryi*.

Vollenhovia yambaru Terayama

Fig. p 104

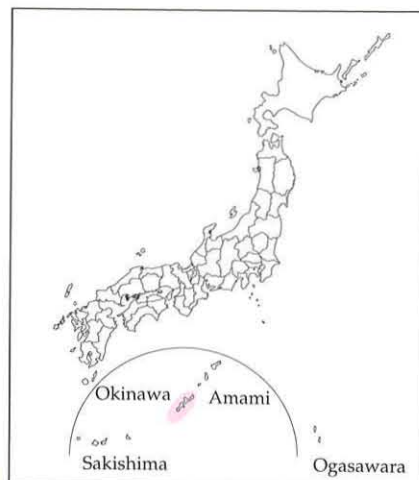
Original Reference: Terayama, M. (1999)

Distribution: Okinawa I.

We are unable to distinguish workers of this species from those of *Vollenhovia okinawana*. However, we treat it as a separate species because all of its known females are wingless ergatoids, while those of *V. okinawana* are winged.

MYRMICINAE

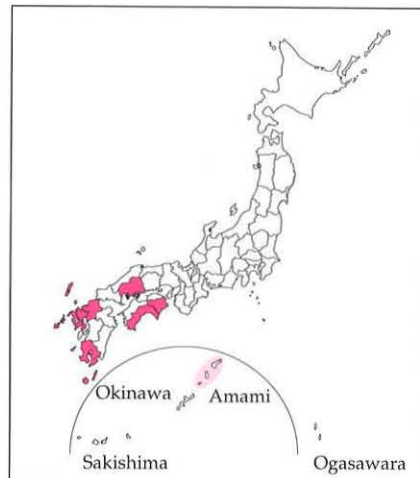
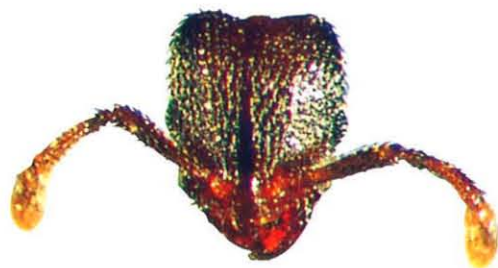
Vollenhovia okinawana Terayama & Kinomura



Workers 2.5 mm. Yellowish brown/red-dish brown. Resembles *V. benzai*, easily distinguished by: (1) promesonotal dorsum smooth, shining, no sculpturing on median strip; (2) dorsal profile of postpetiole slightly concave posteriorly; (3) subpetiolar process larger, lamellate, about 0.04 mm deep.

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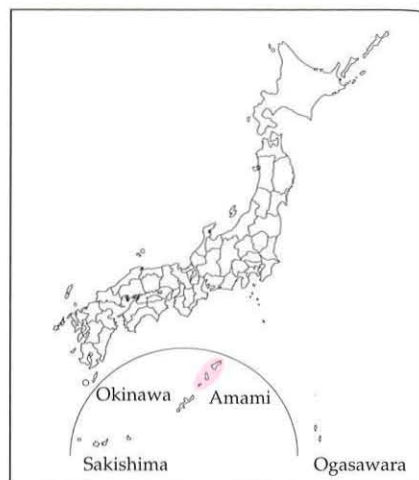
Vollenhovia benzai Terayama & Kinomura



Workers 2.5 mm. Yellowish/reddish brown; legs lighter. Head width/length ratio 0.83. Mandibles 6-toothed. Posterolateral propodeal corners rounded. Subpetiolar process smallest of all Japanese *Vollenhovia*, height ca. 0.03 mm. Postpetiolar dorsal profile semicircular. Head, mesosoma, petiole, postpetiole shagreened (weaker on postpetiole). Gaster, legs smooth. Head, promesonotal dorsum longitudinally rugose. Polygynous. Nests: decaying wood, soil, forests. Both winged and ergatoid females.

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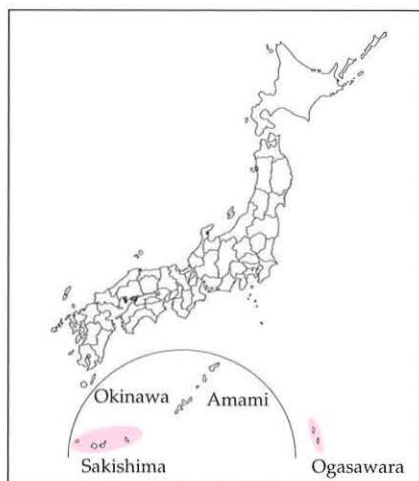
Vollenhovia amamiana Terayama & Kinomura



Workers 3 mm. Reddish brown; legs, antennae, mandibles lighter. Head width measurement relatively small; head width/length ratio 0.71. Anterior clypeal margin rounded. Mandibles 7-toothed. Eyes relatively strongly convex. Posterolateral propodeal margins angulate, without teeth. Petiolar node high, posterior margin steep. Subpetiolar process large, lamellate, ca. 0.07 mm deep. Head, mesosoma, petiole, postpetiole shagreened; gaster, legs smooth. Nests: rotten wood, forests.

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Vollenhovia sakishimana Terayama & Kinomura



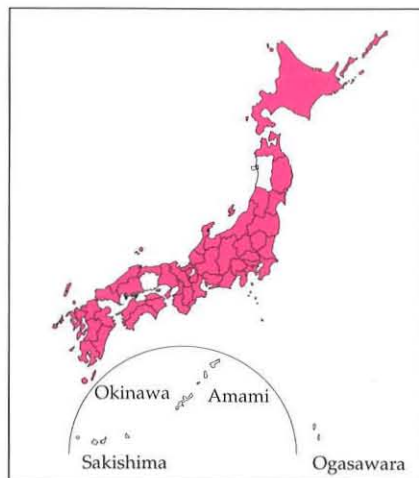
Workers 2 mm. Yellow/pale brown; antennae, legs yellowish. Head width/length ratio 0.83. Mandibles 6-toothed. Propodeal processes dentiform. Subpetiolar process large. Head, mesosoma, petiole, postpetiole shagreened; postpetiolar dorsum shining; gaster, legs smooth.

Resembles *V. emeryi*, distinguished by: (1) frons without black spot behind clypeus; (2) postpetiolar sternum anteriorly almost straight in profile.

Nests: soil, rotten wood, forests. Polygynous, averaging 3.8 queens/nest.

MYRMICINAE

Vollenhovia emeryi Wheeler

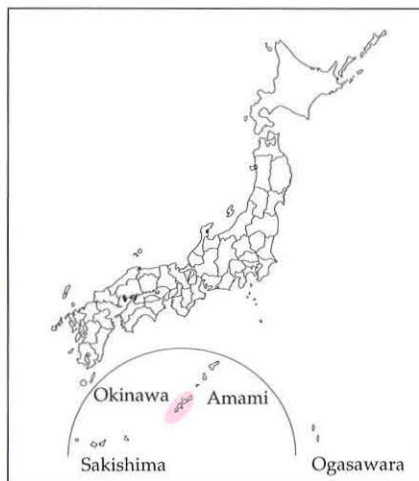


Workers 2.5 mm. Reddish brown/dark brown; gaster darker; blackish spot anteriorly on frons; legs yellowish. Head width/length ratio 0.83. Mandibles 6-7-toothed. Mesosomal profile flat; metanotal groove weak. Propodeum: acute dentiform processes. Subpetiolar process: large, lamellate, ca. 0.05 mm deep. Cephalic dorsum, mesosoma with many longitudinal rugae.

Nests: decaying wood. Colonies monogynous, with long-winged females, or polygynous with short-winged females.

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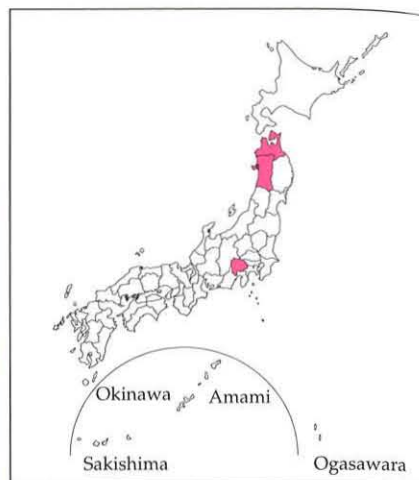
Oligomyrmex sauteri Forel



Strongly dimorphic. Soldier (illustrated) 2 mm (workers 1 mm). Light reddish brown, head darker, 1.1-1.2x longer than wide, sides weakly convex; posterior margin moderately concave; a pair of frontal tubercles; vertex, occiput smooth; vertex with 4-6 transverse rugae; antennae 9-segmented; eye diameter < scape width; posterodorsal propodeal corners rounded, not angulate; posterolateral propodeal margins flanged; subpetiolar process small, triangular.

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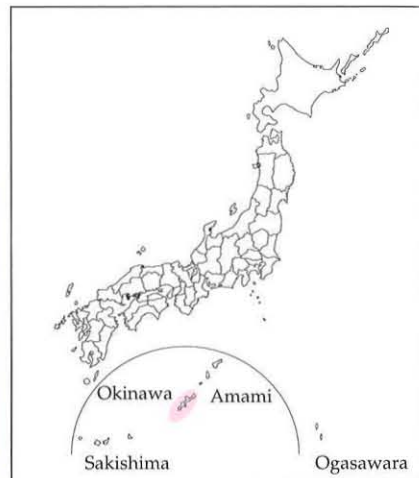
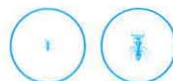
Oligomyrmex borealis Terayama



Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 1.5 mm). Yellowish brown. Head 1.1x longer than wide, sides converging anteriorly, posterior margin concave, frontal tubercles present; mandibles 6-toothed; antennae 9-segmented; eyes 5-faceted; pronotal, mesonotal dorsa distinctly produced; mesonotum, mesopleuron divided; propodeum: posterodorsally toothed; posterolateral margins carinate; subpetiolar process bluntly triangular. Head: punctate, many longitudinal rugae; remaining body smooth or finely punctate.

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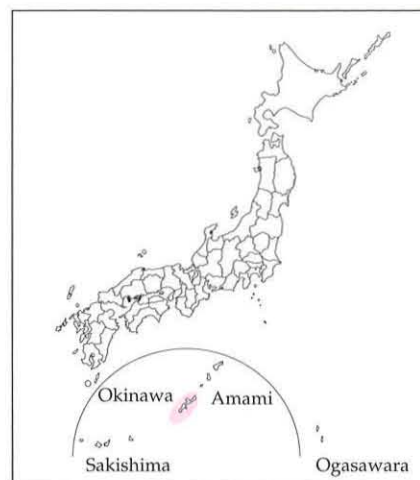
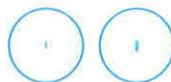
Oligomyrmex oni Terayama



Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 1 mm). Reddish brown, head darker, 1.1x longer than wide, posterior margin concave; frontal tubercles obscure/absent; sometimes a median ocellus; mandibles 6-toothed; eyes +10-faceted, hairy; antennae 9-segmented; mesonotum, mesopleuron divided; propodeal teeth triangular, apices rounded; posterolateral propodeal margins acarinate; subpetiolar process an acute tooth; head: numerous longitudinal rugae, small punctures; dorsa of pronotum, mesonotum shining, remainder finely punctate.

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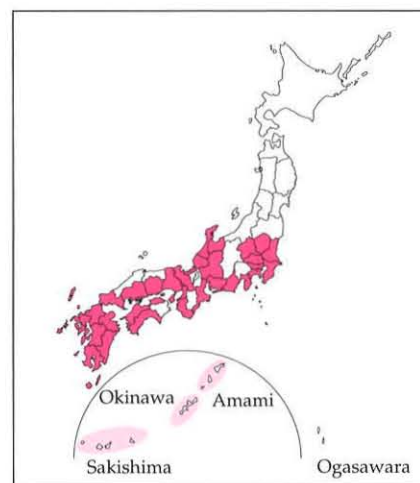
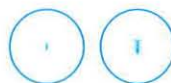
Oligomyrmex hannya Terayama



Strongly dimorphic. Soldier (illustrated) 1.5 mm (workers 1 mm - the smallest Japanese myrmicines). Yellowish brown. Head 1.3x longer than wide, sides parallel; frontal tubercles present; occiput concave medially; eyes: several facets; mandibles 5-toothed; antennae 9-segmented; pronotal, mesonotal dorsa produced; mesonotum, mesopleuron undivided; propodeal spines small; propodeum flanged posterolaterally; subpetiolar process spinose; head anteriorly longitudinally striate, posteriorly impunctate; pronotum shining; remainder finely punctate.

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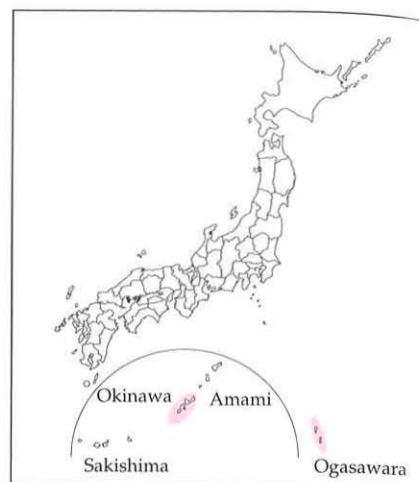
Oligomyrmex yamatonis Terayama



Strongly dimorphic. Soldier (illustrated) 2 mm (workers 1 mm). Light reddish brown, head blackish, 1.3x longer than wide, sides parallel; frontal tubercles present; occiput strongly concave; mandibles 5-toothed; antennae 9-segmented; eyes: 2-3 facets; pronotal, mesonotal dorsa raised; mesopleuron undivided; posterolateral propodeal margins flanged; subpetiolar process bluntly triangular; head, mesosoma, petiole, postpetiole densely punctate; head: many longitudinal rugae. Relatively common.

MYRMICINAE

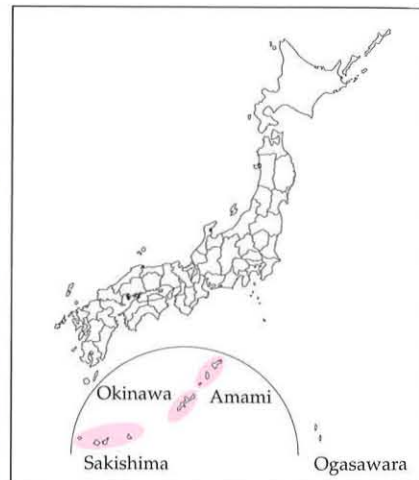
Pheidologeton diversus (Jerdon)



Polymorphic, 2.5-11.0 mm. Minors yellowish/reddish brown. Head rectangular, occiput convex; mandibles 5-toothed; scapes not exceeding occiput; apical two funicular segments together longer than remainder; promesonotal profile convex; metanotal groove deep; propodeal dorsum convex; propodeal spines long. Majors darker: head: disproportionately large, almost square, occiput convex; clypeal border: straight, notched medially; mandibles: triangular, apical teeth acute, others indistinct; eyes small; ocelli present; scapes half as long as head.

MYRMICINAE

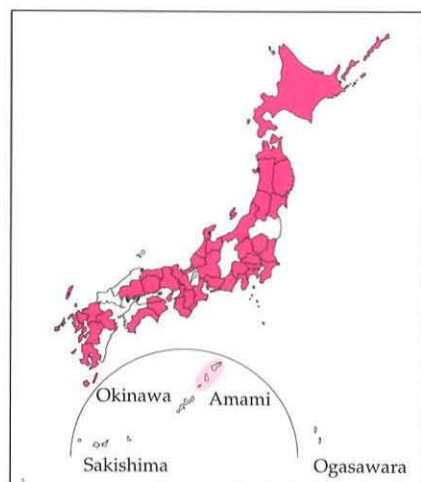
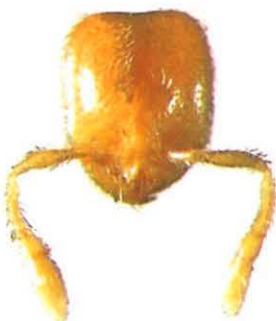
Solenopsis tipuna Forel



Workers 1.5 mm. Yellow/yellowish brown. Eyes small, 2-4 facets. Metanotal groove deeper than *S. japonica*. Posterodorsal propodeal corners rounded, not angulate. Petiole with much more strongly convex ventral margin than *S. japonica*. Polygynous. Nests in soil, under stones.

MYRMICINAE

Solenopsis japonica Wheeler



Workers dimorphic, ca. 1.5 mm. Yellow/yellowish brown. Head rectangular, 1.35x longer than wide. Scapes not reaching occiput. Eyes small, 2-4 facets. Dorsal mesosomal outline weakly convex; metanotal groove deep. Propodeum weakly convex; posterodorsal corner obtusely angled. Ventral petiolar margin straight/weakly convex. Head, mesosoma, petiole, postpetiole with short, sparse, erect hairs. All body surfaces smooth, shining.

MYRMICINAE

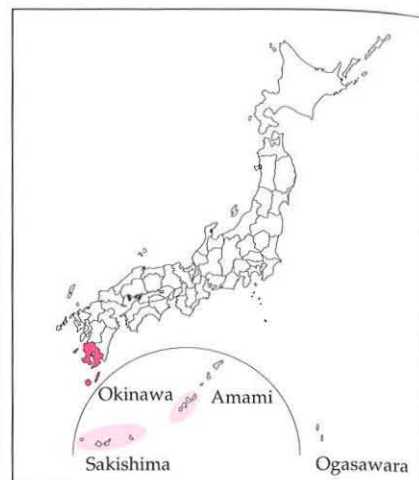
Solenopsis geminata (Fabricius)



Polymorphic ca. 3-8 mm. Reddish brown, head brown. Majors: head almost square, posteriorly convex; mandibles: robust, outer margins strongly convex, 4 blunt teeth, remainder obscure; clypeus longitudinally bicarinate; eyes small, +20 facets; anterior ocelli often present; scapes nearly reaching occiput; 2-segmented club longer than 3rd-9th segments combined. Legs, body hairy. Minors: mandibles 4-toothed; scapes reaching occiput; clypeus longitudinally bicarinate; posterolateral propodeal corners carinate.

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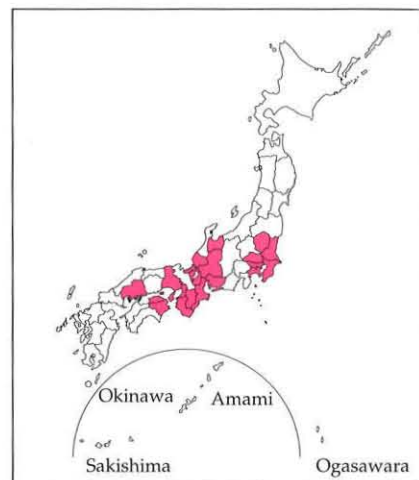
Monomorium hiten Terayama



Workers 1.5 mm. Yellow/yellowish brown, paired brown spots on gaster. Mandibles 3-toothed. Eyes ca. 10 faceted. Median longitudinal clypeal carinae obscure. Metanotal groove distinct. Posterodorsal propodeal border rounded. Ventral petiolar profile roundly convex. Generally smooth, shining, without sculpture. Distinguished by characteristic paired gastral spots. Nests under stones, open land, woodland margins.

MYRMICINAE

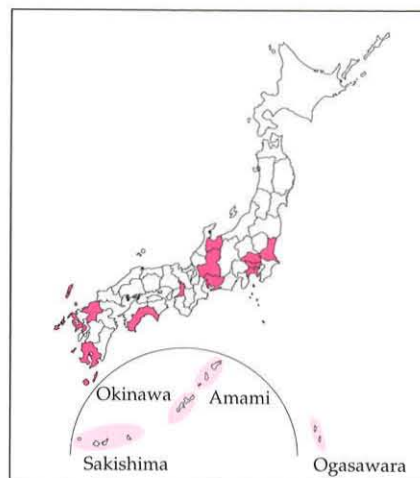
Monomorium triviale Wheeler



Workers 1.5 mm. Yellow/yellowish brown. Eyes ca. 10-faceted. Mandibles 4-toothed. Paired clypeal carinae obscure. Metanotal groove obscure. Posterodorsal propodeal border rounded. Ventral petiolar profile roundly convex. Body surfaces smooth, shining, without sculpture. Similar to *M. intrudens* and *M. hiten* apart from coloration. Rare. Open land, woodland margins.

MYRMICINAE

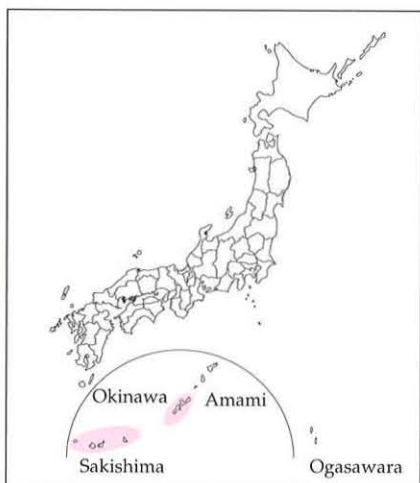
Monomorium pharaonis (Linnaeus)



Workers 2-2.5 mm. Yellow/reddish brown. Eyes 20-faceted. Mandibles 4-toothed. Paired clypeal carinae distinct. Metanotal groove distinct. Posterodorsal propodeal margin angulate. Propodeal dorsum without standing hairs. Ventral petiolar outline not strongly convex. Surfaces from head to postpetiole distinctively finely, densely punctate, opaque.

MYRMICINAE

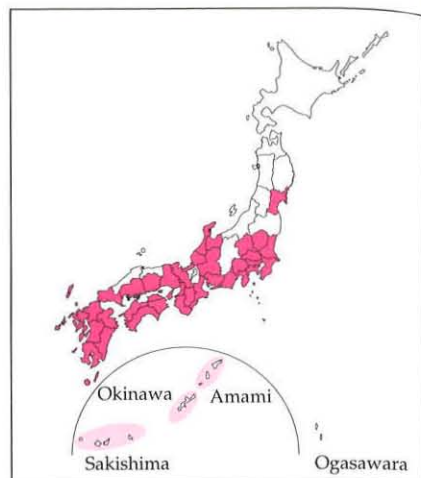
Monomorium latinode Mayr



Workers 3 mm. Head to postpetiole yellowish/reddish brown, gaster blackish brown. Eyes ca. 20-faceted. Mandibles 5-toothed. Clypeus longitudinally bicarinate. Metanotal groove shallow. Posterodorsal propodeal margin angulate. Ventral petiolar outline roundly convex. Postpetiole 1.4x longer than broad. Mesopleuron, propodeal sides finely longitudinally rugose; propodeum dorsally transversely rugose. Distinguished from *M. destructor* by size, coloration, 5-toothed mandibles and shallow metanotal groove.

MYRMICINAE

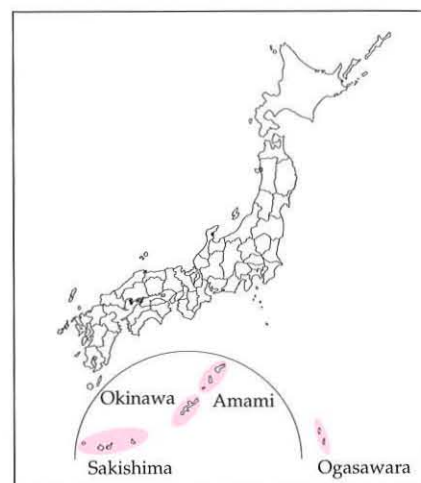
Monomorium intrudens F. Smith



Workers 1.5 mm. Bicolored: Head to postpetiole yellow/yellowish brown; gaster brown/blackish brown. Mandibles 4-toothed. Eyes +10-faceted. clypeal carinae obscure. Metanotal groove distinct. propodeal posterodorsal border rounded; area of petiolar insertion not carinate. Petiole ventrally roundly convex. Body surfaces smooth, shining, without sculpture. Nests under stones, in plant cavities, bamboo stems, open land, woodland margins.

MYRMICINAE

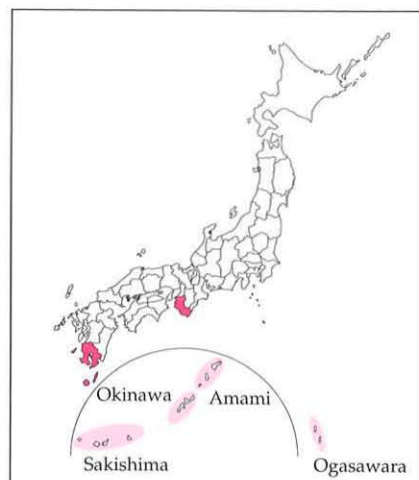
Monomorium sechellense Emery



Workers 1.5 mm. Essentially uniformly Yellow/yellowish brown. Eyes small, only 1-2 facets. Mandibles 4-toothed. Clypeus: distinctly raised medially, carinae obscure. Metanotal groove distinct. Propodeum posterodorsally angulate. Ventral petiolar profile roundly convex. Mesopleuron, sides of propodeum finely punctate; remainder smooth, shining. Nests under stones, plant cavities, open habitats.

MYRMICINAE

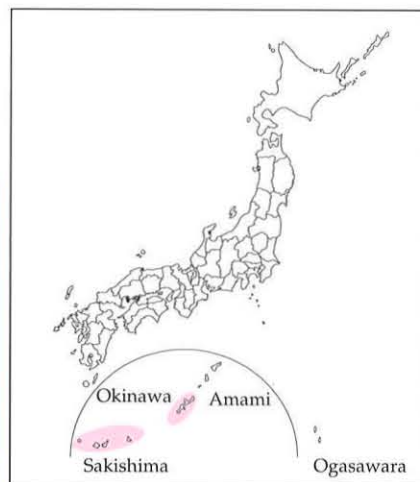
Monomorium floricola (Jerdon)



Workers 1.5 mm. bicolored: Head, gaster dark brown; rest yellowish brown, (mesosoma variable). Eyes ca. 10-faceted. Mandibles 4-toothed. Clypeal carinae distinct. Promesonotum depressed, elongate. Metanotal groove distinct. Posterodorsal propodeal profile rounded. Ventral petiolar profile almost straight. Body surfaces without sculpture, smooth, shining. Nests in tree bark, hollow twigs, open sites.

MYRMICINAE

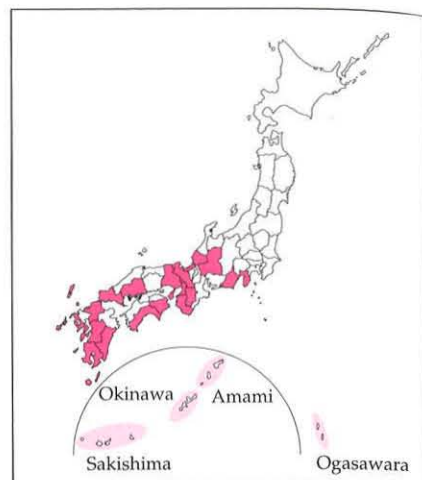
Monomorium destructor (Jerdon)



Workers 3-3.5 mm. Size variable. Generally yellowish/reddish brown; gaster darker. Mandibles 4-toothed. Eyes ca. 20-faceted. clypeal carinae obscure. Metanotal groove distinct. Posterodorsal propodeal border angulate. Ventral petiolar profile relatively strongly convex. Postpetiole 1.1-1.2x longer than wide. Mesopleuron, propodeal sides finely punctate; Propodeal dorsum transversely rugose. Distinguished from *M. latinode* by mandibles (5-toothed in *latinode*), distinct metanotal groove, narrower postpetiole (1.5x longer than broad in *latinode*).

MYRMICINAE

Monomorium chinense Santschi



Workers 1.5 mm. Brown/blackish brown. Mandibles 4-toothed. Eyes +10-faceted. Clypeus longitudinally bicarinate. Metanotal groove distinct. Posterodorsal propodeal border rounded. Ventral petiolar outline roundly convex. Generally lacking sculpture, smooth, shining. Nests in soil, woodland margins, grassland.

MYRMICINAE

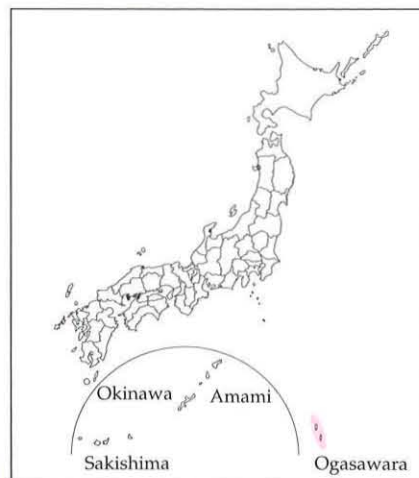
Strongylognathus koreanus Pisarski



Workers 3 mm. Yellowish brown. Head 1.1x longer than wide; occiput weakly convex. Mandibles sickle-shaped; clypeal margin broadly convex. Scapes 0.7x head length. Mesonotal profile straight, propodeal convex. Posterodorsal propodeal corner obtusely bispinose. Petiole triangular, peduncle short. Subpetiolar process low. Postpetiole 1.45x longer than wide. Head shining, areas surrounding eyes longitudinally rugose. Body generally with scattered stout hairs.

MYRMICINAE

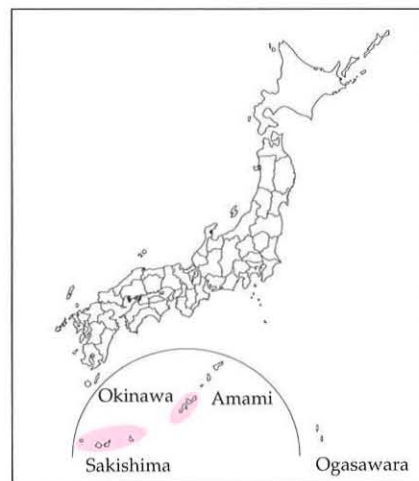
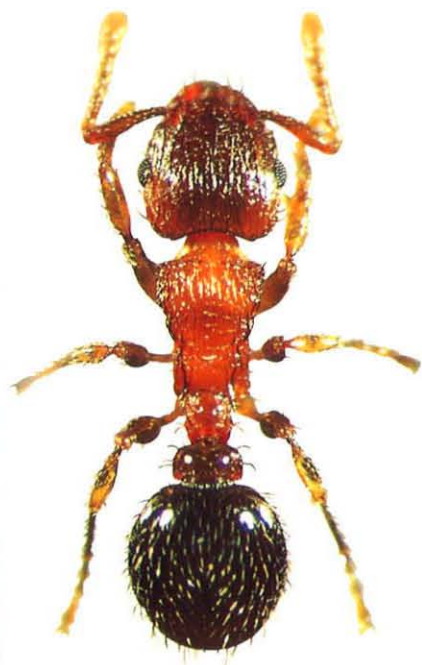
Tetramorium tonganum Mayr



Workers 2.5 mm. Yellow/yellowish brown to postpetiole, gaster dark brown. Antennae 12-segmented. Anterior clypeal margin without median notch. Propodeal spines dentiform, directed upward. Petiole: short peduncle, rounded node. Sculpture rugulose.

MYRMICINAE

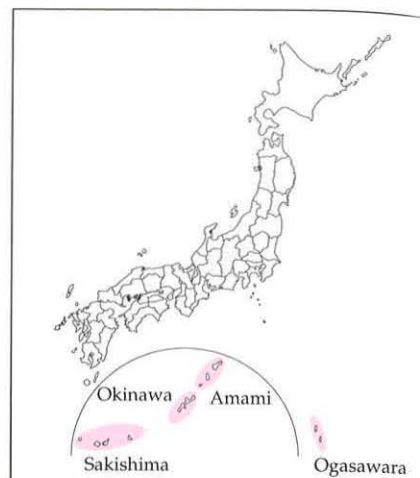
Tetramorium smithi Mayr



Workers 2 mm. Yellowish/reddish brown to postpetiole, gaster darker. Antennae 11-segmented. Anterior clypeal margin notched medially. Lateral mesosomal margins sinuate; mesonotal region expanded laterally. Propodeal spines acute, directed posteriorly. Sculpture coarsely, longitudinally rugulose.

MYRMICINAE

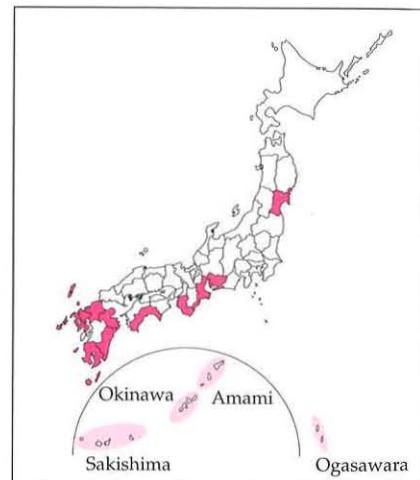
Tetramorium simillimum (F.Smith)



Workers 2.5 mm. Yellowish/reddish brown to postpetiole, gaster dark brown. Antennae 12-segmented. Anterior clypeal margin without median notch. Lateral mesosomal margins sinuate, mesonotal region expanded laterally. Propodeal spines dentiform, directed upward. Body hairs short, stout, blunt, shorter than interspaces. Sculpture fine, longitudinally rugulose; interspaces with fine, dense reticulate-punctuation or granulation.

MYRMICINAE

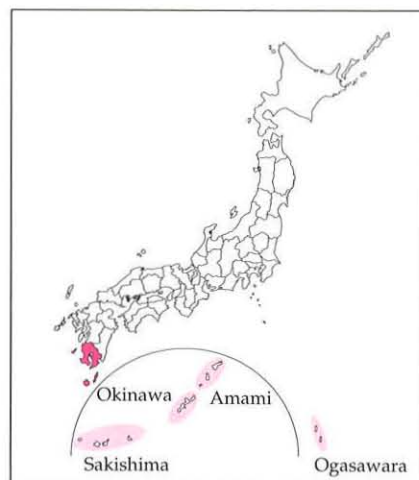
Tetramorium nipponense Wheeler



Workers 3 mm. Uniformly yellow/yellowish brown. Antennae 12-segmented; scapes almost reaching posterior corners of head. Anterior clypeal margin with median notch. Propodeal spines long, acute, curved upward. Head to postpetiole irregularly reticulate-rugose; longitudinal rugae on cephalic dorsum.

MYRMICINAE

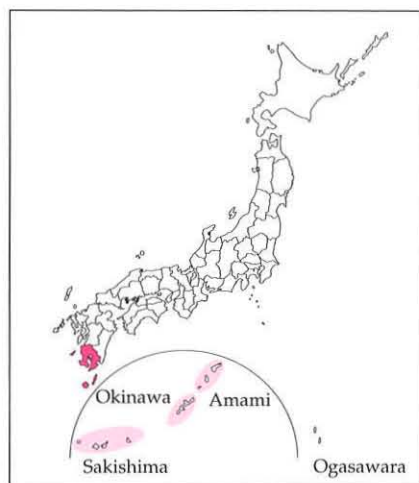
Tetramorium lanuginosum Mayr



Workers 2.5 mm. Yellowish brown/red-dish brown. Antennae 12-segmented. Anterior clypeal margin concave. Dorsal mesosomal profile roundly convex. Petiolar node low, without angulate corners. Head to postpetiole reticulate. Hairs abundant, some bifid or trifid.

MYRMICINAE

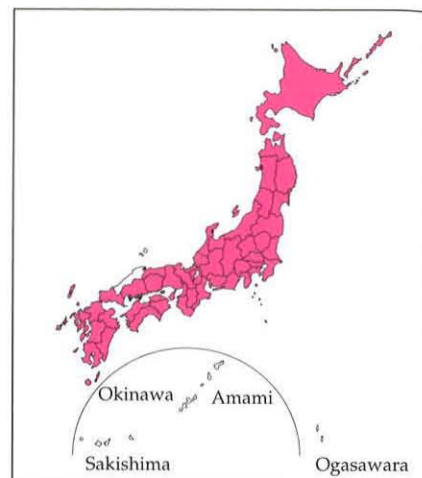
Tetramorium kraepelini Forel



Workers 2 mm. Yellow/yellowish brown, gaster sometimes darker. Antennae 12-segmented; scapes far from reaching posterior corners of head. Anterior clypeal margin without median notch. Lateral mesosomal margin not sinuate. Propodeal spines long, spiniform, curved upward. Petiolar node rounded posteriorly. Head, mesosoma irregularly densely reticulate.

MYRMICINAE

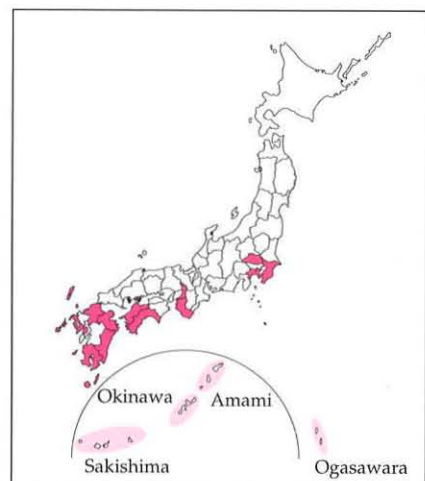
Tetramorium tsushimae Emery



Workers 2.5 mm. Brown/dark brown. Antennae 12-segmented. Anterior clypeal margin slightly convex, without median notch. Frontal carina short, obscure behind level of eyes. Propodeal spines small, dentiform. Petiolar peduncle short, broad. Cephalic dorsum finely longitudinally rugulose; mesosomal sculpture less regular, mostly longitudinal.

MYRMICINAE

Tetramorium bicarinatum (Nylander)



Workers 3 mm. Bicolored: Yellow/yellowish brown to postpetiole; gaster dark brown. Anterior clypeal margin with median notch. Antennae 12-segmented; scapes almost reaching posterior cephalic corners. Propodeal spines long, acute, curved upward. Head to postpetiole densely, irregularly reticulate-rugose; longitudinal rugae prominent on cephalic dorsum.

Distinguished from *T. nipponense*, by shorter body hairs, dark-colored gaster, contrasting with remaining body, higher posterior petiole margin in profile.

Vollenhovia okinawana Terayama & Kinomura

Fig. p 113

Original Reference: Terayama, M. & Kinomura, K. (1998)

Distribution: Okinawa I.

Total length of workers around 2.5 mm. Body color yellowish brown to reddish brown. This species closely resembles *Vollenhovia benzai*, from which it is easily distinguished as follows: (1) no sculpturing on a median strip of the promesonotal dorsum, which is smooth and shining; (2) dorsal profile of postpetiole slightly concave posteriorly. Subpetiolar process relatively small, but larger than that of *V. benzai*, the lamella about 0.04 mm deep.

Widely distributed on Okinawa Island, nesting in decaying wood in forests. The females are winged. *Vollenhovia yambaru*, which produces ergatoid females and workers identical to those of *V. okinawana*, is found in the native forests of northern Okinawa.

Vollenhovia benzai Terayama & Kinomura

Fig. p 113

Original Reference: Terayama, M. & Kinomura, K. (1998)

Distribution: Shikoku, Kyushu, Yaku I., Nansei Is.

Total length of workers around 2.5 mm. Body color yellowish brown to reddish brown; legs lighter. Head width/head length ratio 0.83. Mandibles each with 6 teeth. Posterolateral corners of propodeum rounded, lacking processes. Subpetiolar process the least developed among Japanese *Vollenhovia* species; its height about 0.03 mm. Postpetiolar dorsum semicircular in profile. Head, mesosoma, petiole and postpetiole shagreened, the sculpturing weaker on postpetiole than petiole; gaster and legs smooth. Head and promesonotal dorsum with longitudinal rugae.

This species is polygynous. It nests in decaying wood or in the soil in forests. Wingless ergatoid females are known from the Amami-oshima Island population, in which normal winged females are also present.

Vollenhovia amamiana Terayama & Kinomura

Fig. p 114

Original Reference: Terayama, M. & Kinomura, K. (1998)

Distribution: Amami-oshima I., Tokunoshima I.

Total length of workers around 3 mm. Body color reddish brown; legs, antennae and mandibles lighter. The head width measurement is relatively small compared to other Japanese species; head width/head length ratio 0.71. Anterior margin of clypeus rounded. Mandibles each with 7 teeth. Eyes more strongly convex than in other Japanese species. Posterolateral margin of propodeum angulate, without dentiform processes. Petiolar node high, its posterior

margins steep. Subpetiolar process well developed, forming a large lamellate plate about 0.07 mm deep. Head, mesosoma, petiole and postpetiole shagreened, gaster and legs smooth.

Vollenhovia sakishimana Terayama & Kinomura

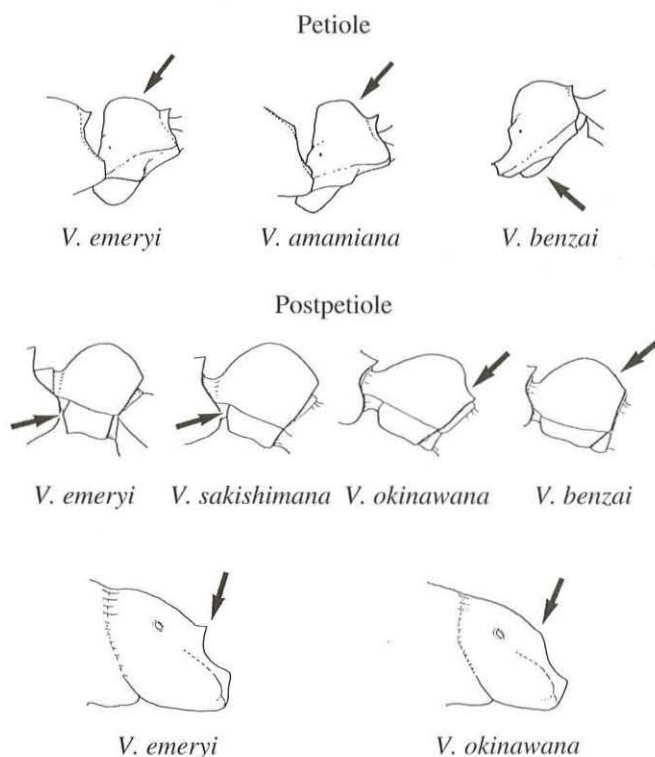
Fig. p 114

Original Reference: Terayama, M. & Kinomura, K. (1998)

Distribution: Nansei Is (Sakishima Is), Ogasawara Is.

Total length of workers around 2 mm. Body color yellow to pale brown; antennae and legs yellowish brown. Head width/length ratio 0.83. Mandibles each with 6 teeth. Propodeal processes dentiform. Subpetiolar process large. Head, mesosoma, petiole and postpetiole shagreened; postpetiolar dorsum feebly sculptured and strongly shining; gaster and legs smooth.

Resembles *V. emeryi*, but can be distinguished from it as follows: (1) head without a median black spot just behind the clypeus; (2) anterior border of postpetiolar sternum almost straight in profile. Nests in the soil or rotten wood in forests. Polygynous; on average 3.8 queens are present per nest.



Vollenhovia emeryi Wheeler

Fig. p 115

Original Reference: Wheeler, W. M. (1906)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I., Kuchino-erabu I.

Total length of workers around 2.5 mm. Body color reddish brown to dark brown; gaster darker; head with a blackish brown spot just above clypeus; legs yellowish brown. Head rectangular; head width/head length ratio 0.83. Mandibles with 6 or 7 teeth. Mesosoma flat in profile; metanotal groove weakly developed. Propodeum with dentiform processes; their apices acute. Subpetiolar process well developed, forming a large lamellate plate about 0.05 mm deep. Dorsal areas of head and mesosoma with many longitudinal rugae.

V. emeryi has colonies of two types: Type 1 colonies are usually monogynous with alate females, the reproductive offspring of which are also alate females; Type 2 colonies are usually polygynous and have short-winged reproductive females, the reproductive female offspring of which are also short-winged. Type 1 colonies are found mainly in mountain forests, nesting in decaying wood. Type 2 colonies are found in or near riverside forests, also nesting in decaying wood. These two colony types might represent two separate species, or might be products of genetic polymorphism within a single species, as suggested by Kubota (1984). We tentatively treat them here as conspecific, while indicating the need for further studies on their status. In both types the alate females and males hibernate within the nests. *V. nipponica* is a parasite frequently found in Type 2 colonies of *V. emeryi*.

Oligomyrmex sauteri Forel

Fig. p 115

Original Reference: Forel, A. (1912)

Distribution: Senkaku Is.; Taiwan, Mainland China(?).

Total length around 2 mm in soldiers, 1 mm in workers. Body light reddish brown, head of soldier darker. In soldiers: head 1.1 to 1.2 times as long as wide, with weakly convex sides in full face view; vertex with a pair of tubercles, posterior margin of head moderately concave; vertex and occiput largely smooth; vertex with 4 to 6 distinct transverse rugae; antennae 9-segmented; eyes small, smaller than the maximum width of an antennal scape; posterodorsal corners of propodeum rounded, not forming an angle; posterolateral margins of propodeum each with a thin lamellate flange; subpetiolar process small, triangular. In workers: head and pronotum largely smooth; antennae 9-segmented; pronotal and mesonotal dorsa moderately convex in profile; posterodorsal corners of propodeum rounded, not forming angles or spines; thin lamellar flanges on posterolateral margins of propodeum; subpetiolar process bearing a small blunt tubercle.

Oligomyrmex borealis Terayama

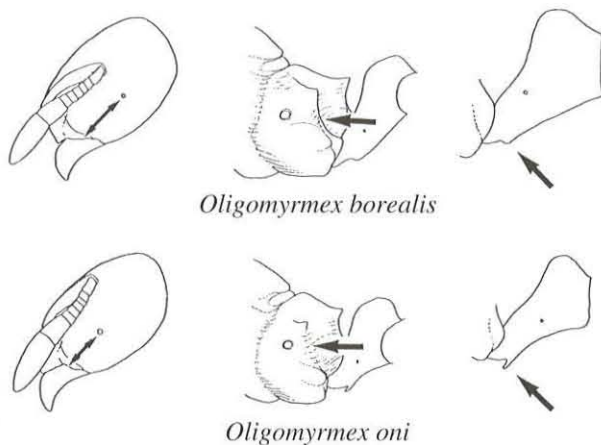
Fig. p 116

Original Reference: Terayama, M. (1996)

Distribution: Honshu (Aomori, Akita, Yamanashi).

Total length around 3.5 mm in soldiers, around 1.5 mm in workers. One of the larger Japanese *Oligomyrmex* species. Body color yellowish brown. In soldiers: head 1.1 times as long as wide, sides

slightly converging anteriorly, posterior margin concave in full face view, vertex with a pair of tubercles; mandibles each with 6 teeth; antennae 9-segmented; eyes small, each with more than 5 facets, situated at midlength of head capsule in side view; pronotum and mesonotal dorsa distinctly produced; mesonotum obscurely divided into mesoscutum and scutellum; mesopleuron separated into two parts by an oblique furrow; metanotum distinct; posterodorsal corners of propodeum each with a triangular tooth; posterolateral margins of propodeum carinate; subpetiolar process small, forming a blunt triangle; head punctate, with many longitudinal rugae; pro- and mesonota mostly smooth; mesopleura, metanotum and propodeum punctate, petiole and lateral surfaces of postpetiole covered with small punctures. In workers: head slightly longer than wide in full face view; antennae 9-segmented; mandibles each with 5 teeth; eyes each with a single facet, situated at midlength of head capsule; posterolateral margins of propodeum with a thin lamellate flange running from posterodorsal corner; propodeal spines present, triangular, their tips turned upwards; head and pronotum mostly smooth; mesonotum, propodeum, petiole and postpetiole covered with small punctures.



Oligomyrmex oni Terayama

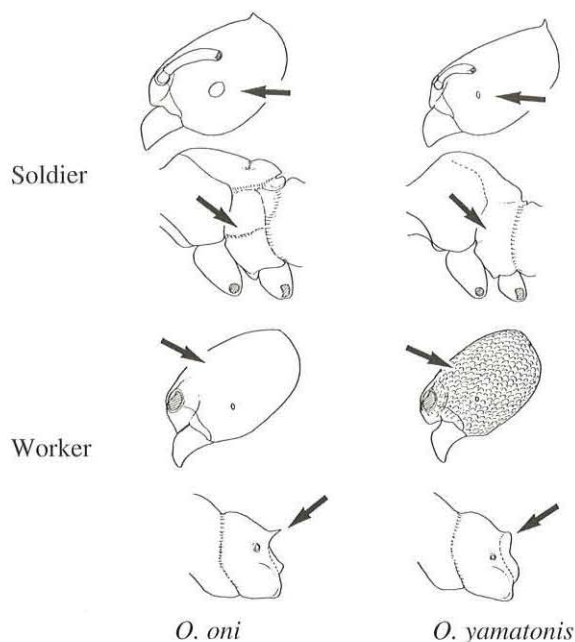
Fig. p 116

Original Reference: Terayama, M. (1996)

Distribution: Nansei Is (Okinawa I., Tokashiki I.).

Total length around 3.5 mm in soldiers, around 1 mm in workers. One of the larger Japanese *Oligomyrmex* species. Body color reddish brown, except the head which is blackish brown in soldiers, yellowish brown in workers. In soldiers: head 1.1 times as long as wide, posterior margin slightly concave at midline in full face view; a single median ocellus present in many individuals; tubercles on vertex variously present, ranging to obscure or absent; mandibles each with 6 teeth; eyes each with more than 10 facets, situated laterally on anterior portion of head capsule, and bearing hairs which are longer than the diameter of a single facet; antennae 9-segmented; mesonotal dorsum produced, divided into mesoscutum and scutellum; mesopleura divided by an oblique furrow.

Metanotum distinct; propodeal teeth triangular, with rounded apices; posterolateral margins of propodeum not carinate; subpetiolar process forming an acute tooth; head with numerous longitudinal rugae and small punctures; dorsa of pronotum and mesonotum mostly smooth and shining, propodeum, petiole and postpetiole with small punctures. In workers: head almost square in frontal view; its posterior margin shallowly convex at midline; anterior margin of clypeus strongly convex at the midline; eyes each with 2 or 3 facets; propodeal spines slender and acute, each as long as or longer than its basal width; posterolateral margins of propodeum each with a thin lamellate flange, its upper end not reaching the propodeal spine; petiole relatively low; subpetiolar process spinose, with an acute anteroventral corner; head and pronotum largely smooth and shining; mesonotum, propodeum, petiole and postpetiole with small punctures.



Oligomyrmex hannya Terayama

Fig. p 117

Original Reference: Terayama, M. (1996)

Distribution: Okinawa I.

Total length around 1.5 mm in soldiers, around 1 mm or less in workers. The smallest known Japanese myrmicine ant. Body color yellowish brown. In soldiers: head 1.3 times as long as wide, with parallel sides in full face view; vertex with a pair of small tubercles; posterior cephalic margin very weakly concave in the middle; eyes small, with only several facets, situated laterally on the anterior portion of head; mandibles each with 5 teeth; antennae 9-segmented; pronotal and mesonotal dorsa weakly produced; mesonotum simple, not divided into mesoscutum and scutellum; mesopleuron simple; propodeal spines present but small; posterolateral margin of propodeum with a thin lamellate flange extending from the propodeal spine; subpetiolar process spinose; anterior half of head with numerous longitudinal striae, posterior half mostly

smooth and impunctate; pronotum smooth and shining; mesonotum, propodeum, petiole and postpetiole covered with small punctures. In workers: head slightly longer than wide in frontal view; antennae 9-segmented; mandibles each with 5 teeth; eyes each with only a single facet, situated laterally on anterior portion of head capsule; propodeum without teeth; posterolateral margins each with a thin lamellate flange which reaches back to the posterodorsal corners of the propodeum; head covered with shallow punctures; pronotum smooth and shining; mesonotum, propodeum, petiole and postpetiole covered with small punctures.

Oligomyrmex yamatonis Terayama

Fig. p 117

Original Reference: Terayama, M. (1996)

Synonym(s): *Oligomyrmex sauteri* Forel (Azuma, 1951; not *O. sauteri*)

Distribution: Honshu, Shikoku, Kyushu, Yaku I., Nansei Is.

Total length around 2 mm in soldiers, around 1 mm in workers. Body color light reddish brown, heads of soldiers blackish. In soldiers: head 1.3 times as long as wide, with parallel sides in frontal view; vertex with a pair of tubercles, posterior margin of head strongly concave; mandibles each with 5 teeth; antennae 9-segmented; eyes small, with 2 or 3 facets, situated on the anterior portion of the head capsule; pronotal and mesonotal dorsa raised in profile; mesopleuron simple, not divided by an oblique furrow; posterolateral margins of propodeum with a thin lamellate flange below the propodeal tooth; subpetiolar process small, forming a blunt triangle; head, mesosoma, petiole and postpetiole covered with punctures; head with many longitudinal rugae. In workers: Head slightly longer than wide in frontal view; mandibles each with 5 teeth; eyes each with only one facet, situated at midlength of head capsule in side view; thin lamellar flanges on posterolateral margins of propodeum; subpetiolar process obscure; head, mesosoma, petiole and postpetiole covered with small, coarse punctures. A relatively common ant.

Pheidologeton diversus (Jerdon)

Fig. p 118

Original Reference: Jerdon, T. C. (1851)

Synonym(s): *Ocodoma diversa* Jerdon (Jerdon, 1851)

Pheidologeton diversus (Jerdon) (Roger, 1863)

Distribution: Nansei Is, Ogasawara Is.; tropical and subtropical Asia.

Total length of workers between 2.5 and 11 mm. Body color yellowish brown to reddish brown in minor workers: reddish brown to blackish brown in majors. In minor workers: head rectangular with weakly convex posterior margin in full face view; mandibles each with 5 teeth; antennal scapes short, not exceeding posterior margin of head; each of the apical two funicular segments long, their combined length longer than the rest of funiculus; promesonotum relatively strongly convex in profile; metanotal groove deeply incised;

dorsum of propodeum convex; propodeal spines long, with acute apices. In major workers: head proportionately large, almost square, with convex posterior margin in frontal view; anterior margin of clypeus straight, with a shallow median notch; mandibles large, triangular, with an acute apical tooth; masticatory margins without distinct teeth; eyes relatively small; ocelli present; antennal scapes 0.5 times as long as head; subpetiolar process present.

P. diversus forms large colonies, often found in the soil or under stones. It regularly forms long foraging columns. There are only two Japanese field records, respectively from the Nansei Islands (Okinawa Island) and the Ogasawara Islands (Chicchi-jima Island). Specimens taken at the U.S. Air force base at Zama City, Kanagawa Prefecture, must have originated from a commercial introduction from SE Asia (Kubota, 1988).

Solenopsis tipuna Forel

Fig. p 118

Original Reference: Forel, A. (1912)

Distribution: Nansei Is; Taiwan.

Total length of workers around 1.5 mm. Body yellow to yellowish brown. Eyes small, each consisting of 2-4 facets. Metanotal groove deeper than in *S. japonica*. Posterodorsal corners of propodeum rounded, not angulate. Petiole with a much more strongly convex ventral margin than that of *S. japonica*.

Polygynous. The nests are found in the soil or under stones.

Solenopsis japonica Wheeler

Fig. p 119

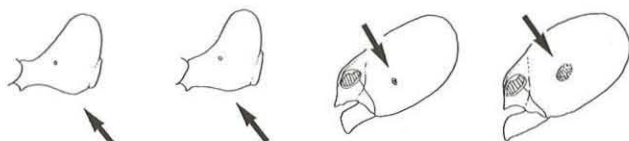
Original Reference: Wheeler, W. M. (1928)

Synonym(s): *Solenopsis fugax* var. *japonica* Wheeler (Wheeler, 1928)

Solenopsis japonica Wheeler (Collingwood, 1976)

Diplorhoptrum fugax var. *japonicum* (Wheeler) (Onoyama, 1980)

Distribution: Hokkaido, Honshu, Shikoku, Tsushima I., Kyushu, Yaku I., Tokara Is; Korea.



S. japonica

S. tipuna

S. japonica

S. geminata

Worker caste weakly dimorphic. Total length of workers around 1.5 mm. Body yellow to yellowish brown. Head rectangular, about 1.35 times as long as wide. Antennal scapes short, not reaching posterior margin of head. Eyes small, each consisting of 2 to 4 facets. Dorsal outline of mesosoma weakly convex; metanotal groove deeply incised dorsally. Propodeum weakly convex; posterodorsal corner forming an obtusely rounded angle. Ventral margin of petiole almost straight, at most very weakly convex. Head, mesosoma, petiole and postpetiole with short, sparse, erect hairs.

All body surfaces smooth and shining.

The nests of this thief ant are connected to those of other ant species by narrow galleries which are used by the *S. japonica* workers to steal food from their hosts.

Solenopsis geminata (Fabricius)

Fig. p 119

Original Reference: Fabricius, J. C. (1804)

Synonym(s): *Atta geminata* Fabricius (Fabricius, 1804)

Solenopsis geminata (Fabricius) (Mayr, 1867)

Distribution: Nansei Is (Okinawa I., Ie I.), Volcano Is (Iwo I.); pantropical and subtropical.

Workers polymorphic, total body length ranging 3 to 8 mm. Body reddish brown, head brown. In major workers: head almost square, posterior margin distinctly convex in full face view; mandibles robust, each with a strongly convex outer margin and 4 blunt teeth on the masticatory margin; mandibular teeth obscure in some individuals; clypeus with a pair of longitudinal carinae; eyes rather small, each with more than 20 facets; anterior ocelli often present; antennal scapes reaching nearly to posterior border of head; antennal club longer than the 3rd to 9th antennal segments combined; legs, mesosoma and gaster with numerous erect hairs. In minor workers: head almost square in full face view; mandibles 4-toothed; antennal scapes reaching posterior margin of head; clypeus with a pair of longitudinal carinae; posterolateral corners of propodeum carinate, the carinae reaching the dorsal surface of the propodeum; subpetiolar process absent.

The distribution of *S. geminata* has been extended to many tropical and sub-tropical areas of the world by human activities. The species is well known as one of the several pestiferous *Solenopsis* "fire ants". It has been found in the Nansei Islands, around the U.S. Army base on Okinawa Island and at the radar site on Ie-jima Island. It was almost certainly introduced to these areas by human commerce (Kubota, 1983; Terayama, 1999). This omnivorous species lives in open land, including barren areas and grassland. It nests in the soil.

Monomorium hiten Terayama

Fig. p 120

Original Reference: Terayama, M. (1996)

Distribution: Yaku I., Nansei Is.

Total length of workers around 1.5 mm. Body color yellow to yellowish brown with a pair of brown spots on the gastral dorsum. Mandibles each with 3 teeth. Eyes each with around 10 facets. Median longitudinal carinae on clypeus obscure. Metanotal groove distinct. Posterodorsal border of propodeum rounded. Ventral outline of petiole roundly convex in profile. Body surfaces smooth and shining, without sculpture.

Similar to *M. intrudens* and *M. triviale*, but identified by the characteristic paired spots on its gaster. Found in open land to woodland margins, nesting under stones.

Monomorium triviale Wheeler

Fig. p 120

Original Reference: Wheeler, W. M. (1906c)

Distribution: Honshu; Korean Peninsula.

Total length of workers around 1.5 mm. Body unicolorous: yellow to yellowish brown. Eyes each with around 10 facets. Mandibles each with 4 teeth. Median paired longitudinal carinae on clypeus obscure. Metanotal groove obscure. Posterodorsal border of propodeum rounded. Ventral outline of petiole roundly convex in profile. Body surfaces smooth and shining, without sculpture.

Apart from coloration, the species is similar to *M. intrudens* and *M. hiten*. It is found in open land and at woodland margins, and is quite rare.

Monomorium pharaonis (Linnaeus)

Fig. p 121

Original Reference: Linnaeus, C. (1758)

Synonym(s): *Formica Pharaonis* Linnaeus (Linnaeus, 1758)

Monomorium pharaonis Mayer (Mayer, 1862)

Distribution: Honshu, Shikoku, Kyushu, Nansei Is, Ogasawara Is; worldwide.

Total length of workers around 2 to 2.5 mm. Body unicolorous: yellow to reddish brown. Eyes each with around 20 facets. Mandibles each with 4 teeth. Paired longitudinal carinae on clypeus distinct. Metanotal groove distinct. Posterodorsal margin of propodeum more or less angulate. No standing hairs on propodeal dorsum. Ventral outline of petiole not strongly convex. Body surfaces from head to postpetiole finely, densely, and distinctively punctate and opaque.

M. pharaonis is essentially world-wide in distribution, and is well known as a household, hospital and store pest capable of nesting within buildings and ships. It inhabits open land or grassland in the Nansei Islands, but there have been no reports of its presence outdoors from Kyushu or more northern areas of Japan.

Monomorium latinode Mayr

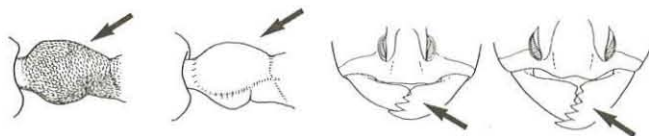
Fig. p 121

Original Reference: Mayr, G. (1872)

Distribution: Nansei Is (Okinawa I.); pantropical and subtropical.

Total length of workers around 3 mm. The largest *Monomorium* species from Japan. Body bicolorous: yellowish to reddish brown from head to postpetiole; the gaster blackish brown. Eyes large, each consisting of around 20 facets. Mandibles each with 5 teeth. Clypeus with paired longitudinal carinae. Metanotal groove shallow dorsally. Posterodorsal margin of propodeum angulate. Ventral outline of petiole more or less roundly convex. Postpetiole 1.4 times as long as broad. Mesopleuron and sides of propodeum with fine longitudinal rugulation; dorsal surface of propodeum with transverse rugae.

Similar to *M. destructor* in size and coloration, but the 5-toothed mandibles and shallow metanotal groove distinguish *M. latinode*.



M. pharaonis *M. intrudens* *M. destructor* *M. latinode*

Monomorium intrudens F. Smith

Fig. p 122

Original Reference: Smith, F. (1874)

Synonym(s): Not *Monomorium floricola* (Jerdon) (Jerdon,)

Monomorium nipponense Wheeler (Wheeler, 1906)

Monomorium nipponense var. *gracilum* Teranishi (Teranishi, 1940)

Monomorium nipponense var. *robustum* Teranishi (Teranishi, 1940)

Monomorium nipponense var. *satoi* Teranishi (Teranishi, 1940)

Distribution: Honshu, Shikoku, Kyushu, Nansei Is; Korean Peninsula.

Total length of workers around 1.5 mm. Body bicolorous: yellow to yellowish brown from head to postpetiole; the gaster brown to blackish brown. Mandibles each with 4 teeth. Eyes each with 10 or more facets. Paired longitudinal carinae of clypeus obscure. Metanotal groove distinct. Posterodorsal border of propodeum rounded; the area of petiolar insertion not carinate. Ventral outline of petiole roundly convex. Body surfaces smooth and shining, without sculpture.

Monomorium sechellense Emery

Fig. p 122

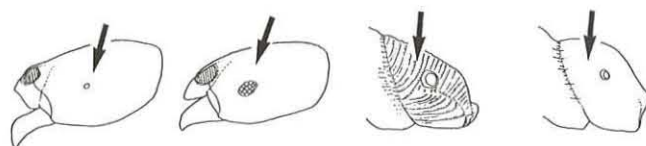
Original Reference: Emery, C. (1894)

Synonym(s): *Monomorium fossulatum* subsp. *sechellense* Emery, 1894a

Monomorium fossulatum Emery, 1895k

Distribution: Nansei Is, Ogasawara Is; Taiwan, SE Asia, Oceania.

Total length of workers around 1.5 mm. Body essentially uniform in color: yellow to yellowish brown. Eyes small, each with only 1 or 2 facets. Mandibles each with 4 teeth. Paired longitudinal carinae on clypeus obscure; median part of clypeus distinctly raised. Metanotal groove distinct. Posterodorsal portion of propodeum angulate. Ventral outline of petiole roundly convex in profile.



M. sechellense *M. intrudens* *M. latinode* *M. intrudens*

Surface of mesopleuron and lateral portions of propodeum with fine punctures; remainder of the body smooth and shining.

Monomorium floricola (Jerdon)

Fig. p 123

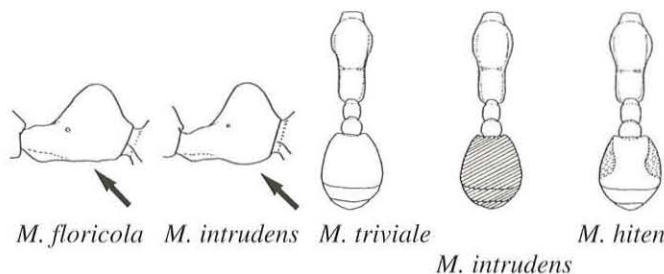
Original Reference: Jerdon, T. C. (1851)

Synonym(s): *Atta floricola* Jerdon, 1851

Monomorium floricola: Emery in Dalla Torre, 1893

Distribution: Nansei Is, Ogasawara Is; pantropical, subtropical.

Total length of workers around 1.5 mm. Body bicolored: head and gaster dark brown; the rest yellowish brown, with the mesosoma variable in hue. Eyes each with around 10 facets. Mandibles each with 4 teeth. Paired longitudinal carinae on clypeus distinct. Promesonotum depressed and elongate. Metanotal groove distinct. Propodeum with a rounded posterodorsal margin in profile. Ventral outline of petiole almost straight in profile. Body surfaces without sculpture, smooth and shining. Found in open land, nesting under bark on trees or in hollow twigs.



Monomorium destructor (Jerdon)

Fig. p 123

Original Reference: Jerdon, T. C. (1851)

Synonym(s): *Atta destructor* Jerdon, 1851

Monomorium destructor: Emery in Dalla Torre, 1893

Distribution: Nansei Is; pantropical, subtropical.

Total length of workers around 3 to 3.5 mm. A relatively large *Monomorium* species, variable in size. Body yellowish brown to reddish brown from head to postpetiole; gaster blackish brown. Mandibles each with 4 teeth, the basalmost sometimes obscure. Eyes large, each with around 20 facets. Median paired carinae of clypeus obscure. Metanotal groove distinct. Propodeum with angulate posterodorsal border; the area of petiolar insertion carinate. Ventral outline of petiole less convex than in other species. Postpetiole 1.1-1.2 times as long as broad. Mesopleuron and sections of lateral surfaces of propodeum with fine puncturation; dorsal surface of propodeum with transverse rugae.

M. destructor is similar to *M. latinode*, but distinguished by the presence of 4 teeth on each mandible (versus 5 in *latinode*), the distinct metanotal groove (shallow and indistinct in *latinode*) and the narrower postpetiole (1.5 times as long as broad in *latinode*). *M. destructor* is a significant pest species, known to gnaw holes in fabrics, some plastics and rubber goods, to remove rubber insulation from electrical or telephone wires, and to damage polyethylene

cable. It is distributed throughout tropical and subtropical regions of the world as a commercially-dispersed tramp species.

Monomorium chinense Santschi

Fig. p 124

Original Reference: Santschi, F. (1925)

Synonym(s): *Monomorium minutum* var. *chinensis* Santschi, 1925

Monomorium chinense: Bolton, 1987

Distribution: Honshu, Shikoku, Kyushu, Nansei Is, Ogasawara Is; Mainland China, Taiwan.

Total length of workers around 1.5 mm. Body essentially uniform in color: brown to blackish brown. Mandibles each with 4 teeth. Eyes each with 10 or more facets. Median portion of clypeus with a pair of longitudinal carinae. Metanotal groove distinct. Propodeum with rounded posterodorsal border. Ventral outline of petiole roundly convex. Body surfaces without sculpture, smooth and shining. Found in woodland margins and grassland, nesting in the soil near the bases of plants.

Strongylognathus koreanus Pisarski

Fig. p 124

Original Reference: Pisarski, B. (1966)

Distribution: Honshu (Masutomi, Yamanashi Pref.; Washu-zan, Hiroshima Pref.); Korean Peninsula.

Total length of workers around 3 mm. Body yellowish brown. Head approximately square, 1.1 times as long as wide; posterior margin almost straight, very weakly convex medially in full face view. Anterior margin of clypeus broadly convex. Antennal scapes short, 0.7 times as long as head length. Mesonotal dorsum almost straight in profile; dorsum of propodeum gently convex. Posterodorsal corner of propodeum with a pair of obtuse spines. Petiole triangular, with a short peduncle. Subpetiolar process low, anteroventrally angled. Viewed from above the postpetiole 1.45 times as wide as long and wider than the petiole. Front of head and areas surrounding the eyes with longitudinal rugae; head elsewhere smooth and shining. Dorsal surface of head, mesosoma, petiole, postpetiole, and gaster with scattered stout hairs. Female around 7 mm long; color brown; mandibles remarkably sickle-shaped, as in the workers. This species was found from nests of *Tetramorium tsushimae* but is very rare.

Tetramorium tonganum Mayr

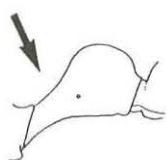
Fig. p 125

Original Reference: Mayr, G. (1870)

Distribution: Ogasawara Is; SE Asia, New Guinea, Oceania.

Total length of workers around 2.5 mm. Body color yellow to yellowish brown from head to postpetiole; gaster dark brown. Antennae 12-segmented. Anterior margin of clypeus without median notch. Propodeal spines dentiform, directed upward. Petiole

with short peduncle and rounded node. Sculpture rugulose.



T. tonganum



T. simillimum

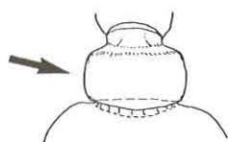
Tetramorium smithi Mayr

Fig. p 125

Original Reference: Mayr, G. (1879)

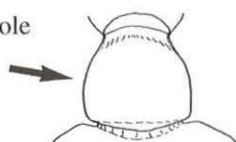
Distribution: Nansei Is; SE Asia, India, Sri Lanka.

Total length of workers around 2 mm. Body color yellowish to reddish brown from head to postpetiole; gaster darker. Antennae 11-segmented. Anterior margin of clypeus without median notch. Lateral margin of mesosoma sinuate; mesonotal region expanded laterally in dorsal view. Propodeal spines acute, directed posteriorly. Sculpture somewhat coarse, longitudinally rugulose.

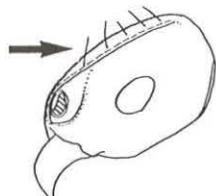


T. smithi

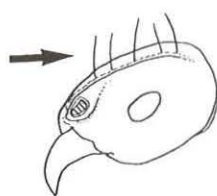
Postpetiole



T. kraepelini



T. bicarinatum



T. nipponense

Tetramorium simillimum (F. Smith)

Fig. p 126

Original Reference: Smith, F. (1851)

Synonym(s): *Myrmica simillima* F. Smith (F. Smith, 1851)

Tetramorium simillimum Mayr (Mayr, 1861)

Distribution: Nansei Is, Ogasawara Is; Pantropical and subtropical.

Total length of workers around 2.5 mm. Body color yellowish to reddish brown from head to postpetiole; gaster dark brown. Antennae 12-segmented. Anterior margin of clypeus without median notch. Lateral margin of mesosoma sinuate, mesonotal region expanded laterally in dorsal view. Propodeal spines dentiform, directed upward. Body hairs short, stout and blunt, shorter than their interspaces. Sculpture somewhat fine, longitudinally rugulose; the space between the rugulae filled with a fine, dense reticulate-puncturation or granulation.

A common pantropical species, distributed by human commerce and found in southern parts of Japan.

Tetramorium nipponense Wheeler

Fig. p 126

Original Reference: Wheeler, W. M. (1928)

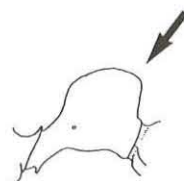
Synonym(s): *Tetramorium guineense nipponense* Wheeler (Wheeler, 1928)

Tetramorium nipponense Bolton (Bolton, 1977)

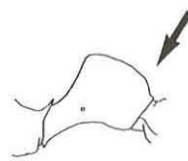
Distribution: Honshu, Shikoku, Kyushu, Tsushima I., Yaku I., Nansei Is, Ogasawara Is; Mainland China, Taiwan, Viet Nam, Bhutan.

Total length of workers around 3 mm. Body color uniformly yellow to yellowish brown. Antennae 12-segmented; scapes almost reaching posterior corners of head. Anterior margin of clypeus with median notch. Propodeal spines long and acute, curved upward. Body surface from head to postpetiole covered with irregular reticulate-rugosity; longitudinal rugae prominent on dorsum of head.

Found in woodland, ranging to its margins. Nests are located in decayed parts of tree trunks, stems of small bamboos, under bark, or under stones. Habitat preferences are for less moist sites than in *T. bicarinatum*.



T. nipponense



T. lanuginosum

Tetramorium lanuginosum Mayr

Fig. p 127

Original Reference: Mayr, G. (1870)

Synonym(s): *Tetramorium obesum striatidens* Emery (Emery, 1889)

Triglyphothrix lanuginosa Emery (Emery, 1891)

Triglyphothrix striatidens Forel (Forel, 1902)

Tetramorium lanuginosum Bolton (Bolton, 1985)

Distribution: Nansei Is; SE Asia.

Total length of workers around 2.5 mm. Body color yellowish brown to reddish brown. Antennae 12-segmented. Anterior margin of clypeus concave. Dorsal outline of mesosoma roundly convex in profile. Petiolar node low, without angulate corners. Head to postpetiole covered with reticulation. Body hairs abundant, some of them bifid or trifid.

T. lanuginosum was formerly assigned to the genus *Triglyphothrix* Forel, which was thought to be distinguished from *Tetramorium* by the presence of branched (bifid or trifid) body hairs. This character has proved insufficient to sustain the separate status of *Triglyphothrix*, which was synonymized under

Tetramorium by Bolton (1985). In Japan *T. lanuginosum* is found in somewhat open land, and nests under stones or logs.

Tetramorium kraepelini Forel

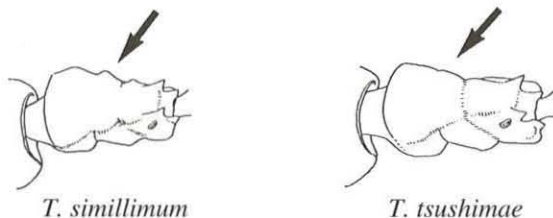
Fig. p 127

Original Reference: Forel, A. (1905)

Distribution: Kyushu (southern part), Nansei Is; Mainland China, SE Asia.

Total length of workers around 2 mm. Body color yellow to yellowish brown, gaster sometimes darker. Antennae 12-segmented; scapes short, their apices far from reaching the posterior corners of head. Anterior margin of clypeus without median notch. Lateral margin of mesosoma not sinuate in dorsal view. Propodeal spines long, spiniform, curved upward. Petiolar node with rounded posterior angle. Head and mesosoma covered with irregular reticulations.

Bolton (1977) described a taxon which he named *T. tanakai* from Ishigaki I., Ryukyus, Japan. He considered it to be "closely related" to *T. kraepelini*. The cited characters distinguishing *T. tanakai* were the color pattern (with head and gaster blackish-brown) and the shape of the petiolar node (dorsal length greater than height of tergal portion in profile). We do not consider these differences sufficient to define a species separate from *T. kraepelini*, and thus here suspend recognition of *T. tanakai* as a distinct species. *T. kraepelini* is found in grassland and woodland margins; it nests under stones.



Tetramorium tsushimae Emery

Fig. p 128

Original Reference: Emery, C. (1925c)

Synonym(s): *Tetramorium caespitum semileve* var. *jacoti* Wheeler, 1923 [unavailable]

Tetramorium caespitum subsp. *tsushimae* Emery, 1925c

Tetramorium caespitum subsp. *jacoti* Wheeler, 1927d

Tetramorium caespitum subsp. *jacoti* var. *annectens* Wheeler, 1927d [unavailable]

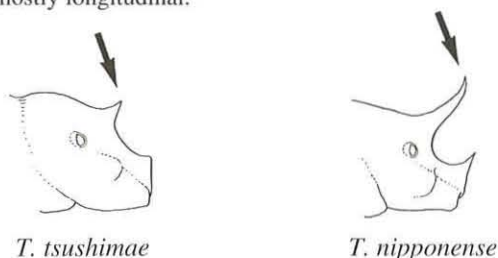
Tetramorium annectens Pisarski, 1969a

Tetramorium tsushimae: Bolton, 1995

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima I.; Holarctic.

Total length of workers around 2.5 mm. Body color brown to dark brown. Antennae 12-segmented. Anterior margin of clypeus slight-

ly convex, without median notch. Frontal carina short, obscure behind the level of the eyes. Propodeal spines small, dentiform. Petiolar peduncle short and broad. Dorsum of head covered with fine longitudinal rugulation. Sculpture on mesosoma more irregular, but mostly longitudinal.



Tetramorium bicarinatum (Nylander)

Fig. p 128

Original Reference: Nylander, W. (1846)

Synonym(s): *Formica bicarinata* Nylander (Nylander, 1846)

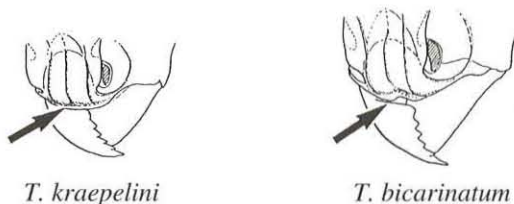
Tetramorium guineense (Fabricius, 1793) sensu Mayr (Mayr, 1862)

Tetramorium bicarinatum Bolton (Bolton, 1977)

Distribution: Honshu, Shikoku, Kyushu, Yaku I., Nansei Is, Ogasawara Is; Pan-tropical/subtropical (except for the Afrotropical region).

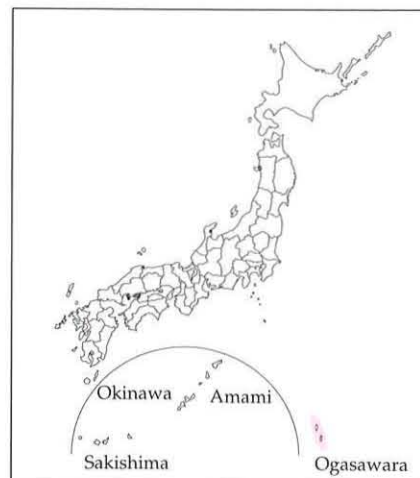
Total length of workers around 3 mm. Body bicolorous: yellow to yellowish brown from head to postpetiole; gaster dark brown. Anterior margin of clypeus with a median notch. Antennae 12-segmented; scapes almost reaching posterior corners of head. Propodeal spines long and acute, curved upward. Body surfaces from head to postpetiole covered with irregular reticulate-rugosity; longitudinal rugae prominent on dorsum of head.

Similar to *T. nipponense*, but distinguished by its shorter body hairs, dark-colored gaster, contrasting with the light yellowish remainder of the body, and higher posterior margin of the petiole in profile. *T. bicarinatum* is found in grassland and areas of bare coastal soil. It prefers more open and dryer situations than *T. nipponense*. Nests are found under stones and logs. Widely distributed to many parts of the world by human commerce.



MYRMICINAE

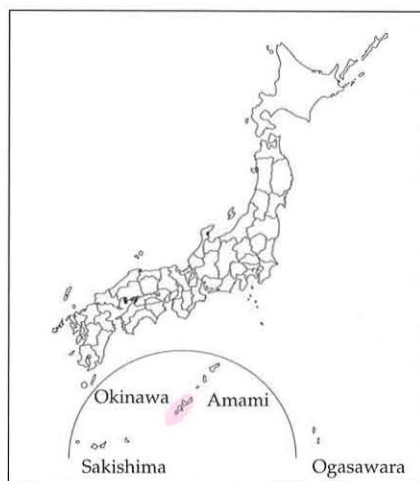
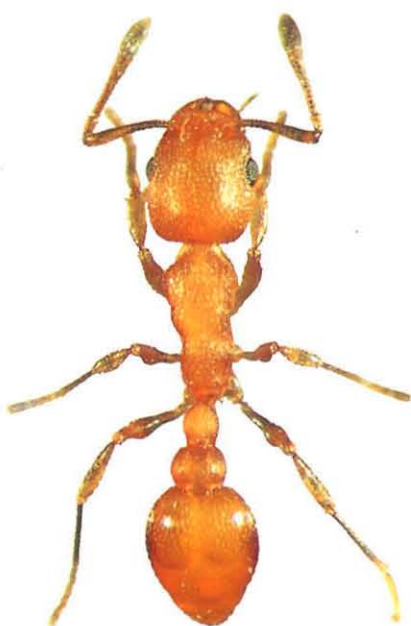
Cardiocondyla sp. 6



Workers 1.5 mm. Head to postpetiole, legs, antennae yellowish brown; gaster black. Head rectangular; occiput straight. Eyes large, convex. Scapes failing occiput. Mandibles 5-toothed; apical tooth largest. Promesonotum depressed, profile straight; pronotal humeri angulate. Metanotal groove indistinct. Propodeal profile convex; spines longer than wide. Petiole: relatively long peduncle, high node. Postpetiole convex anteriorly. Head, mesosoma, petiole, postpetiole shagreened; gaster smooth.

MYRMICINAE

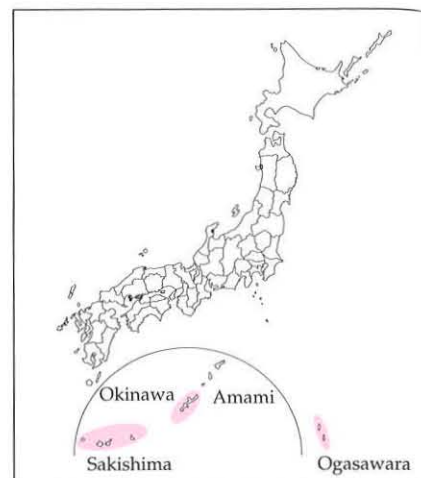
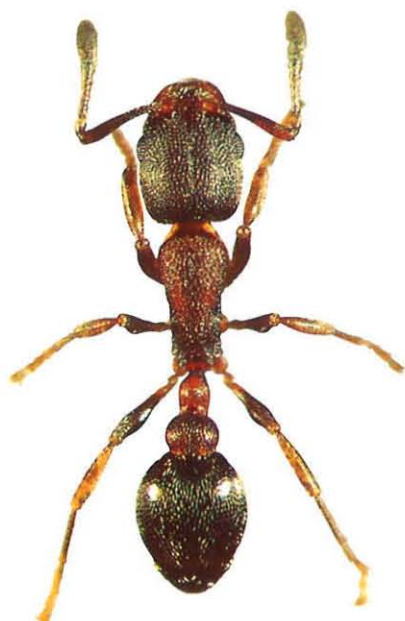
Cardiocondyla yamauchii Terayama



Workers 1.5-2 mm. Yellow, a pair of brownish gastral spots. Head rectangular; occiput concave medially. Scapes failing occiput. Promesonotum depressed, profile straight; humeri angulate. Metanotal groove distinct. Propodeal profile roundly convex, highest anteriorly; propodeal spines longer than wide. Distinguished from *C. wroughtonii*, by coloration. Males: alates and ergatoids (with falcate mandibles). Nests: plant cavities, grass stems, grassland, forest margins.

MYRMICINAE

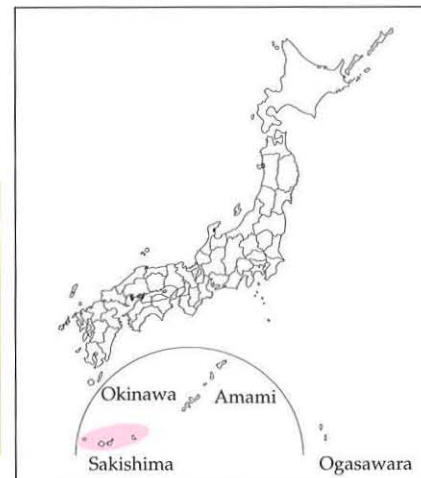
Cardiocondyla tsukuyomi Terayama



Workers 1.5 mm. Blackish brown. Head rectangular, 1.2x longer than wide; occiput straight. Clypeal border rounded. Eyes feebly convex. Mandibles 5-toothed. Scapes failing occiput. Promesonotal profile straight. Metanotal groove absent. Propodeal profile broadly rounded; teeth triangular. Petiolar peduncle short. Head, mesosoma, petiole, postpetiole shagreened; gaster smooth. Distinguished from *C. nuda* by propodeal teeth, shorter petiolar peduncle. Males: alates and ergatoids.

MYRMICINAE

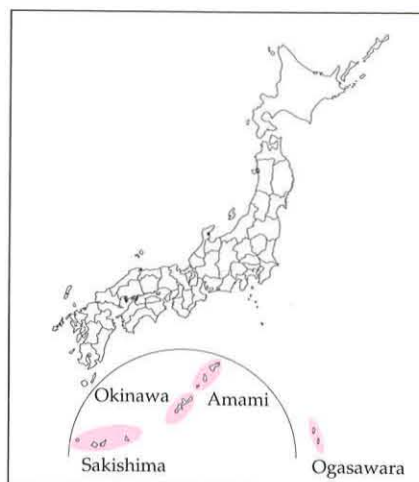
Cardiocondyla kagutuchi Terayama



Workers 2 mm. Blackish brown-black. Similar to *C. nuda* (morphological descriptions almost identical) but petiolar node generally narrower anterodorsally (sometimes undependable). *C. kagutuchi* has 27 chromosomes, *C. nuda* 28. Male caste systems differ: *kagutuchi* is dimorphic, with both alate and ergatoid males, *nuda* is known only to have ergatoid males.

MYRMICINAE

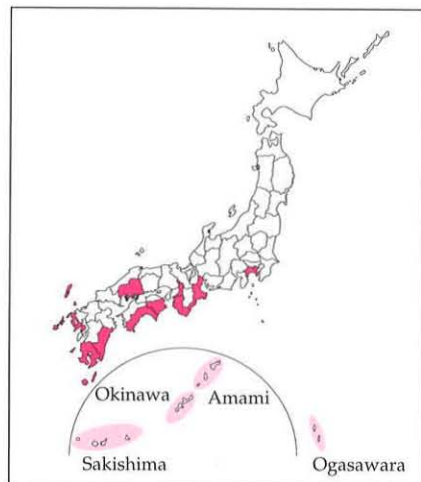
Cardiocondyla wroughtonii (Forel)



Workers 1.5-2 mm. Head, mesosoma, petiole, postpetiole yellow; gaster brown. Head rectangular; occiput concave medially. Eyes large, convex. Scapes failing occiput. Mandibles 5-toothed; apical largest. Promesonotal profile straight; humeri angulate. Metanotal groove distinct. Propodeum: longer than wide; profile roundly convex. Petiole: long peduncle, high node. Postpetiole anteriorly concave. Head, mesosoma, petiole, postpetiole shagreened; gaster smooth. Males: alates and ergatoids.

MYRMICINAE

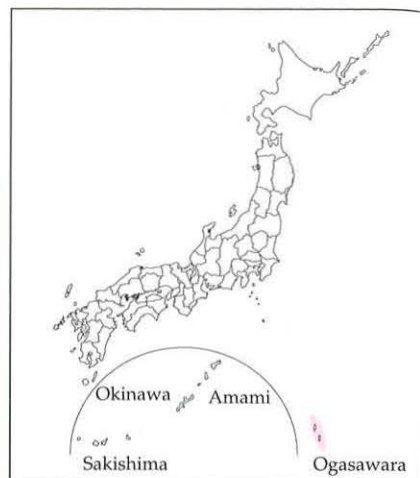
Cardiocondyla nuda (Mayr)



Workers 2 mm. Blackish brown-black; legs, antennae, mandibles brown. Head rectangular, 1.15x longer than wide; occiput convex. Mandibles 5-toothed. Scapes almost reaching occiput. Metanotal groove shallow. Propodeal spines weak, right-angular. Petiole: peduncle long, node inverted U-shaped; subpetiolar process small, spinose. Postpetiole lower than petiole, 1.25x longer than wide. Head, mesosoma shagreened; node, postpetiole, gaster smooth. Males all ergatoid, three variants.

MYRMICINAE

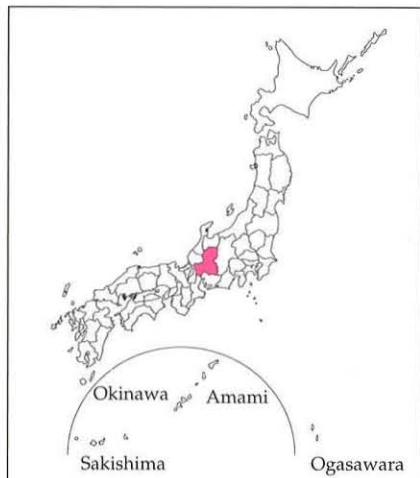
Leptothorax santra Terayama & Onoyama



Workers 2.5 mm. Yellowish brown; head darker. Scapes exceeding occiput. Dorsal mesonotal outline convex. Metanotal groove weakly incised. Propodeal spines: acute, relatively short; longer than wide, bluntly angled, apices downcurved. Petiolar peduncle relatively short, node an inverted U-shape, lateral margins converging dorsally. Sides of mesonotum, propodeum predominantly longitudinally rugulose. Rare.

MYRMICINAE

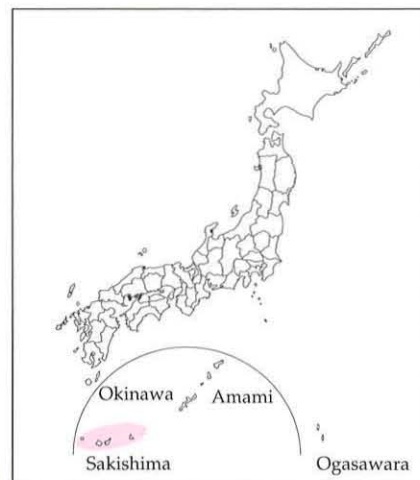
Leptothorax kinomurai Terayama & Onoyama



Likely a workerless social parasite. Four series from *L. makora* nests are all ergatoid queens: ca. 3 mm. head, mesosoma, petiole, postpetiole, legs yellow; gaster brown. Scapes failing occiput. Ocelli distinct. promesonotal profile convex. Metanotal groove not incised. Propodeal spines: long, acute, downcurved, bases broad. Petiole short, high, node an inverted U-shape. Postpetiole high, dorsal profile convex. Gaster angulate anterolaterally.

MYRMICINAE

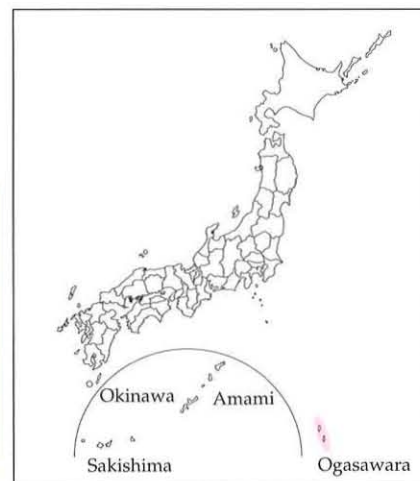
Leptothorax basara Terayama & Onoyama



Workers 2.5 mm. Yellow. Scapes reaching occiput. Metanotal groove not incised. Propodeal profile straight; spines long, thin. Petiole: peduncle relatively long; node an inverted U-shape; anterior margin steeper than posterior. Distinguished from *L. indra* by absence of rugae on mesosomal dorsum, much steeper anterior slope of petiolar node.

MYRMICINAE

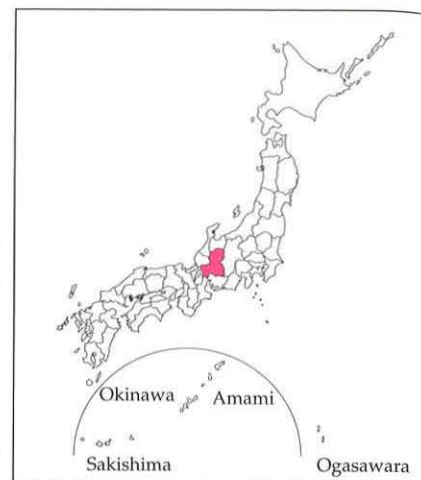
Leptothorax haira Terayama & Onoyama



Workers 2 mm. Head, gaster brownish, remainder yellow. Scapes reaching occiput. Mesosomal dorsum convex; metanotal groove not indented. Propodeal spines relatively long, length ca. 2x distance between their bases. Petiolar peduncle short; node low, anterior margin straight. Subpetiolar process relatively large, triangular.

MYRMICINAE

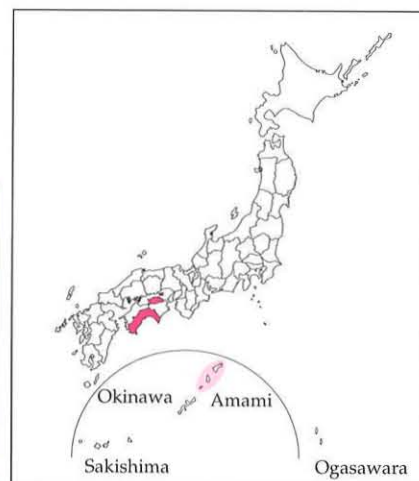
Leptothorax bikara Terayama & Onoyama



Workers 2 mm. Black-blackish brown. Scapes failing occiput. Mesosomal profile straight. Propodeal disc flat. Metanotal groove weak. Propodeal spines acute, narrow, longer than wide. Petiole: peduncle short; dorsal, ventral margins parallel; node inverted U-shaped; dorsum transversely straight, sides parallel, dorsolateral corners angulate. Postpetiole dorsally trapezoidal. Distinguished from *L. spinosior*, *L. makora* by mesosomal profile, peduncular structure, transverse postpetiolar dorsum.

MYRMICINAE

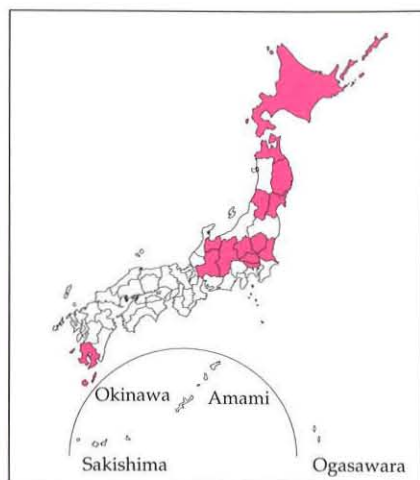
Leptothorax antera Terayama & Onoyama



Workers 3 mm. Black-blackish brown. Scapes long, exceeding occiput. Mesonotal profile straight. Metanotal groove not incised. Propodeal spines acute, longer than basal width, down-curved. Petiolar peduncle longest among Japanese *Leptothorax* species. Petiolar node an inverted U-shape, but posterior margin much more steeply sloping than anterior margin.

MYRMICINAE

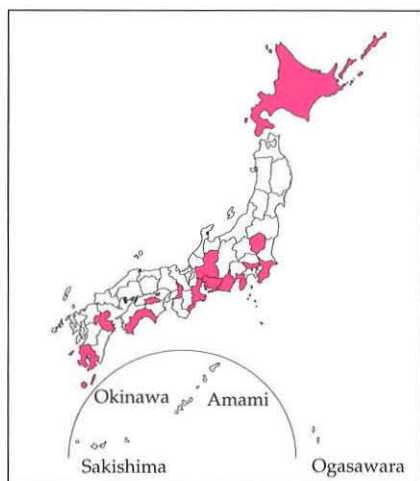
Leptothorax kubira Terayama & Onoyama



Workers 2.5-3 mm. Reddish brown-brown; head, gaster sometimes darker than mesosoma, grading brown-blackish brown; legs yellow. Scapes long, reaching occiput. Metanotal groove usually distinct; sometimes obscure. Propodeum: dorsum straight; spines narrowly triangular, longer than distance separating them. Petiolar node triangular, subpetiolar process small. Inhabits mountainous regions. There are several variant forms.

MYRMICINAE

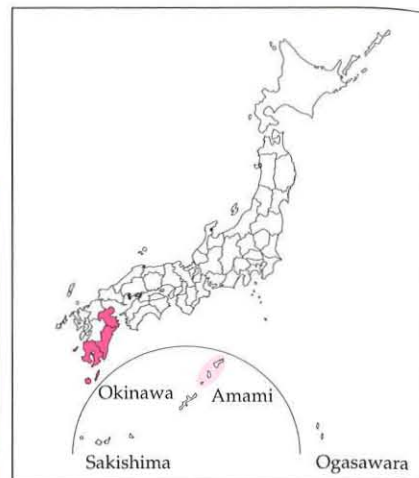
Leptothorax makora Terayama & Onoyama



Workers 2-2.5 mm. Black-blackish brown. Scapes reaching occiput. Mesosomal profile convex. Metanotal groove distinctly incised. Propodeal spines relatively long, longer than their basal width. Petiolar node high, an inverted U-shape. Distinguished from *L. spinosior* by inverted U-shaped node, (versus triangular); from *L. anira* by convex mesosomal profile. Nests: dead twigs on trees, forests, forest margins.

MYRMICINAE

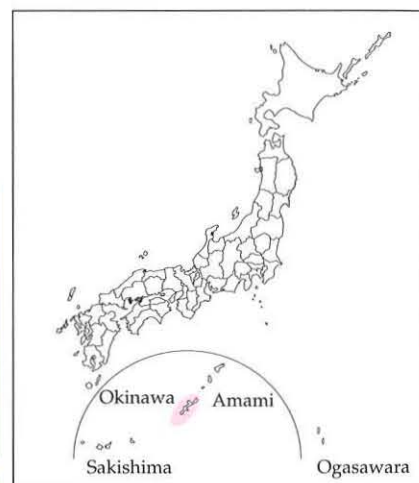
Leptothorax anira Terayama & Onoyama



Workers 2.5-3 mm. Black-blackish brown. Scares reaching occiput. Dorsal mesonotal profile straight. Metanotal groove weak. Propodeal spines acute, narrow, shorter than *L. spinosior*; each 2.5-3 times as long as its basal width. Petiolar node an inverted U-shape. Distinguished from *L. spinosior* and *L. makora*, by straight dorsal mesosomal profile.

MYRMICINAE

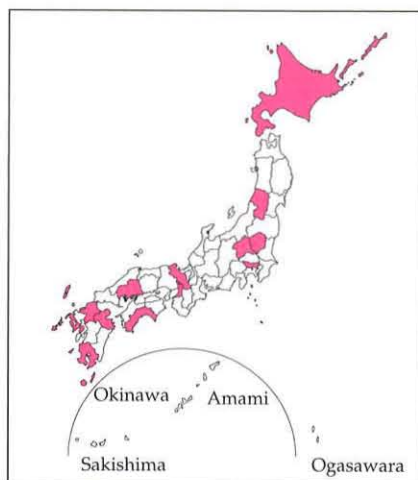
Leptothorax indra Terayama & Onoyama



Workers 3 mm. Yellow. Scares reaching occiput. Metanotal groove usually distinct, sometimes obscure to absent. Propodeum: dorsum flat; spines acute, narrow, downcurved, longer than wide. Petiole: peduncle long, node an inverted U shape. Subpetiolar process triangular. Head, mesosomal dorsum: numerous distinct rugae. Nests: dead twigs on trees.

MYRMICINAE

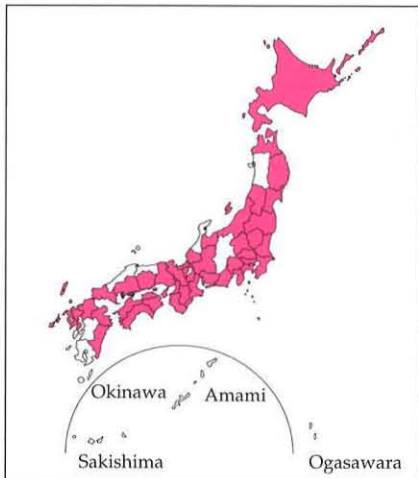
Leptothorax koreanus Teranishi



Workers 2-2.5 mm. Head, gaster black, mesosoma yellowish brown-blackish brown. Antennae 11-segmented; Scapes failing occiput. Pronotal shoulders distinctly angled dorsally. Distinguished from Japanese congeners by distinctly angulate pronotal humeri. Collected in open situations, seashore, parks, shrine sites. Rare.

MYRMICINAE

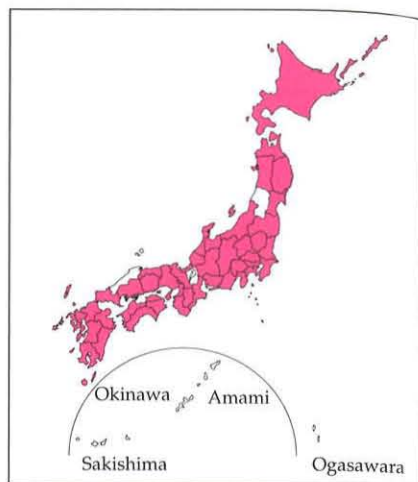
Leptothorax spinosior Forel



Workers 2 mm. Black-blackish brown. Scapes almost reaching occiput. Mesosomal profile evenly convex. Metanotal groove incised. Propodeal spines long, acute, narrow; downcurved. Petiolar node: triangular in profile, posterior margin weakly convex or sometimes straight. Nests: soil, dry open areas. Nuptial flights: July.

MYRMICINAE

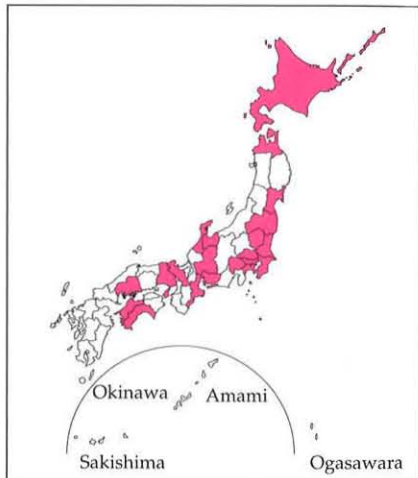
Leptothorax congruus F. Smith



Workers 2.5-3 mm. Black-blackish brown. Scares failing occiput. Mesosomal profile straight. Propodeum: short, triangular spines of variable size. Petiolar node triangular, dorsum angulate in profile. Arboreal. Nests: dead twigs on trees. Nuptial flights: mid July.

MYRMICINAE

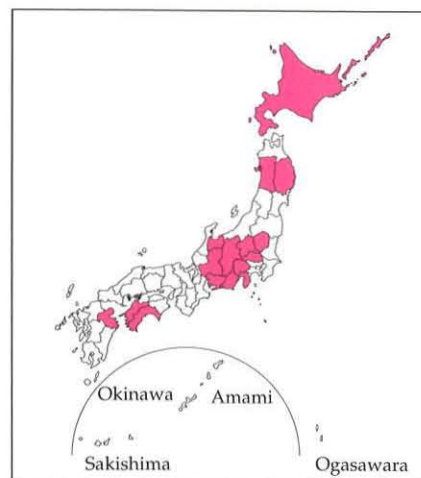
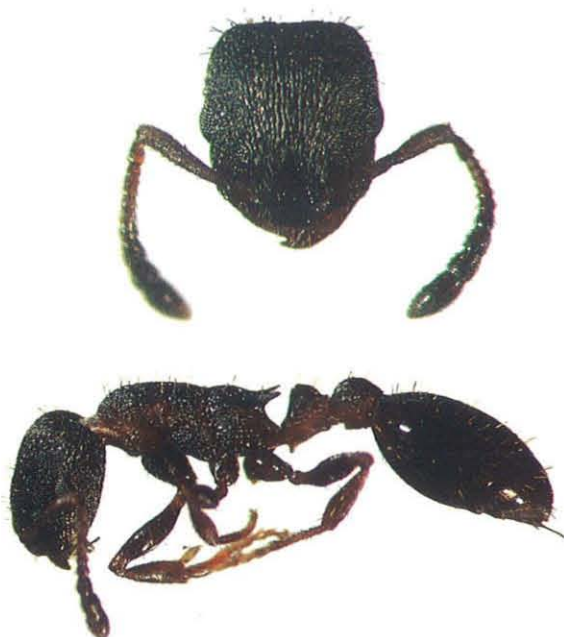
Leptothorax arimensis Azuma



Workers 2 mm. Head brown; remainder yellow-yellowish brown. Scares exceeding occiput. Mesosomal profile simply convex, without metanotal interruption (propodeal dorsum straight in some individuals). Metanotal groove not incised. Propodeal teeth relatively short, longer than wide. Petiolar node: triangular, anterior margin straight. Subpetiolar process small to obscure. Nests: soil, dead twigs, lowlands, mountains to ca. 1000 m. Rare.

MYRMICINAE

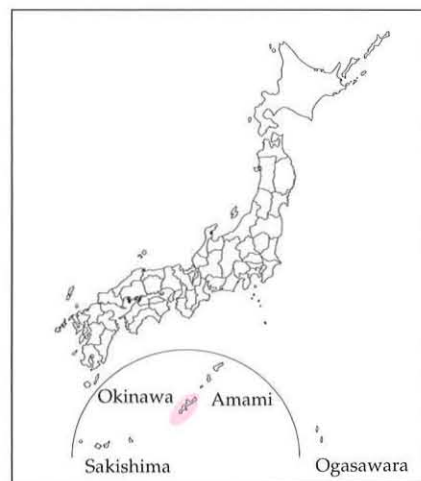
Leptothorax acervorum (Fabricius)



Workers 3-3.5 mm. Head, gaster black; mesosoma, petiole, postpetiole reddish brown, dorsa blackish brown; legs brown. Antennae 11-segmented; Scapes failing occiput. Pro-, mesonotal profile depressed. Propodeum: dorsum convex, spines longer than wide, tips acute. Petiolar node high, triangular; anterior margin sloping steeply forwards; peduncle obscure. Both monogynous and polygynous colonies known.

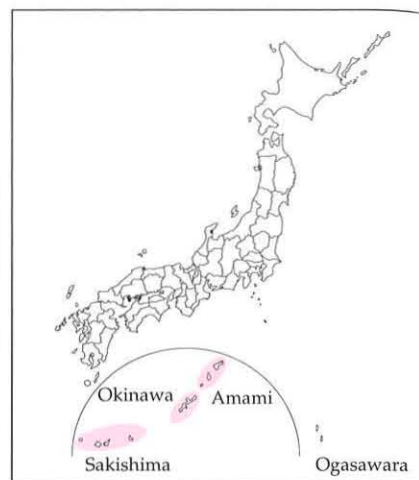
MYRMICINAE

Pheidole bugi Wheeler



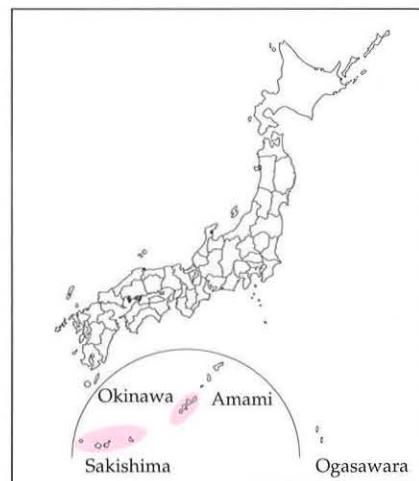
Strongly dimorphic. Soldier (illustrated) 2.5 mm (workers 1.5 mm). Soldiers: yellowish brown; mandibles, clypeus, gaster darker. Cephalic dorsum concave posteriorly; gular dentition: paired lateral processes, three median projections; pronotum, mesonotum a single convexity; propodeal spines pointed, bases broad; postpetiole shorter than petiole. Workers: occiput concave.

MYRMICINAE

Pheidole susanowo Onoyama & Terayama

Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 2 mm). Blackish-brown. Soldiers: gular dentition: 3 distinct median projections; head ca. as long as wide; mesonotal area not separately raised from pronotum; mesosoma, petiole, postpetiole finely punctate. Workers: occiput weakly concave, no occipital carina; gular dentition undeveloped; median longitudinal carina on clypeus; otherwise as for soldier. Rare.

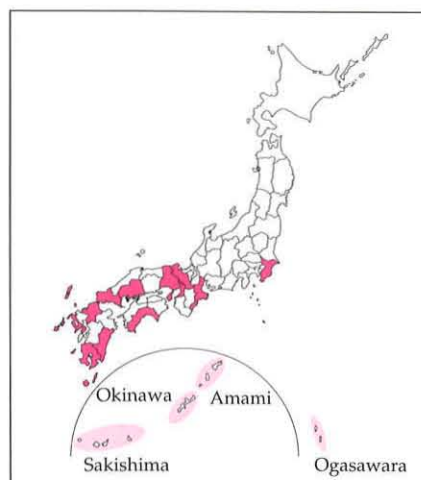
MYRMICINAE

Pheidole ryukyuensis Ogata

Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 2 mm). Reddish-brown. Soldiers: gular dentition: 3 median projections; head elongate, ca. 1.2x longer than wide; mesonotal area not separately raised from pronotum. Workers: occiput flat, posterior margin concave, no occipital carina; gular dentition undeveloped; median longitudinal carina on clypeus; pronotum laterally smooth, shining; remaining features as for soldier.

MYRMICINAE

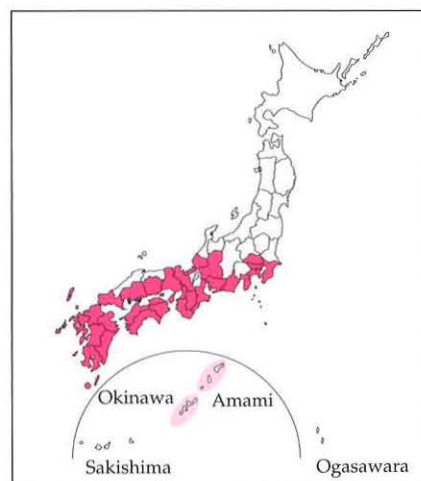
Pheidole pieli Santschi



Strongly dimorphic. Soldier (illustrated) 3 mm, <1.04 mm (workers 1.5 mm, head width <0.45 mm). Yellow-yellowish-brown. Soldiers: gular dentition: 3 median projections; head ca. as long as wide; promesonotum a single convexity. Workers: occiput flat, posterior margin concave, no occipital carina; gular dentition undeveloped; clypeal carina lacking; pronotum laterally smooth, shining; remainder as in soldier.

MYRMICINAE

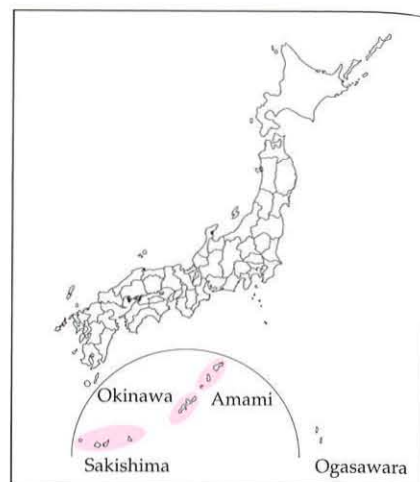
Pheidole noda F. Smith



Strongly dimorphic. Soldier (illustrated) 4.5 mm (workers 3 mm). Head, gaster blackish brown, remainder reddish brown. Soldiers: gular dentition: paired lateral projections, obscure median projections; postpetiole larger than petiole. Workers: occiput rounded, occipital carina more or less distinct. Easily distinguished by enlarged postpetiole. Open land, woodland, woodland margins. Colonies are large, up to 3,000 individuals.

MYRMICINAE

Pheidole megacephala (Fabricius)

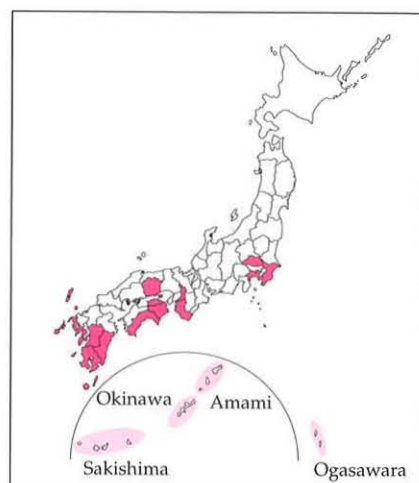
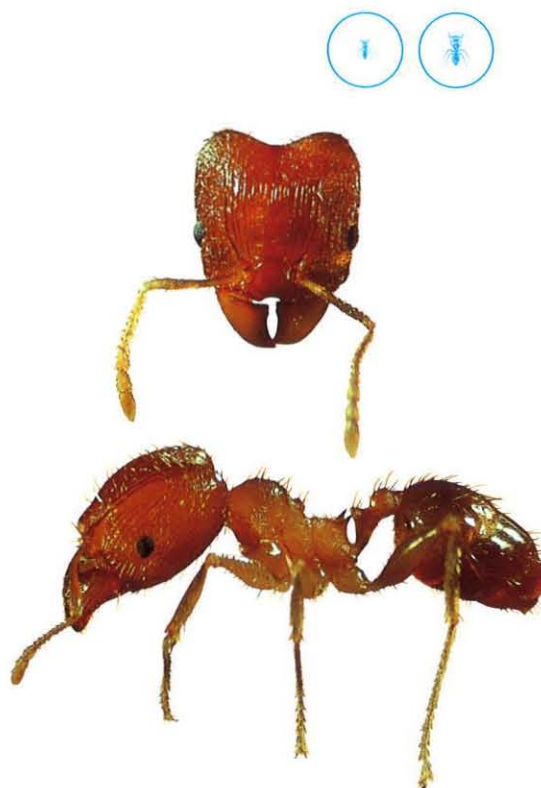


Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 2 mm). Head, gaster dark brown, elsewhere brown. Soldiers: gular dentition: paired lateral projections, no median projections; occiput smooth, shining. Workers: occiput rounded, occipital carina more or less distinct; gular dentition undeveloped; remainder as in soldier.

Distinguished by sculpturing of head in soldiers and shape of promesonotum in soldiers and workers.

MYRMICINAE

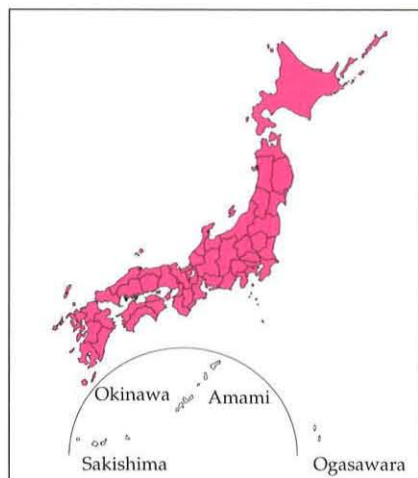
Pheidole indica Mayr



Strongly dimorphic. Soldier (illustrated) 4 mm (workers 2.5 mm). Reddish brown, head, gaster darker. Soldiers: 3 low median gular projections; cephalic dorsum sculptured; eye diameter > length of 10th antennomere; mesonotum raised separately from pronotum; propodeal spines directed upwards; postpetiole shorter than petiole. Workers: occiput: rounded, unsculptured, with occipital carina; gular dentition undeveloped; otherwise as for soldier.

MYRMICINAE

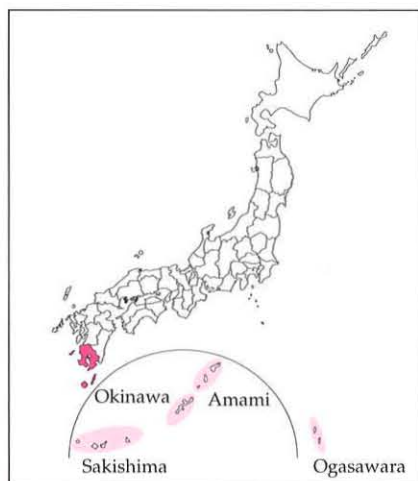
Pheidole fervida F. Smith



Strongly dimorphic. Soldier (illustrated) 3.5 mm (workers 2.5 mm). Yellowish brown-reddish brown, gaster sometimes darker. Soldiers: 3 median gular projections; Scapes reaching 2/3 length of head; pronotum, mesonotum usually separately raised, mesonotal convexity variable. Workers: occiput flat, sculptured; Scapes exceeding occipital corners; mesonotum more or less raised; otherwise as for soldier.

MYRMICINAE

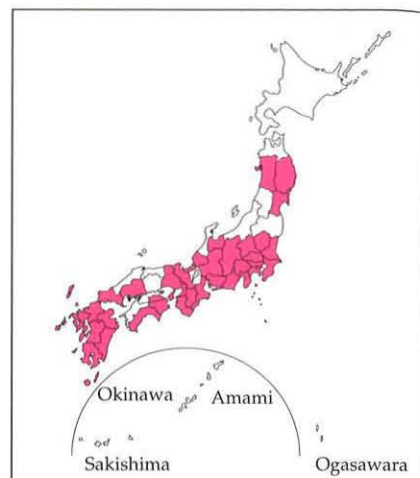
Pheidole fervens F. Smith



Strongly dimorphic. Soldier (illustrated) 4.5 mm (workers 3 mm). Light reddish brown, head, gaster darker, mesosoma lighter. Soldiers: head reticulately sculptured; eye ca 0.18 mm; paired lateral + 3 indistinct median gular processes; pronotum, mesonotum separately raised; propodeal spines slender, curved posteriorly; postpetiole shorter than petiole. Workers: occiput rounded, smooth, carinate; eye 0.26-0.30 mm; gular dentition undeveloped; otherwise as soldier.

MYRMICINAE

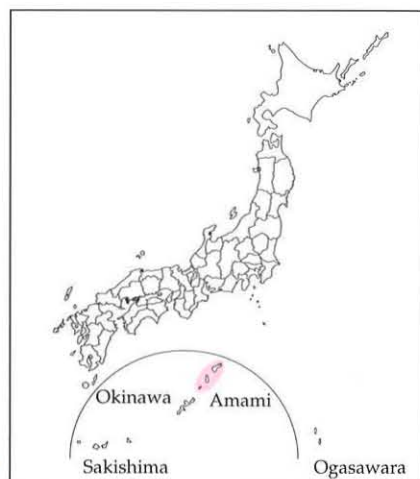
Messor aciculatus (F. Smith)



Workers 4-5 mm. Black. Head longer than wide. Scares surpassing occiput. Ventral cephalic hairs not relatively long. Metanotal groove deep, distinct. Dorsal and declivitous propodeal faces straight, junction rounded, ca. 120 degrees, aspinose. Petiolar node nearly triangular in lateral view; postpetiole rounded. Middle, hind leg tibial spurs simple. Mandibles to postpetiole rugose; gaster smooth, shining. Yellowish-white setae generally abundant.

MYRMICINAE

Aphaenogaster minutula Watanabe & Yamane



Workers 3.5-5 mm. Yellowish brown, head (except mandibles), mesosoma darker. Antennal club pale. Distinguished from relatives *A. concolor*, *A. luteipes*, *A. kumejimana* by smaller size, 4-segmented maxillary palpi (versus 5-segmented), and chromosome number $2n=28$. Nests: soil, with distinctive surrounding wood chip pile, open sites in forests, forest edges.

Cardiocondyla sp. 6

Fig. p 137

Distribution: Volcano Islands (Iwo-jima island).

Total length of workers around 1.5 mm. Bicolored: head, mesosoma, petiole and postpetiole yellowish brown; gaster black; legs yellowish brown. Antennae yellowish brown except for the club, which is dark brown. Head rectangular; occipital border almost straight. Eyes relatively large and convex. Scapes not reaching occipital border of head. Mandibles each with 5 teeth; apical tooth largest, the others gradually smaller. Promesonotal area depressed, almost straight in profile; pronotal humeri slightly angulate in dorsal view. Metanotal groove indistinct. Dorsal outline of propodeum weakly convex in profile; propodeal spines longer than their basal width. Petiole with a relatively long peduncle and high node. Anterior margin of postpetiole convex in dorsal view. Head, mesosoma, petiole and postpetiole shagreened; gaster smooth.

Known only from Iwo-jima island.

Cardiocondyla yamauchii Terayama

Fig. p 137

Original Reference: Terayama, M., (1999)

Distribution: Okinawa I.

Total length of workers around 1.5 - 2 mm. Body yellow, essentially uniformly colored, except for a pair of brownish spots on the gaster. Head rectangular; occipital border almost straight, but slightly concave in the middle. Scapes not reaching occipital border of head. Promesonotal area depressed, almost straight in profile; pronotal humeri slightly angulate in dorsal view. Metanotal groove distinct. Dorsal outline of propodeum roundly convex in profile, highest at anterior third; propodeal spines longer than their basal width.

This species resembles *C. wroughtonii*, but the differences in coloration between them are consistent. The males are dimorphic; alate and ergatoid. The latter have falcate mandibles like those of *C. wroughtonii*. Nests are found in plant cavities, like grass stems, in open areas, grassland and forest margins. To date, the species is known only from the northern part of Okinawa Island.

Cardiocondyla tsukuyomi Terayama

Fig. p 138

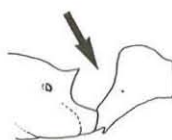
Original Reference: Terayama, M., (1999)

Distribution: Nansei Is, Daito Is, Senkaku Is, Ogasawara Is.

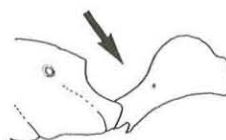
Total length of workers around 1.5 mm. Body color blackish brown. Head rectangular, 1.2 times as long as wide. Occipital border almost straight. Anterior margin of clypeus rounded. Eyes feebly convex. Mandibles each with 5 teeth. Scapes short, not reaching occipital border. Promesonotal area depressed, almost straight in profile. Metanotal groove absent. Dorsal outline of propodeum broadly rounded in profile; propodeal teeth triangular. Petiolar

peduncle short. Head, mesosoma, petiole and postpetiole shagreened; gaster smooth.

The males are dimorphic, alate and ergatoid. Workers are similar to those of *C. nuda*, but distinguished by their more angulate propodeal spines and shorter petiolar peduncles. Chromosome number $2n=30$ (Imai & Yamauchi, unpublished).



C. tsukuyomi



C. nuda

Cardiocondyla kagutuchi Terayama

Fig. p 138

Original Reference: Terayama, M., (1999)

Distribution: Ishigaki I.

Total length of workers around 2 mm. Body color blackish brown to black. Closely similar to *C. nuda*. The worker petiolar node tends to be much narrower anterodorsally than in that species, but this character is not always dependable.

C. kagutuchi and *C. nuda* are so similar that their morphological descriptions given here are almost identical. However, *C. kagutuchi* has 27 chromosomes, while *C. nuda* has 28 (Imai & Yamauchi, unpublished). Also, the male caste system of *C. kagutuchi* differs from that of *C. nuda*. The former is dimorphic, and has both alate and ergatoid males, while *C. nuda* is believed to have only ergatoid males.

Cardiocondyla wroughtonii (Forel)

Fig. p 139

Original Reference: Forel, A. (1890)

Synonym(s): *Emeryia wroughtonii* Forel (Forel, 1890)

Cardiocondyla wroughtonii (Forel) (Forel, 1892)

Distribution: Nansei Is, Ogasawara Is, Volcano Is; pantropical, pansubtropical.

Total length of workers around 1.5 - 2 mm. Bicolored: head, mesosoma, petiole and postpetiole yellow; gaster brown. Head rectangular; occipital border almost straight, but slightly concave in the middle. Eyes relatively large and convex. Scapes not reaching occipital border of head. Mandibles each with 5 teeth; apical tooth largest, the others gradually smaller. Promesonotal area depressed, almost straight in profile; pronotal humeri slightly angulate in dorsal view. Metanotal groove distinct. Dorsal outline of propodeum roundly convex in profile, highest at anterior third; propodeal spines longer than their basal width. Petiole with a relatively long peduncle and high node. Anterior margin of postpetiole concave in dorsal view. Head, mesosoma, petiole and postpetiole shagreened; gaster smooth.

The males of this species are dimorphic, comprising both alates and ergatoids. Ergatoid males are further divided into 3 types: the first has 13-segmented antennae and falcate mandibles; the second has 12-segmented antennae; and the third has 9-segmented antennae. This species is arboreal and typically nests in hollows in decaying branches. It is thought to have originated in tropical Africa and to have extended its range very widely in the tropics and subtropics through human agency. Chromosome number $2n=52$ (Imai & Yamauchi, unpublished).

Cardiocondyla nuda (Mayr)

Fig. p 139

Original Reference: Mayr, G. (1866)

Synonym(s): *Leptothorax nudus* Mayr (Mayr, 1866)

Cardiocondyla nuda (Mayr) (Forel, 1881)

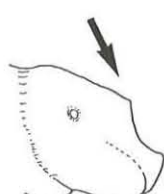
Distribution: Honshu, Shikoku, Kyushu, Nansei Is, Ogasawara Is, Volcano Is; India to Pacific Is, N America.

Total length of workers around 2 mm. Body color blackish brown to black; legs, antennae and mandibles brown. Head rectangular, 1.15 times as long as wide; occipital border slightly convex. Mandibles each with 5 teeth, the apical largest. Scapes long, almost reaching occipital border of head. Metanotal groove shallow and weak in side view. Propodeal spines weakly developed, right-angled in profile. Petiole with a long peduncle, and with the node an inverted U-shape in profile; subpetiolar process small and spinose, situated on anteroventral portion of petiole. Postpetiole slightly lower than petiole in profile, 1.25 times as wide as long in dorsal view. Head and mesosoma shagreened; petiolar node, postpetiole and gaster smooth.

Males are ergatoid - alate males have never been reported in this species. There are three types of ergatoid males: (1) with 12-segmented antennae and mandibles with 3 or 4 teeth, (2) with 12-segmented antennae and mandibles with 5 teeth, (3) with 11-segmented antennae. Ergatoid males mate with both alate females and dealated females in the nests. Nests are polygynous, with a high queen/worker ratio (reported to average 1.2 by Shindo, 1980). Colonies multiply by budding. It has been suggested that *C. nuda* originated in tropical Africa and extended its range almost worldwide as a tramp species, but there have been no records of this species from Africa. *C. nuda* is found in open habitats, as at the sea shore and on bare ground. It nests in the soil or under stones. Chromosome number $2n=28$ (Imai & Kubota, 1981).



C. wroughtoni



C. nuda

Leptothorax santra Terayama & Onoyama

Fig. p 140

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Ogasawara Is.

Total length of workers around 2.5 mm. Body color yellowish brown; head darker than mesosoma and gaster. Antennal scapes slightly exceeding posterior margin of head in full face view. Dorsal outline of mesonotum weakly convex. Metanotal groove very weakly incised dorsally. Propodeal spines acute and relatively short: each longer than its basal width when viewed laterally, with the dorsal margin forming a blunt angle and the posterior half of the spine somewhat downcurved. Petiolar peduncle relatively short; node in profile an inverted U-shape, its lateral margins gradually converging towards the dorsum. Sides of mesonotum and propodeum with predominantly longitudinal rugulae.

A rare species. The known specimens were collected from leaf litter samples using a Berlese funnel.

Leptothorax kinomurai Terayama & Onoyama

Fig. p 140

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Honshu (Gifu Pref.).

Total length of ergatoid queen around 3 mm. Head, mesosoma, petiole, postpetiole and legs yellow; gaster brown. Antennal scapes not reaching posterior margin of head in full face view. Ocelli distinct. Dorsal outline of pro- and mesoscutum weakly convex. Metanotal groove not incised dorsally. Propodeal spines acute, with relatively broad bases; each spine longer than its basal width and somewhat downcurved. Petiole short and high, node in profile an inverted U-shape. Postpetiole high, with strongly convex dorsal margin in profile. Gaster with acutely angulate anterolateral corners in dorsal view.

Leptothorax kinomurai might be a social parasite of other *Leptothorax* species. Four series have been collected from nests of *Leptothorax makora*. All consisted entirely of ergatoid queens. Therefore, it is considered likely that *L. kinomurai* has no worker caste.

Leptothorax basara Terayama & Onoyama

Fig. p 141

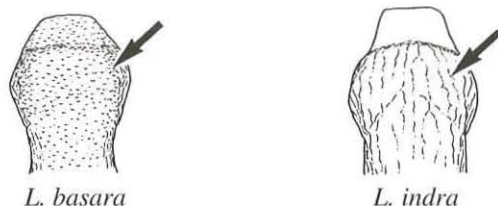
Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Ishigaki I., Iriomote I.

Total length of workers around 2.5 mm. Body color yellow. Antennal scapes reaching posterior margin of head in frontal view. Metanotal groove not incised dorsally. Dorsum of propodeum straight in profile; propodeal spines long and thin. Petiole with rel-

atively long peduncle; node in profile essentially an inverted U-shape; its anterior margin much more steeply sloping than the posterior margin.

This species resembles *Leptothorax indra*, but is distinguished by the absence of rugae on the mesosomal dorsum and the much more steeply sloping anterior margin of the petiolar node. The type material from Iriomote Island was collected from a rotting fallen tree which was partly buried in the ground.



Leptothorax haira Terayama & Onoyama

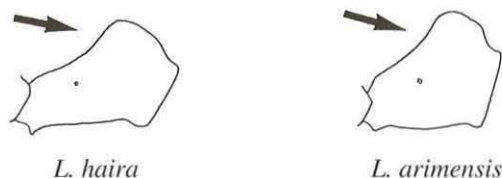
Fig. p 141

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Ogasawara Is.

A small species: total length of workers around 2 mm. Head and gaster brownish, rest of body yellow. Antennal scapes reaching posterior margin of head in full face view. Dorsum of mesosoma weakly convex; metanotal groove not indented in profile. Propodeum with relatively long spines, their length about twice the distance separating them in dorsal view. Petiolar peduncle short; node low, with straight anterior margin. Subpetiolar process relatively large, triangular.

L. haira is known only from two individuals collected on Anijima Island, Ogasawara Islands.



Leptothorax bikara Terayama & Onoyama

Fig. p 142

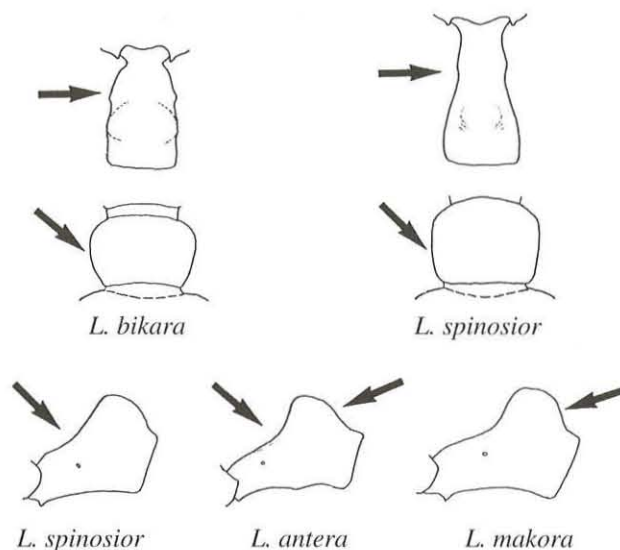
Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Honshu (Gifu Pref.).

Total length of workers around 2 mm. Body color black to blackish brown. Antennal scapes not reaching posterior margin of head in frontal view. Dorsal outline of mesosoma straight in profile. Dorsal disc of propodeum flat. Metanotal groove weakly incised dorsally. Propodeal spines long, acute and narrow; each distinctly longer than its basal width. Petiolar peduncle short, with parallel dorsal

and ventral margins in lateral view; node in profile a relatively narrow inverted U-shape; viewed anteriorly it has a straight dorsal margin, parallel sides and angulate dorsolateral corners. Postpetiole trapezoidal in dorsal view, broadest posteriorly.

Leptothorax bikara might be a social parasite of other *Leptothorax* species. Twenty-six workers have been collected from a nest of *Leptothorax spinosior*, and a putative alate female has been taken in a nest of *Leptothorax makora*. This species is distinguished from *L. spinosior* and *L. makora* by the straight dorsal outline of its mesosoma, the parallel dorsal and ventral margins and parallel sides of its petiolar peduncle, and the transverse, trapezoidal postpetiolar dorsum.



Leptothorax antera Terayama & Onoyama

Fig. p 142

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Shikoku, Izu Is, Nansei Is.

Total length of workers around 3 mm. Body color black to blackish brown. Antennal scapes long, exceeding posterior margin of head in full face view. Dorsal outline of mesonotum straight. Metanotal groove not incised dorsally. Propodeal spines acute and long, each distinctly longer than its basal width and somewhat downcurved. Petiolar peduncle relatively the longest among Japanese *Leptothorax* species. Petiolar node essentially an inverted U-shape, but the posterior margin much more steeply sloping than the anterior margin.

Leptothorax kubira Terayama & Onoyama

Fig. p 143

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Hokkaido, Honshu, Shikoku, Yaku I.

Total length of workers around 2.5 - 3 mm. Body color reddish brown to brown; in some individuals the head and gaster are darker than the mesosoma, grading brown to blackish brown; legs yellow. Antennal scapes long, reaching posterior margin of head in full face view. Metanotal groove usually distinctly incised dorsally; obscure in some individuals. Dorsum of propodeum straight. Propodeal spines narrowly triangular, longer than the distance between them in dorsal view. Petiolar node triangular, subpetiolar process present but small.

This species inhabits mountainous regions and is known from about 600 m to 2,000 m above sea level in central Honshu, and from 1,300 - 1,900 m on Yaku Island. There are several variant forms, known respectively from Hokkaido, Honshu and Yaku Island, which we treat here as geographical variants of the single species *L. kubira*. Further comparative studies are needed to assess possible alternative taxonomic relationships.

Leptothorax makora Terayama & Onoyama

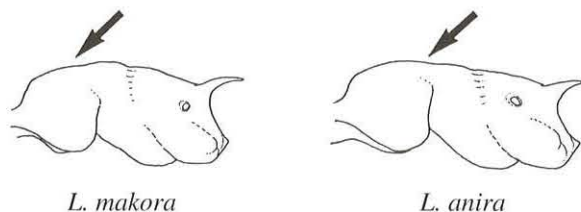
Fig. p 143

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu.

Total length of workers around 2 - 2.5 mm. Body color black to blackish brown. Antennal scapes long, reaching posterior margin of head in full face view. Dorsum of mesosoma weakly convex in profile. Metanotal groove distinctly incised dorsally. Propodeal spines relatively long, longer than their basal width. Petiolar node high and with an inverted U-shape.

This species resembles *Leptothorax spinosior* and *Leptothorax anira*. It is distinguished from *L. spinosior* by its inverted U-shaped, opposed to triangular, petiolar node, and from *L. anira* by its convex mesosomal dorsum. *Leptothorax makora* nests in dead twigs on standing trees in forests or forest margins, while *L. spinosior* nests in the soil of open habitats or grasslands.



Leptothorax anira Terayama & Onoyama

Fig. p 144

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Honshu, Kyushu, Nansei Is.

Total length of workers around 2.5 - 3 mm. Body color black to blackish brown. Antennal scapes long, reaching posterior margin of head in frontal view. Dorsal outline of mesonotum straight in

profile. Metanotal groove present but weak. Propodeal spines acute and narrow but somewhat shorter than those of *L. spinosior*; in lateral view, each is 2.5 - 3 times as long as its basal width. Petiolar node an inverted U-shape.

This species resembles *Leptothorax spinosior* and *Leptothorax makora*, but is separable by the straight dorsal outline of the mesosoma in profile.

Leptothorax indra Terayama & Onoyama

Fig. p 144

Original Reference: Terayama, M. & Onoyama, K. (1999)

Distribution: Okinawa I.

Total length of workers around 3 mm. Body color yellow. Antennal scapes long, reaching posterior margin of head in full face view. Metanotal groove distinctly incised, in some specimens obscure to absent. Dorsum of propodeum flat; propodeal spines acute, narrow and somewhat downcurved; each distinctly longer than its basal width. Petiole with a long peduncle, the node shaped like an inverted U. Subpetiolar process present, triangular. Head and dorsum of mesosoma with numerous distinct rugae.

L. indra nests in dead twigs on standing trees.

Leptothorax koreanus Teranishi

Fig. p 145

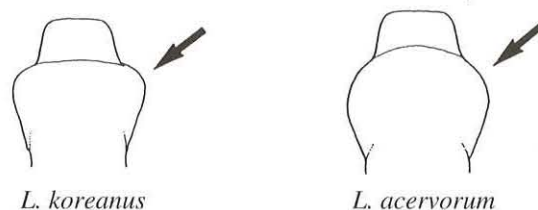
Original Reference: Teranishi, C. (1940)

Synonym(s): *Leptothorax (Nesomyrmex) koreanus* Teranishi (Teranishi, 1940)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Korea.

Total length of workers around 2 - 2.5 mm. Head and gaster black, mesosoma yellowish brown to blackish brown. Antennae 11-segmented; scapes short, not reaching posterior margin of head. Anterolateral corners of pronotum distinctly angled in dorsal view.

L. koreanus is easily distinguished from its Japanese congeners by its distinctly angulate pronotal humeri. It is often collected in open situations such as the seashore, parks and shrine sites.



Leptothorax spinosior Forel

Fig. p 145

Original Reference: Forel, A. (1901)

Synonym(s): *Leptothorax congruus* var. *spinosior* Forel (Forel, 1901)

Leptothorax (Leptothorax) congruus var. *spinosior* Forel (Emery, 1922)

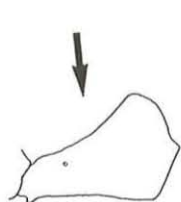
Leptothorax (Myrafant) congruus var. *spinosior* Forel (Onoyama, 1980)

Leptothorax spinosior Forel (Terayama & Satoh, 1990)

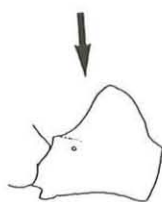
Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Korean Peninsula.

Total length of workers around 2 mm. Body color black to blackish brown. Antennal scapes almost reaching posterior margin of head in full face view. Dorsal outline of mesosoma weakly and evenly convex in profile. Metanotal groove incised dorsally. Propodeal spines long, acute and narrow; somewhat downcurved. Petiolar node triangular in profile, with weakly convex posterior margin (almost straight in some specimens).

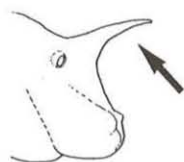
L. spinosior is found in dry open areas, such as grasslands and bare places. It nests in the soil. Workers are usually found on the ground, seldom on trees. There is a queen body-size dimorphism in this species. Nuptial flights occur in July. The chromosome number is $2n = 24$ (Imai & Yoshida, 1965).



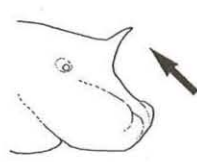
L. spinosior



L. acervorum



L. spinosior



L. congruus

Leptothorax congruus F. Smith

Fig. p 146

Original Reference: Smith, F. (1874)

Synonym(s): *Leptothorax congruus* F. Smith (F. Smith, 1874)

Leptothorax (Myrafant) congruus F. Smith (Onoyama, 1980)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Korean Peninsula.

Total length of workers around 2.5-3 mm. Body color black to blackish brown. Antennal scapes short, not reaching posterior margin of head. Dorsal outline of mesosoma almost straight in profile. Propodeum with short, triangular spines of variable size. Petiolar node triangular, its dorsal margin angulate in profile.

This is an arboreal species, nesting in dead twigs on standing trees. Nuptial flights occur on mid July. Chromosome number is $2n = 18$ (Imai & Kubota, 1972). It is common in Honshu, Shikoku and Kyushu, but rare in Hokkaido.

Leptothorax arimensis Azuma

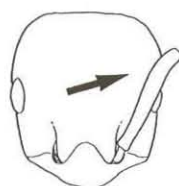
Fig. p 146

Original Reference: Azuma, M. (1977)

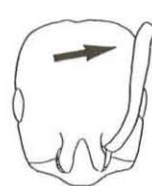
Distribution: Hokkaido, Honshu, Shikoku.

A small ant: total length of workers around 2 mm. Body color yellow to yellowish brown from mesosoma to gaster, head brown. Antennal scapes long, exceeding posterior margin of head. Dorsal outline of mesosoma gently and simply convex, without interruption in the metanotal section (propodeal dorsum almost straight in some individuals). Metanotal groove not incised dorsally. Propodeal teeth relatively short, slightly longer than their basal width. Petiolar node triangular, with straight anterior margin. Subpetiolar process very small to obscure.

L. arimensis ranges from lowlands to mountainous areas, up to about 1000 m above sea level. It nests in soil or dead twigs, and is relatively rare.



L. congruus



L. arimensis

Leptothorax acervorum (Fabricius)

Fig. p 147

Original Reference: Fabricius, J. C. (1793)

Synonym(s): *Formica acervorum* Fabricius (Fabricius, 1793)

Leptothorax acervorum (Fabricius) (Mayr, 1855)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Sakhalin, Korean Peninsula, Eurasia, North America.

Total length of workers around 3 - 3.5 mm. Head and gaster black; mesosoma, petiole and postpetiole reddish brown, their dorsa blackish brown; legs brown. Antennae 11-segmented; scapes short, not reaching posterior margin of head in frontal view. Dorsal outline of pro- and mesonota depressed in profile. Dorsum of propodeum weakly convex. Propodeal spines longer than wide in side view, with acute tips. Petiolar node high, triangular; anterior margin sloping steeply forwards in profile; peduncle obscure.

In Japan this species is distributed in the lowlands of Hokkaido and mountainous areas of Honshu, Shikoku and Kyushu. In central Honshu *L. acervorum* is found at 1300-2600 m above sea level; at 1920 - 1980 m on Mt. Ishizuchi in Shikoku, and at 1740 m on Mt. Kujyu, Kyushu. Monogynous and polygynous colonies are present, but research indicates that in Japan only one of the colony queens has functional ovaries and lays eggs. Three socially parasitic ant species are known to associate with *L. acervorum* in Europe, but none of them are yet known to occur in Japan.

Pheidole bugi Wheeler

Fig. p 147

Original Reference: Wheeler, W. M. (1919)

Distribution: Nansei Is; Myanmar, E. Malaysia, Indonesia, S. China

Total length of body around 2.5 mm in soldiers, around 1.5 mm in workers. Body color yellowish brown, mandibles, clypeus and gaster darker. In soldiers: dorsal surface of head slightly concave posteriorly; gular dentition with paired lateral processes and three median projections; pronotum and mesonotum forming a single convexity; propodeal spines pointed and with broad bases; postpetiole shorter than petiole. In workers: posterior portion of head weakly concave.

This species was originally described from Sarawak, Borneo, and is known to occur in SE Asia, including Myanmar, E. Malaysia, Indonesia and southern China.

Pheidole susanowo Onoyama & Terayama

Fig. p 148

Original Reference: Onoyama, K. & Terayama, M. (1999)

Distribution: Ishigaki I.

Total length of body around 3.5 mm in soldiers, around 2 mm in workers. Body color blackish-brown. In soldiers: gular dentition with 3 distinct median projections; head almost as long as wide; mesonotal area not raised separately from pronotum; mesosoma, petiole and postpetiole covered with fine punctures. In workers: posterior portion of head flat, with weakly concave posterior margin and no occipital carina; gular dentition undeveloped; median longitudinal carina present on clypeus; remaining features as given for soldier.

A rare species. No biological observations have been reported.

Pheidole ryukyuensis Ogata

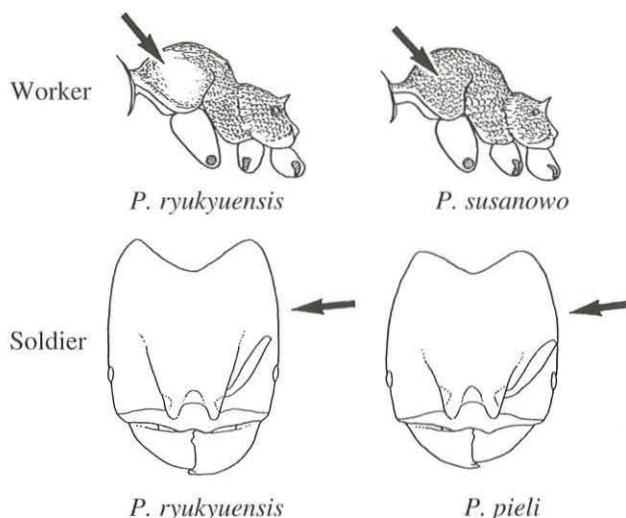
Fig. p 148

Original Reference: Ogata, K. (1982)

Distribution: Ishigaki I., Iriomote I.

Total length of body around 3.5 mm in soldiers, around 2 mm in workers. Body color reddish-brown. In soldiers: gular dentition with 3 distinct median projections; head elongate, about 1.2 times as long as wide; mesonotal area not raised separately from pronotum. In workers: posterior portion of head flat, with weakly concave posterior margin and no occipital carina; gular dentition undeveloped; median longitudinal carina present on clypeus; lateral portion of pronotum smooth and shining, without sculpturing; remaining features as given for soldier.

P. ryukyuensis is found in rather moist habitats, nesting in decayed wood, in the soil or under stones in woodland. Soldiers may store liquid food in their crops.



Pheidole pieli Santschi

Fig. p 149

Original Reference: Santschi, F. (1925)

Distribution: Honshu (southern part), Shikoku, Kyushu, Nansei Is; Mainland China, Korean Peninsula.

Total length of body around 3 mm in soldiers, around 1.5 mm in workers. The smallest known Japanese *Pheidole* species (head width 1.04 mm or less in soldiers, 0.45 mm or less in workers). Body color yellow to yellowish-brown. In soldiers: gular dentition with 3 distinct median projections; head almost as long as wide; pro- and mesonota forming a single convexity. In workers: posterior portion of head flat, with weakly concave posterior margin and no occipital carina; gular dentition undeveloped; median longitudinal carina absent on clypeus; lateral portion of pronotum smooth and shining, without sculpturing; the remainder as in soldier.

Sculpturing on the head of workers from the Nansei Islands is less-developed and the propodeal spines smaller than in material from mainland Japan. Found in rather moist woodland habitats, nesting in decaying wood and in the soil, often under stones. Colonies include at most around 2,000 individuals. Soldiers may be utilized for the storage of liquid food in their gasters, in addition to their other functions.

Pheidole noda F. Smith

Fig. p 149

Original Reference: Smith, F. (1874)

Synonym(s): *Pheidole nodus* Fr. Smith (Fr. Smith, 1874)

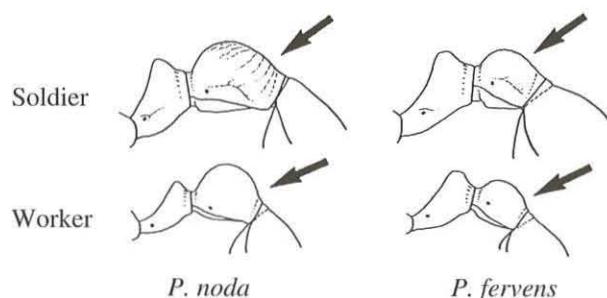
Pheidole nodus var. *praevevata* Wheeler (Wheeler, 1929)

Distribution: Honshu, Shikoku, Kyushu, Nansei Is; Mainland China, Korean Peninsula, Taiwan, India, Sri Lanka.

Total length of body around 4.5 mm in soldiers, around 3 mm in workers. Head and gaster blackish brown, remainder reddish brown. In soldiers: gular dentition with paired lateral projections

and obscure median projections; postpetiole larger than petiole. In workers: posterior portion of head rounded, with more or less distinct occipital carina.

P. noda is easily distinguished from other Japanese *Pheidole* species by its large postpetiole. This is one of the most common ants in southwestern Japan. Found in open land and woodland or its margins. Colonies are large, comprising up to ca 3,000 individuals. Soldiers dissect large food items and defend the nest and surrounds. The presence of hostile ants does not influence soldier production. Imai & Kubota (1972) reported chromosomal variation. This species has been previously called "*Pheidole nodus*", which is incorrect according to the International Code of Zoological Nomenclature.



Pheidole megacephala (Fabricius)

Fig. p 150

Original Reference: Fabricius, J. C. (1793)

Synonym(s): *Formica megacephala* Fabricius (Fabricius, 1793)

Pheidole megacephala Roger (Roger, 1863)

Distribution: Nansei Is; pantropical, subtropical.

Total length of body around 3.5 mm in soldiers, around 2 mm in workers. Head and gaster dark brown, body otherwise brown. In soldiers: gular dentition with paired lateral projections but lacking median projections; posterior portion of head without sculpture, smooth and shining. In workers: posterior portion of head rounded, with more or less distinct occipital carina; gular dentition undeveloped; the remainder as in soldier.

P. megacephala is easily distinguished from other Japanese *Pheidole* species by the sculpturing of the head in soldiers and the shape of the promesonotum in soldiers and workers. This ant is found worldwide in the tropics and subtropics. It is generally considered to be of Afrotropical origin and to have been dispersed by human commerce. In Japan, it occurs on Okinawa Island and southwards in open land, sugar-cane fields and coastal barrens, nesting in the soil, often under stones or logs. Minato et al. (1990) observed hygienic behavior involving the heaping away from nests of bodies of dead colony members by this ant.

Pheidole indica Mayr

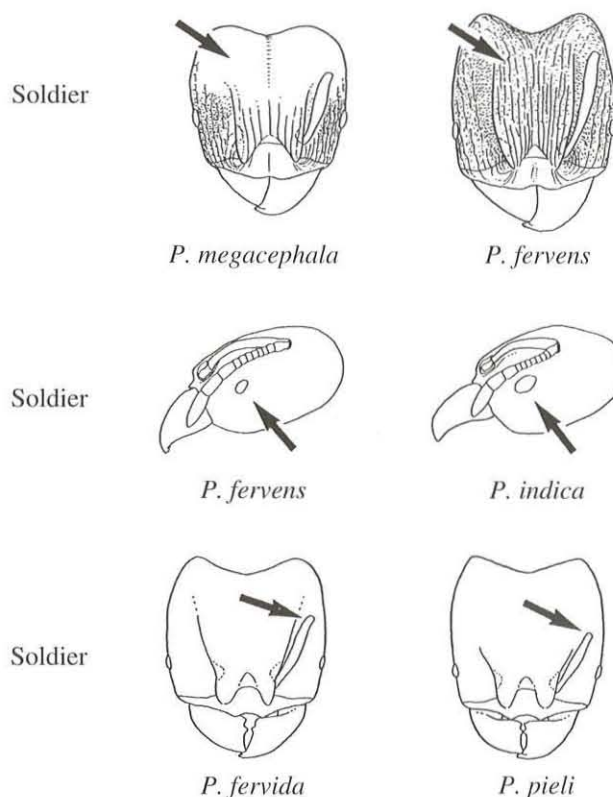
Fig. p 150

Original Reference: Mayr, G. (1879)

Distribution: Honshu (southern part), Shikoku, Kyushu, Nansei Is; India, Sri Lanka, SE Asia.

Total length of body around 4 mm in soldiers, around 2.5 mm in workers. Generally reddish brown, head and gaster darker. In soldiers: gular dentition with 3 low median projections; dorsum of head sculptured; eyes relatively large, their diameter exceeding the length of the 10th antennal segment; mesonotum raised separately from pronotum; propodeal spines directed upwards; postpetiole shorter than petiole. In workers: posterior portion of head rounded and unsculptured, with distinct occipital carina; gular dentition undeveloped; remaining features as given for soldier.

Similar to *P. megacephala*, *P. fervens* and *P. noda*. *P. indica* can be distinguished from *P. megacephala* by the extent of posterior cephalic sculpturation in soldiers and the separately raised mesonotum in soldiers and workers; from *P. fervens*, by the dark-colored body, larger eyes and upwardly directed propodeal spines in soldiers and workers; and from *P. noda* by the smaller postpetiole. This species is found in rather dry habitats and is common in southern Kyushu. Nest entrances sometimes involve small mounds of sand or soil particles. Total worker/soldier numbers in colonies can run to almost 1,000 individuals.



Pheidole fervida F. Smith

Fig. p 151

Original Reference: Smith, F. (1874)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Korean Peninsula.

Total length of body around 3.5 mm in soldiers, around 2.5 mm in workers. Body color yellowish brown to reddish brown, gaster sometimes darker. In soldiers: gular dentition with 3 median pro-

jections; antennal scapes reaching back 2/3 the length of the head; pronotum and mesonotum usually separately raised, the mesonotal convexity variable. In workers: posterior portion of head flat and sculptured; antennal scapes exceeding posterior corners of head; mesonotum more or less raised; remaining features as given for soldier.

The gular dentition of the soldiers and the shape of the posterior part of the head in workers of *P. fervida* are similar to those of *P. ryukyuensis* and *P. pieli*. *P. ryukyuensis* resembles *P. fervida* in coloration, but *P. fervida* can be distinguished from it by the relative length of the antennal scapes in the soldiers and the shape of the mesosoma in the workers. The distributions of these two species are not known to overlap: *P. fervida* is found on Yaku Island and northwards, while *P. ryukyuensis* is found in the Yaeyama Islands. *P. fervida* is distinguishable from *P. pieli* by the shape of its mesonotum. This is a temperate-climate species, found at low elevations in northern regions and mountainous areas in the southern part of Japan. Nests in rotting wood or under stones on the forest floor.

Pheidole fervens F. Smith

Fig. p 151

Original Reference: Smith, F. (1858)

Distribution: Kyushu (southern part), Nansei Is; Mainland China, Taiwan, SE Asia, Sri Lanka, Oceania.

Total length of body around 4.5 mm in soldiers, around 3 mm in workers. Body color light reddish brown, head darker, mesosoma lighter, gaster blackish brown. In soldiers: head covered with reticulate sculpturing; eyes rather small, their maximum diameter (ca 0.18 mm) less than length of 10th antennal segment; gular dentition with paired lateral processes, the three median projections indistinct; pronotum and mesonotum separately raised; propodeal spines slender, curved posteriorly; postpetiole shorter than petiole. In workers: posterior portion of head rounded, smooth and shining, with distinct occipital carina; eyes small, like those of soldiers (0.26 - 0.30 mm in diameter); gular dentition undeveloped; remaining features as given for soldier.

This species occurs in southern Kyushu and the Ryukyus. It is found nesting under stones in open land grading to forest margins (Ogata, 1981). Colonies can include hundreds of workers (Yano, pers. comm.). Habitat preference, body size and coloration are similar to *Pheidole indica*, *P. noda* and *P. megacephala*. In fact, these species are sometimes closely sympatric in the Ryukyus. *P. fervens* can be distinguished by its lighter body color, smaller eyes, the relatively fine reticulation on the heads of its soldiers, the shape of the propodeal spines and the proportions of its postpetiole.

Messor aciculatus F. Smith

Fig. p 152

Original Reference: Smith, F. (1874)

Synonym(s): *Aphaenogaster aciculata* F. Smith, 1874

Stenamma (Messor) aciculata: Forel, 1901

Stenamma (Messor) aciculatum var. *brunneicornis* Forel, 1901

Messor barbarus var. *lobulifera* Emery, 1901

Aphaenogaster (Attomyrma) aciculata: Emery, 1921

Messor aciculata: Forel, 1922

Distribution: Honshu, Shikoku, Kyushu, Yaku I.; Mainland China, Korean Peninsula, Mongolia.

Total length of workers around 4 - 5 mm. Body color black. Head slightly longer than broad. Antennal scapes slightly surpassing posterior border of head. Long hairs absent from ventral surface of head, those present about as long as other body hairs. Metanotal groove rather deeply impressed and distinct both dorsally and laterally. Dorsal and declivitous faces of propodeum almost straight in lateral view, meeting at an angle of about 120 degrees, the junction rounded, without spines. Petiolar node nearly triangular in lateral view; postpetiolar node rounded. Tibial spurs of middle and hind legs simple. Almost all surfaces of body from mandibles to postpetiole rugose; the gaster entirely smooth and shining. Yellowish-white setae rather abundant over nearly the whole body.

This species nests in bare areas near standing grasses and in open grasslands. Its nests open directly at the ground surface. Underground there is a nearly vertical shaft and many chambers; total nest depth may be up to 4 meters. In autumn workers collect grass seeds. Foraging workers show individual site tenacity: each returning repeatedly to search a particular area, though foraging methods vary according to food conditions. Winged sexuals fly from April to May (Onoyama, 1981).

The number of larval instars is three (Onoyama, 1981; Onoyama, 1982). Chromosomal number $2n=44$ (Imai & Yosida, 1965). In Japan *Messor aciculatus* is distributed from Iwate Prefecture to Yaku Island. It is also found widely on the Asian continent.

Aphaenogaster minutula Watanabe & Yamane

Fig. p 152

Original Reference: Watanabe, H. & Yamane, S. (1999)

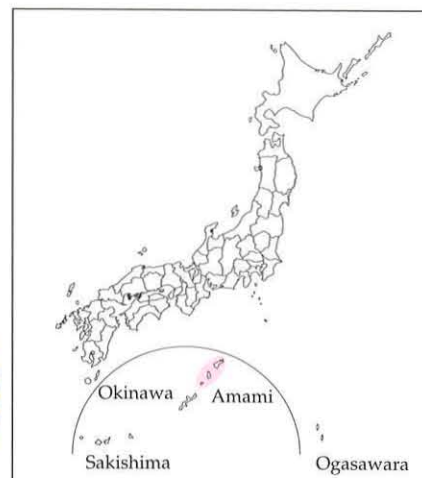
Distribution: Nansei Is.

Total length of workers 3.5-5 mm. Body yellowish brown, with head (excepting mandibles) and mesosoma slightly darker. Antennal club pale in color. This species is distinguished from its close relatives (*A. concolor*, *A. luteipes* and *A. kumejimana*) by the smaller body size, 4-segmented maxillary palp (5-segmented in the other species), and the chromosome number $2n=28$.

A. minutula nests in relatively open sites in forests and at forest edges. Nests are excavated in the soil, with a distinctive pile of wood chips around each entrance.

MYRMICINAE

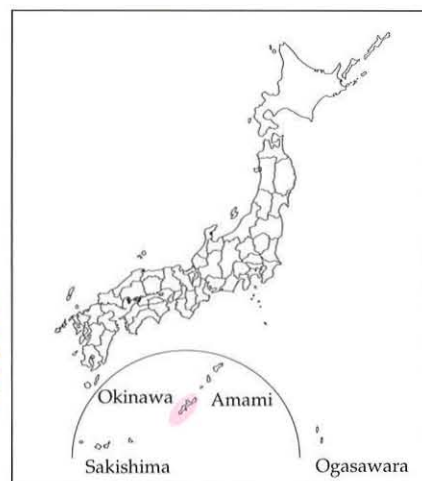
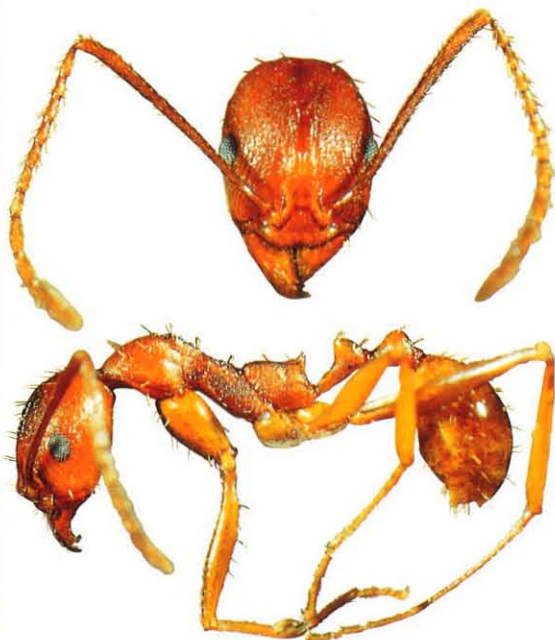
Aphaenogaster luteipes Watanabe & Yamane



Workers 3.5-5 mm. Reddish light brown-dark brown. Flagellum progressively paler in color, club palest. Distinguished from *A. concolor* by more laterally produced eyes, presence of 4 strong bristles on anteriorly produced median clypeal margin (2 in *A. concolor*), higher chromosome number ($2n=32$ vs. 30). Nests: soil, forests, forest margins.

MYRMICINAE

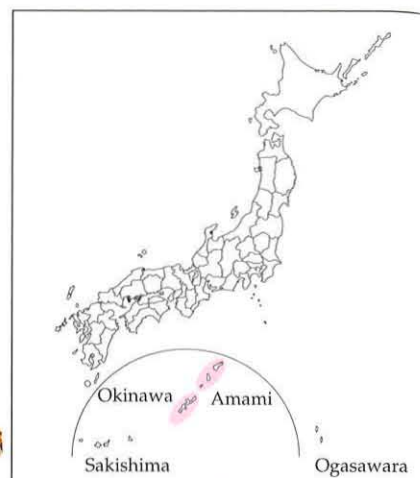
Aphaenogaster kumejimana Watanabe & Yamane



Workers 4.5-5.5 mm. Light brown, head, gaster slightly darker. Legs yellow. Seen from above a large gap separates pronotum from mesonotum. not distinguished from *A. concolor* by worker morphology, but they differ in chromosome number ($2n=26$ in *kumejimana*, $2n=30$ in *concolor*). Nests: in rotting wood, tree holes.

MYRMICINAE

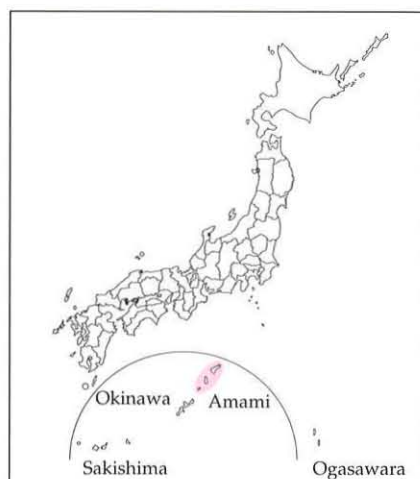
Aphaenogaster concolor Watanabe & Yamane



Workers 4.5-6 mm. Head, mesosoma brown-yellowish brown; gaster blackish dark brown; legs yellowish brown. Similar to *Aphaenogaster famelica*, and *Aphaenogaster erabu*, distinguished by striation, punctation on pronotal dorsum, angulate pronotal humeri. Varies in form, color, perhaps comprising several similar species. Nests: soil, under wood, wood cavities, woodland margins.

MYRMICINAE

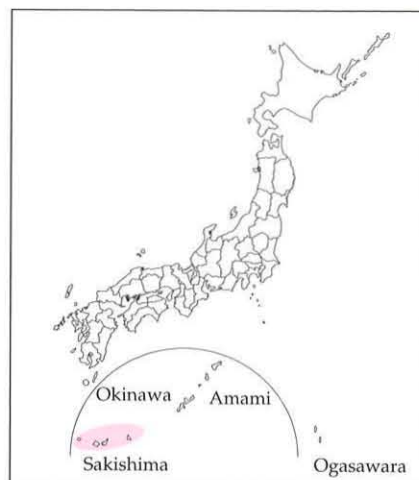
Aphaenogaster erabu Nishizono & Yamane



Close to *A. famelica* in form, sculpture. Consistently distinguished by yellowish brown body color, shorter propodeal spines, lower chromosome number ($2n=32$ vs. $2n=34$).

MYRMICINAE

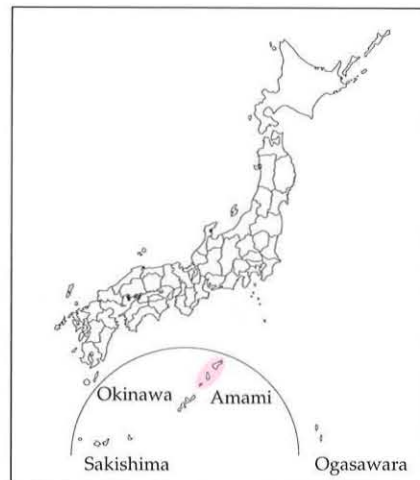
Aphaenogaster donann Watanabe & Yamane



Workers 6-7 mm. Blackish brown. Antennae, mesosoma, legs distinctly relatively long. Propodeal spines large, long. Similar to *Aphaenogaster gracillima*; distinguished by unicolorous body. Chromosome number $2n=28$. Nests: soil, woodland.

MYRMICINAE

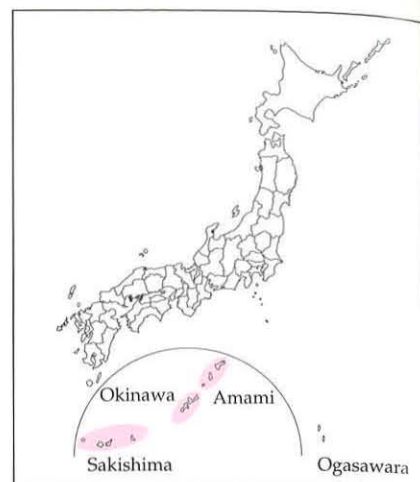
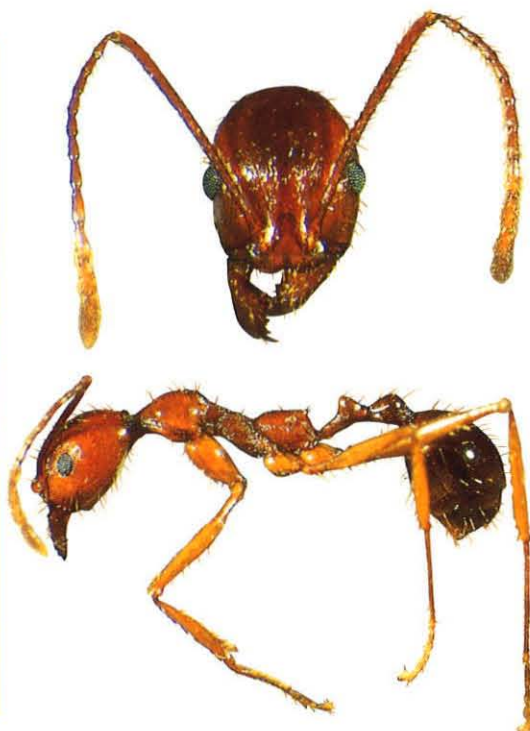
Aphaenogaster tokarainsulana Watanabe & Yamane



Workers 3-5.5 mm. Head, mesosoma dark reddish brown; mandibles, petiole, postpetiole, legs lighter; gaster often darker; scapes paler toward apices; funiculi light reddish brown. Scapes, mesosoma, legs relatively short. Head: abundant striae, punctures, striae on frons fail occipital carina, posteriorly dull. Pronotal humeri angulate. Mesonotum: raised, often above pronotum, striae, punctures. Mesopleura dull, punctate, parallel striae. Chromosome number $2n=34$.

MYRMICINAE

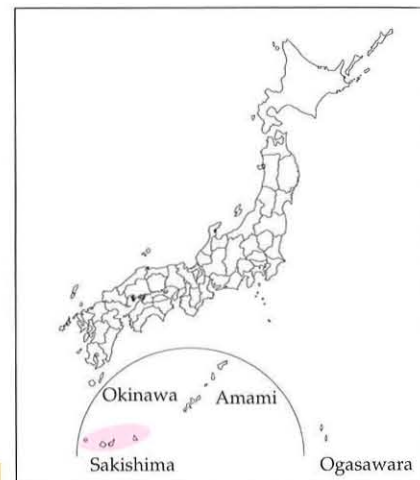
Aphaenogaster irrigua Watanabe & Yamane



Workers 4-6 mm. Head brown-light brown, mesosoma, legs light brown, gaster dark brown. Scapes, mesosoma, legs relatively long. Clypeus anteriorly transversely striate. Mandibles often weakly serrate basally. Mesonotum weakly raised, predominantly punctate. Chromosome number $2n=32$. Distinguished from *A. osimensis* by shallow, small punctures on occiput, pronotal dorsum; dull propodeal surfaces; striae, punctures on mesopleura laterally.

MYRMICINAE

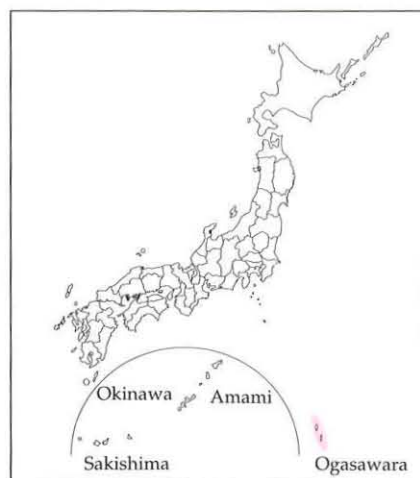
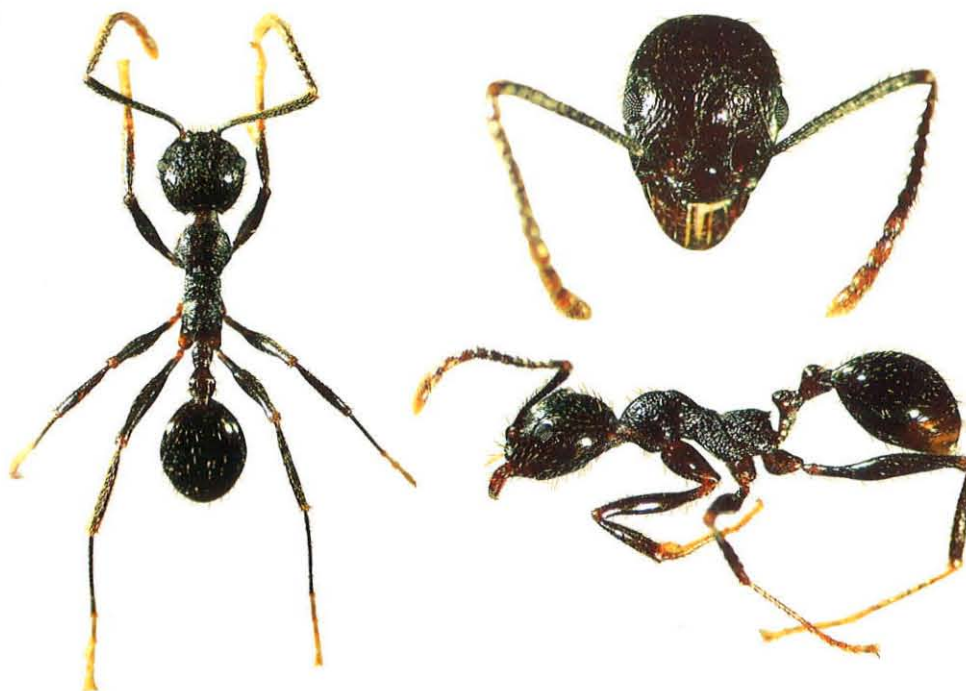
Aphaenogaster rugulosa Watanabe & Yamane



Workers 5 mm. Head, mesosoma blackish brown; antennae, mandibles, legs, petiole, postpetiole, gaster dark brown. Antennae, mesosoma, legs relatively short. Occipital border flat. Head: punctures; longitudinal striae attaining occipital carina. Pronotal striation stronger than cephalic, interspaces shining. Humeri not angulate. Mesosoma higher than pronotum, striate, punctate. Mesopleura striate-punctate laterally, without reticulation. Propodeal spines slender, acute. Chromosome number $2n=34$.

MYRMICINAE

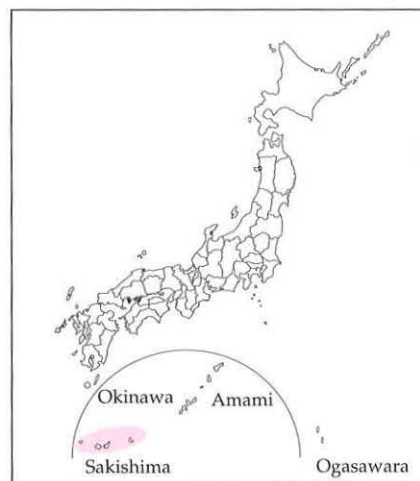
Aphaenogaster edentula Watanabe & Yamane



Workers 4-6 mm. Dark brown; legs, petiole, mandibles, apical antennomeres, tarsi lighter. Head, pronotal dorsum: numerous standing hairs, longer than gastral. Occipital border flat. Posterior cranium simply, sparsely striate. Funicular segments strongly constricted. Mesonotum: raised, lower than pronotum, striae, shallow punctures. Mesopleurae laterally strongly longitudinally striate. Propodeal spines weak, low (shorter than basal width), apices blunt. Nests: soil, woodland.

MYRMICINAE

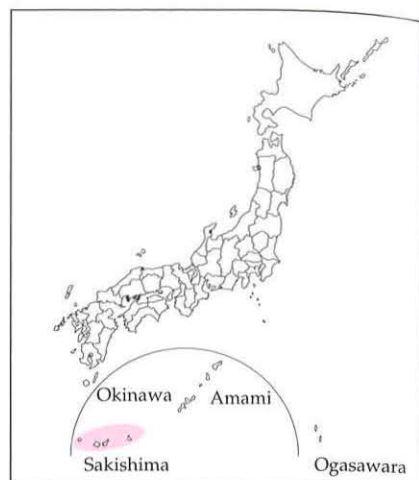
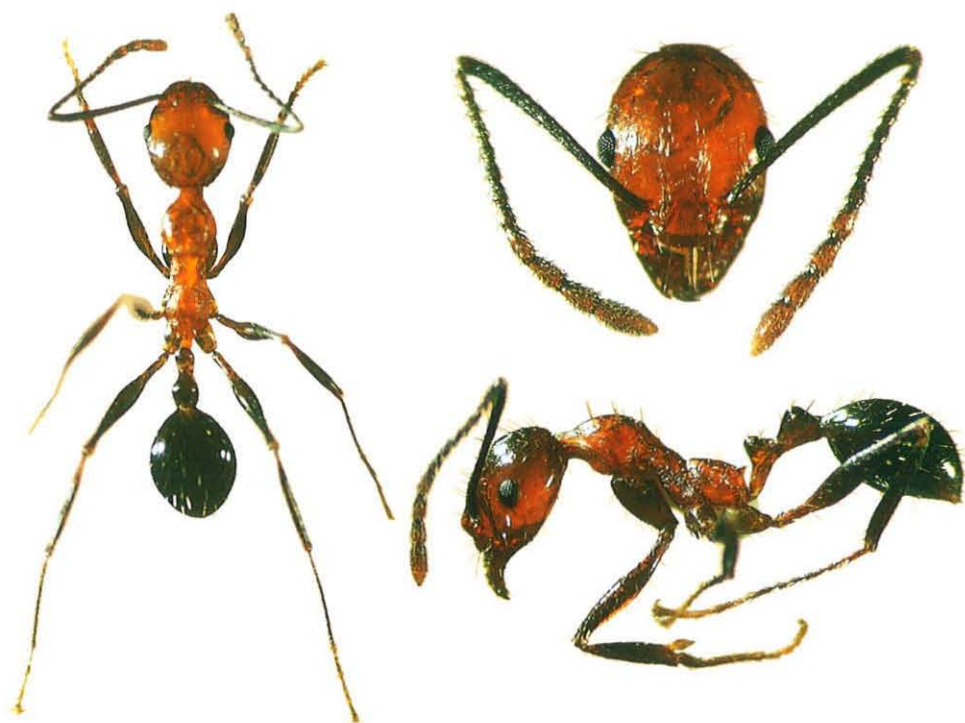
Aphaenogaster gracillima Watanabe & Yamane



Workers 3.5-8 mm. Head, mesosoma reddish brown; mandibles lighter; scapes, legs, gaster dark brown. Scares, mesosoma, legs distinctly long, slender. Head elongate behind eyes, strongly narrowed posteriorly. Funicular segments elongate; apical four paler. Mesonotum: weakly raised, irregular striation, punctation. Propodeal spines varying: long, slender to short, broad. Chromosome number $2n=28$. Similar to *A. donann*, distinguished by worker coloration, male morphology.

MYRMICINAE

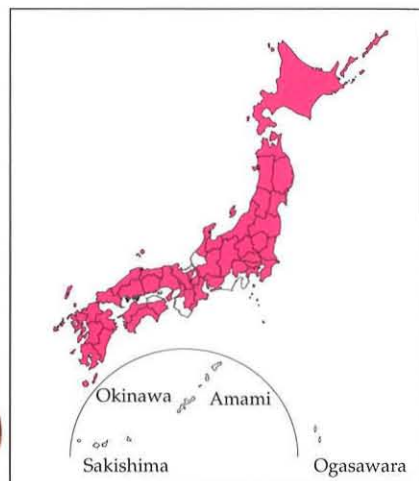
Aphaenogaster tipuna Forel



Workers 3-5.5 mm. Head, mesosoma red-dish brown; gaster dark brown. Scapes, mesosoma, legs relatively short. Occipital border flat. Occipital area shining, shallowly punctate. Pronotum shining, shallowly punctate, feebly striate; humeri not angulate. Mesonotum: striate/punctate, raised, lower than pronotum, forming an angulate convexity. Portions of mesopleurae laterally reticulate/punctate. Propodeal spines slender. Nests: soil, under stones, in plant roots.

MYRMICINAE

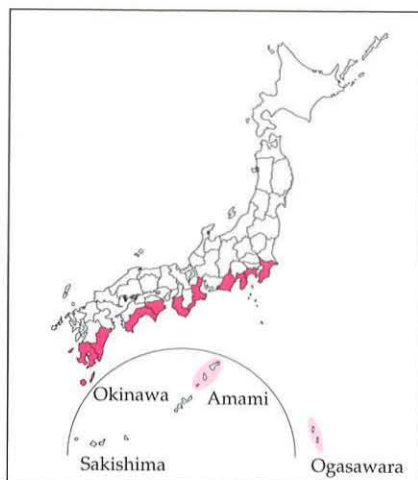
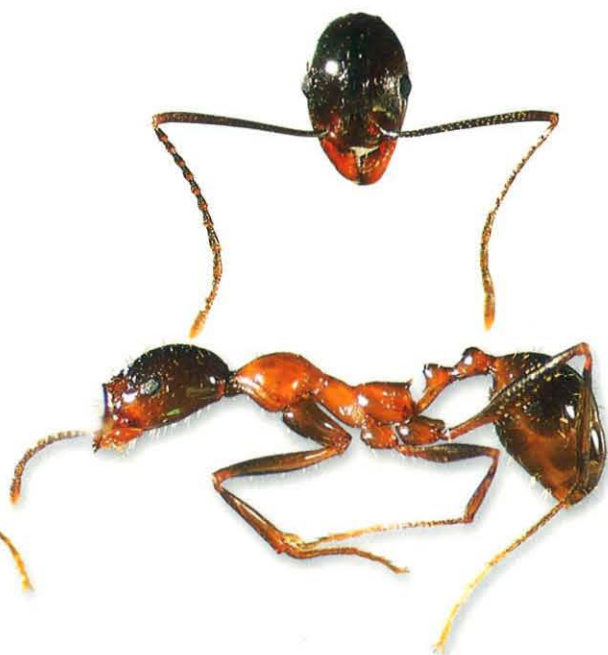
Aphaenogaster japonica Forel



Workers 3-5 mm. Dark-light brown; legs dark brown-dark yellowish brown. Scapes, mesosoma, legs relatively short. Occipital border flat. Occipital area opaque, punctate. Pronotum: dorsum punctate medially, transverse marginal striae; humeri angulate. Mesonotum: raised, sometimes above pronotum, forming angulate convexity, punctate/striate. Mesopleurae laterally punctate. Propodeal spines broad, apices acute. Chromosome number $2n = 22$.

MYRMICINAE

Aphaenogaster osimensis Teranishi

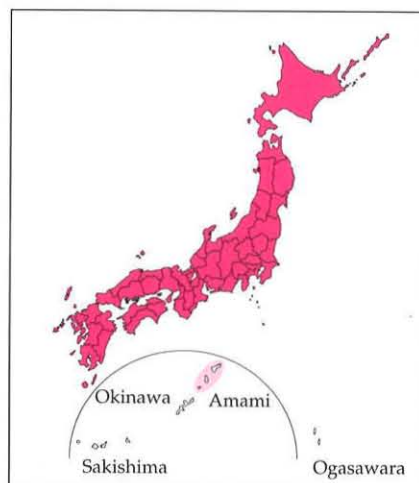


Workers 4-6 mm. Head, gaster dark brown-reddish brown; mesosoma, petiole, postpetiole light brown; legs brown. Scapes relatively short. Clypeus transversely striate anteriorly. Mandibles weakly serrate. Head posteriorly, pronotal dorsum shining, lacking sculpture. Mesonotum: not distinctly raised, weak striation, punctures. Propodeum, metanotum: laterally shining, little sculpturation.

Chromosome number $2n = 32$.

MYRMICINAE

Aphaenogaster famelica (F. Smith)

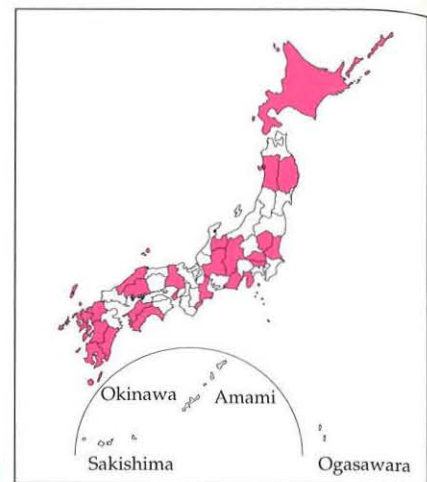


Workers 3.5-8 mm. Dark reddish brown; head, gaster blackish brown. Scapes, mesosoma, legs relatively long. Pronotum: feebly-distinctly punctate; rugae laterally on larger workers; humeri not angulate. Mesonotum: densely rugose, dorsum variably raised. Propodeal spines acute, broad basally, dorsal profile straight, ventral profile concave. Chromosome number $2n = 34$.

Nests: soil, under stones, woodlands, lowlands to mountains.

MYRMICINAE

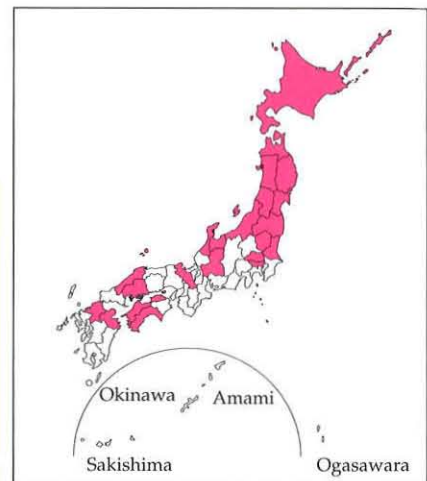
Stenamma owstoni Wheeler



Workers 2.5-4 mm. Yellowish brown-dark reddish brown. Similar to *S. nipponense*: eyes larger (longest diameter exceeding length of 9th antennal segment). A rare species.

MYRMICINAE

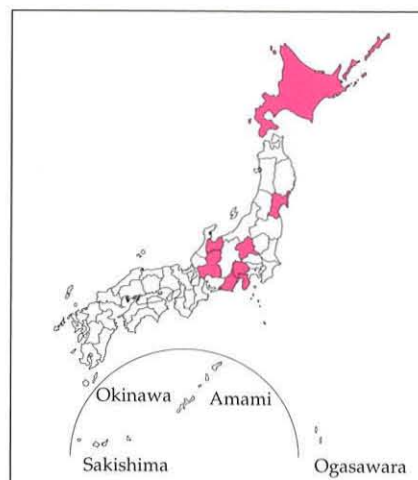
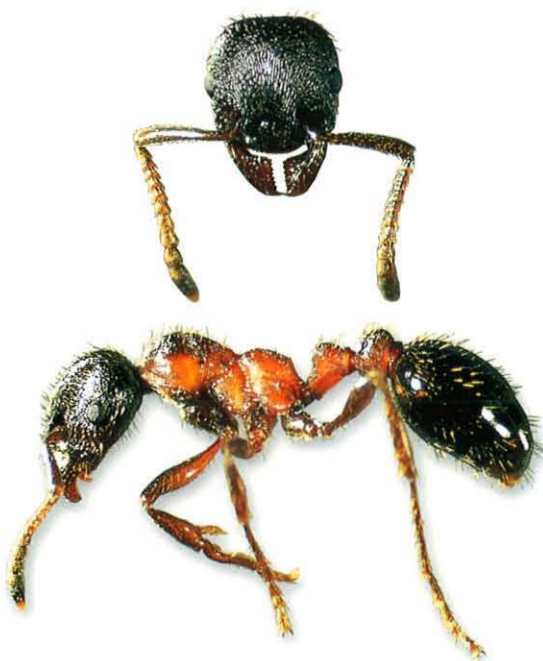
Stenamma nipponense Yasumatsu & Murakami



Workers 2.5-3.5 mm. Yellowish-brown to dark reddish-brown. Head, mesosoma with dense irregular reticulation. Scapes attaining posterior margin of head. Eyes small, longest diameter shorter than 9th antennal segment. Propodeum sometimes marginate anterodorsally. Nests: soil, woodland, woodland margins. Winged reproductives observed late September in Hokkaido.

MYRMICINAE

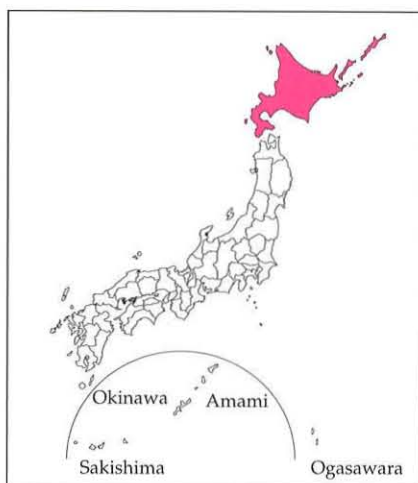
Manica yessensis Azuma



Workers 5-7 mm. Head, gaster black, elsewhere brown/yellowish brown. Mandibles: two large apical teeth, 10-11 denticles. Clypeal margin concave. Scapes reaching occiput; bent basally. Promesonotal profile smooth. Metanotal groove impressed. Posterodorsal propodeal corners obtusely angulate. Cephalic dorsum, mesosoma, petiole longitudinally rugose. Standing hairs abundant. Middle, hind tibial spurs simple. Nests: gravelly sites, volcanic mountains, dry river-beds.

MYRMICINAE

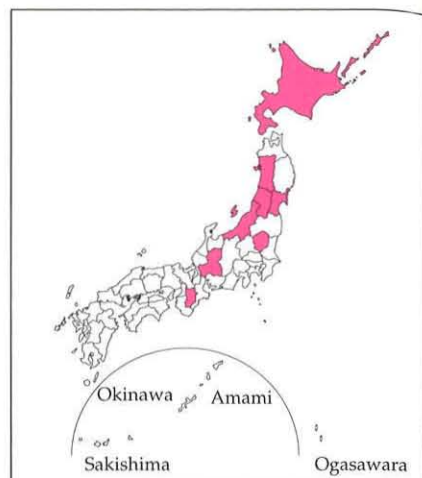
Myrmica sp. 8



Workers 4 mm. Dark brown. Clypeal margin medially concave. Scapes narrowed; bent basally, angle ca. 100 degrees; bend margined at right-angle to axis, with thin blackish-brown lamella. Third funicular segment wider than long. Dorsa of mesosoma, petiole: strongly rugose. Metanotal groove impressed. Propodeal spines, petiole shorter than *M. jessensis*, spines often directed upwards. Petiolar node: posterodorsal border angulate.

MYRMICINAE

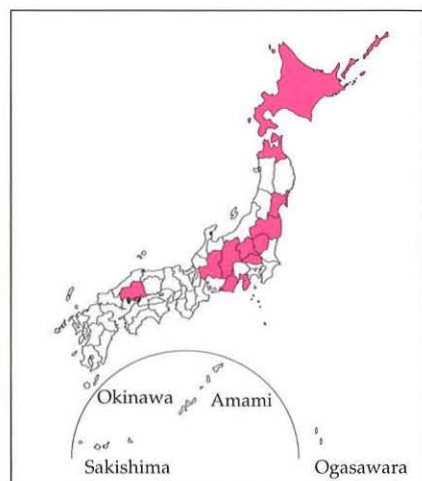
Myrmica sp. 7



Workers 4 mm. Brown. Clypeal margin medially concave. Scapes: barely narrowed basally, bent, angle ca. 120 degrees, weakly lamellate at bend, lamellae extended in large workers. Third funicular segment wider than long. Strongly impressed. Spaced rugae on dorsa of head, mesosoma, petiole. Metanotal groove shallow. Propodeal spines long. Petiolar node low, long. Distinguished from *M. jessensis* by scape morphology, petiolar structure.

MYRMICINAE

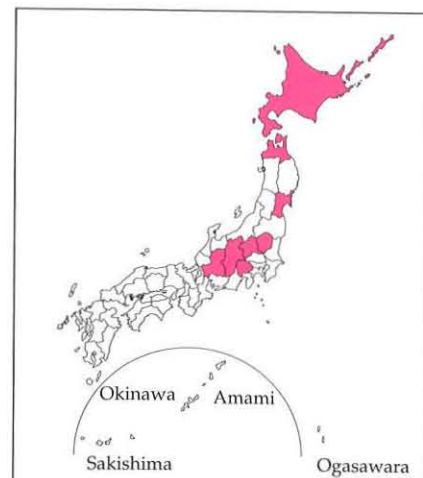
Myrmica sp. 6



Workers 3.5-4 mm. Brown-blackish brown; gaster darker. Posterior clypeal margin crenate in front of antennal insertions, so that each is circularly enclosed. Anterior clypeal margin almost straight. Frons, pronotal dorsum longitudinally rugose (the latter coarsely). Distinguished by crenate posterior clypeal margin, scape bent at right-angle, with corner rounded. Nests: under stones, bare sites, grasslands, in mountains of central Honshu.

MYRMICINAE

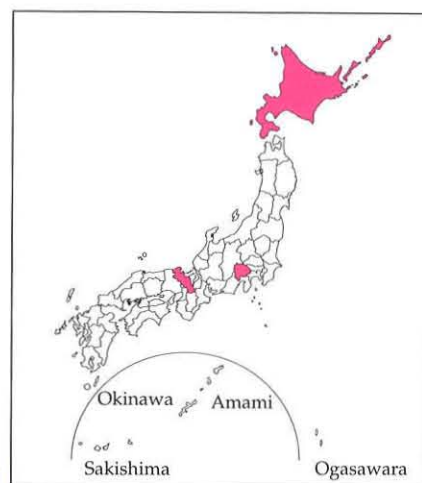
Myrmica luteola Kupyanskaya



Workers 5-5.5 mm. Ochreous-brown. Gaster often appearing waxy. Head broad; clypeal border medially slightly concave, lacking denticles. Scapes basally strongly curved, thickened. Mesosomal dorsum weakly, irregularly rugose. Propodeal spines long. Subpetiolar process produced anteriorly. Petiole ventrally convex. Middle, hind tibial spurs small, simple. Distinguished by convex ventral petiolar profile, characteristic scape morphology. Females smaller than workers; propodeal spines very small-absent.

MYRMICINAE

Myrmica rubra (Linnaeus)



Workers 4-5.5 mm. Yellow-yellowish brown. Difficult to distinguish from *M. kotokui*, due to morphological, color variation, in latter. Unraised rugae posterodorsally on mesonotum usually characteristic. Lower half of mesonotal pleura, smooth, fewer strong rugae than *kotokui*; propodeal spines shorter, rugae at anterior base of 1st gastral tergite relatively weak, sparse. Nests: soil, grassland, seashores, lowlands. Rare. Identification of this species still obscure.

MYRMICINAE

Myrmica kurokii Forel



Workers 4.5-5.5 mm. Head, gaster, legs black; mesosoma reddish brown. Scares strongly curved basally. Clypeal border medially convex, no projecting denticles. Pronotal dorsum finely, irregularly rugose. Mesonotal dorsum finely rugose, often transversely so, smooth shining areas small. Node short, posterodorsal border gently curved. Subpetiolar process projecting anteriorly. Nests: soil, under stones, rocky sites, grasslands, near tree roots.

MYRMICINAE

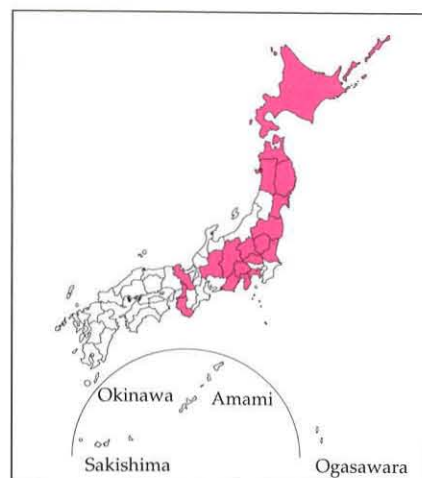
Myrmica kotokui Forel



Workers 4-5.5 mm. Brown-blackish brown; legs lighter. Scape gently curved near base. Clypeal border medially convex, rugae projecting anteriorly as denticles. Thoracic dorsum strongly rugose. Posterodorsal mesonotal rugae raised. Propodeal spines long. First gastral tergite basally longitudinally rugose. Nests: under stones, soil, fallen trees, etc. Flights September-early October.

MYRMICINAE

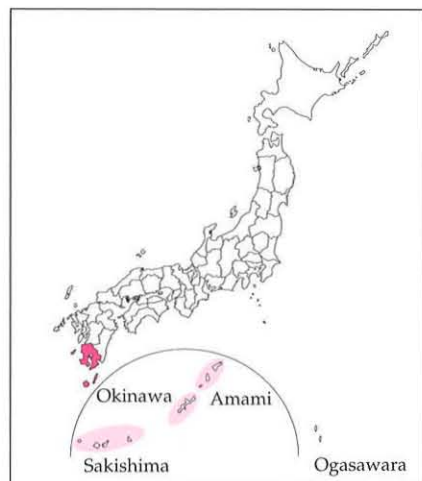
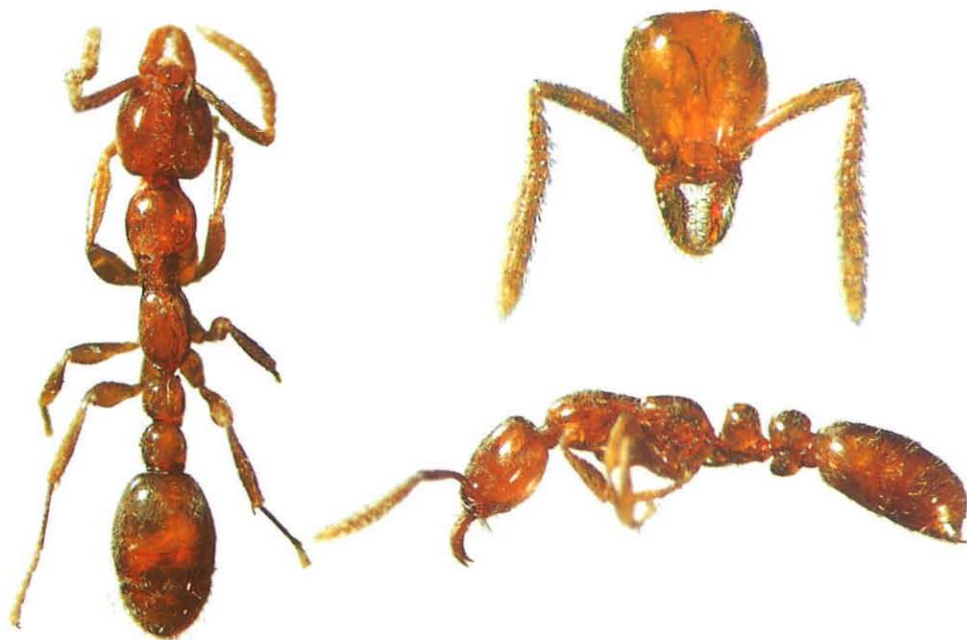
Myrmica jessensis Forel



Workers 3-4.5 mm. Brown-reddish brown, head, gaster dark. Scape bent basally at ca. 100 degrees, bend dorsally margined, usually with thin projecting blackish lamella. Clypeal border medially concave. Dorsal rugae of head, mesosoma weak, spaces narrow. Metanotal groove shallow to deep. Propodeal spines short. Petiolar node short, posterodorsal border not angular. Nests: under stones, open grasslands bare areas.

LEPTANILLINAE

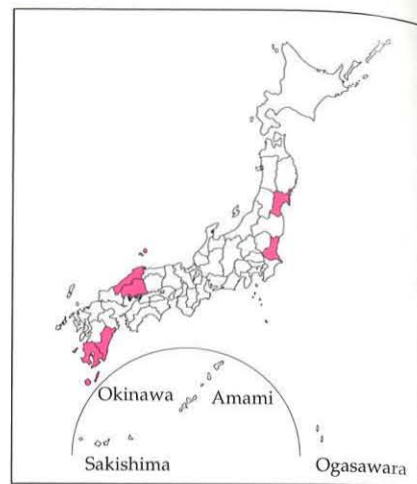
Protanilla sp. 1



Workers 2.5 mm. Yellowish-reddish brown. Almost entirely smooth, shining, unsculptured. Mandibles long, triangular, down-curved; inner surfaces with peg-like setae. Scape exceeding occiput. Head ca. 1.3 x longer than wide. Mesosoma slender; promesonotum arched; metanotal groove deep. Propodeum as large as pronotum; dorsum longer than declivity. Petiole, postpetiole of similar size. Petiole ventrally rounded, with subtrapezoidal projection. First gastral segment large. Sting long, a triangular structure apically.

LEPTANILLINAE

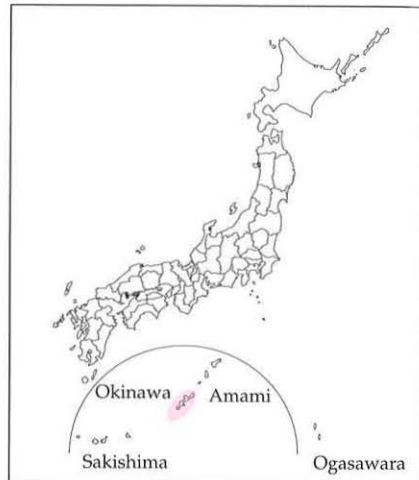
Anomalomyrma sp. 1



Workers 2.5 mm. Reddish brown. Groove on outer surface of mandible from base to terminal quarter. Metanotal groove crossed by several short striae. Petiolar node rounded in profile; ventral portion prominent. Very rare.

LEPTANILLINAE

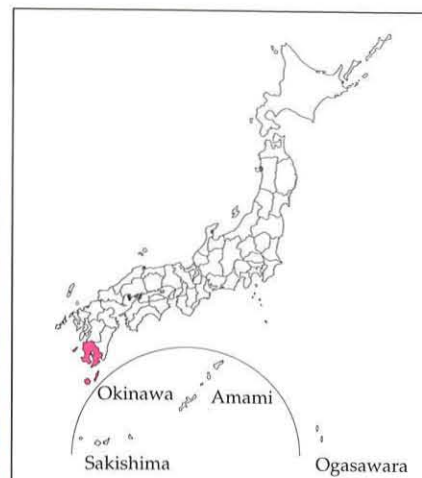
Leptanilla sp. 6



Workers 1 mm. Mandibles 3-toothed. Occipital border slightly concave. Similar to *L. morimotoi*, but apical segment of antenna relatively short, shorter than length of preceding 10th, 11th segments together.

LEPTANILLINAE

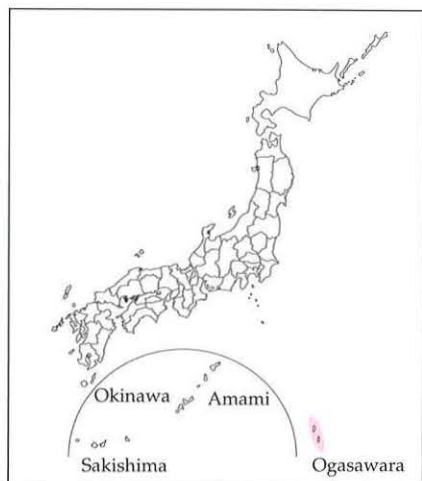
Leptanilla tanakai Baroni Urbani



Workers 1 mm. Mandibles 3-toothed. Occipital border slightly concave. Postpetiole more or less marginate posteriorly, forming a vertical face, posterior portion appears straight, corners rounded in dorsal view. First gastral segment narrowed anteriorly, anterior width as broad as postpetiole or narrower.

LEPTANILLINAE

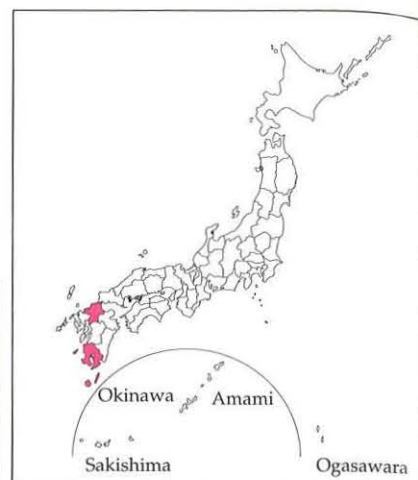
Leptanilla oceanica Baroni Urbani



Workers 1 mm. Mandibles 3-toothed. Anterior clypeal margin produced, with median incision - a configuration unique among Japanese *Leptanilla* species. Posterior margin of head concave.

LEPTANILLINAE

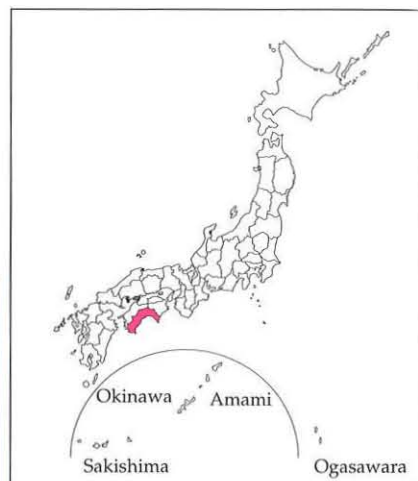
Leptanilla morimotoi Yasumatsu



Workers 1 mm. Mandibles 3-toothed. Apical antennal segment longer than preceding 10th, 11th segments together. Posterior cephalic margin concave. First gastral segment with almost parallel sides, corners rounded anteriorly in dorsal view.

LEPTANILLINAE

Leptanilla kubotai Baroni Urbani



Workers ca 1.5 mm. The largest Japanese *Leptanilla* species. Mandibles 3-toothed. Occipital border almost straight. Ventral portion of petiole not prominent; almost straight (a major distinguishing characteristic). First gastral segment with somewhat convergent sides.

Aphaenogaster luteipes Watanabe & Yamane

Fig. p 161

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Nansei Is (Amami-oshima I. to Okinawa I., Senkaku Is).

Total length of workers 3.5-5 mm. Body reddish light brown to dark brown. Antennal flagellum progressively more pale towards its apex; the club paler than the remainder. Very similar to *A. concolor*, but distinguished by the more laterally produced eyes, the presence of 4 strong bristles on the anteriorly produced median margin of the clypeus (there are 2 bristles in *A. concolor*), and the higher chromosome number ($2n=32$ vs. 30).

Nests are found in the soil in forests and at forest margins. The gasters of foraging workers are turned downwards, and death-feigning behavior is absent.

Aphaenogaster kumejimana Watanabe & Yamane

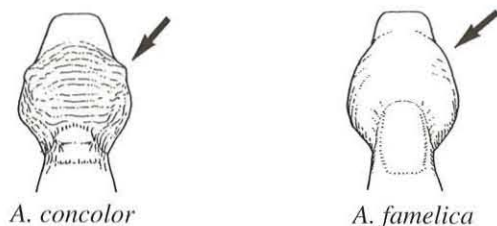
Fig. p 161

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Nansei Is (Kumejima I.).

Total length of workers 4.5-5.5 mm. Body light brown, the head and gaster slightly darker. Legs yellow. As seen from above a large gap separates the pronotum from the mesonotum. This species is not separable from *A. concolor* in worker morphology but the two differ in chromosome number ($2n=26$ in *kumejimana*, $2n=30$ in *concolor*).

This species nests in rotting wood, tree holes etc. Workers turn their gasters downwards while foraging, and perform death-feigning behavior.



Aphaenogaster concolor Watanabe & Yamane

Fig. p 162

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Nansei Is (Okinoerabujima, Okinawa I.).

Total length of workers 4.5 - 6 mm. Head and mesosoma brown to yellowish brown; gaster blackish to dark brown; legs yellowish brown. Similar to *Aphaenogaster famelica* and *erabu*, but separa-

ble in having striation and punctation on the pronotal dorsum, and angulate pronotal humeri.

The taxon varies in form and color. As conceived here it could include several closely similar species. Nests are found in woodland or its margins, in the soil, under wood or in wood cavities.

Aphaenogaster erabu Nishizono & Yamane

Fig. p 162

Original Reference: Nishizono, Y. & Yamane, S. (1990)

Synonym(s): *Aphaenogaster famelica erabu* Nishizono & Yamane, 1990; Watanabe & Yamane, 1992

Distribution: Nansei Is (Kuchinoerabujima I., ? Kuroshima I., Nakanoshima I., Akusekijima I.).

Very similar to *A. famelica* in body shape and sculpture. *A. erabu* is, however, consistently distinguished from *famelica* by its yellowish brown body color, shorter propodeal spines, and lower chromosome number ($2n=32$ vs. $2n=34$).

The population on Kuroshima I. is undoubtedly closely related to the others listed above, but there is some uncertainty concerning its relative taxonomic status. *A. erabu* nests underground in forests. Workers turn their gasters downwards while foraging.

Aphaenogaster donann Watanabe & Yamane

Fig. p 163

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Yonaguni I.

Total length of workers 6 - 7 mm. Body unicolorous blackish brown. Antennae, mesosoma and legs distinctly relatively long. Propodeal spines large and long. Similar to *Aphaenogaster gracillima*, but separable by its unicolorous body color. Chromosome number $2n=28$.

Nests in the soil of woodland. Turned-down gasters are frequently observed in foraging workers.

Aphaenogaster tokarainsulana Watanabe & Yamane

Fig. p 163

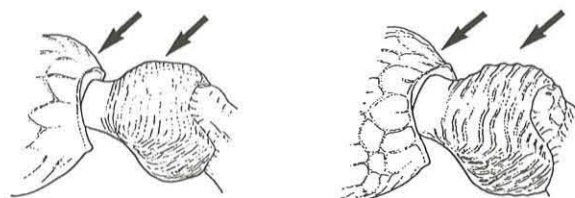
Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Nansei Is (Tanegashima I., Tokara Is).

Total length of workers around 3 - 5.5 mm. Head and mesosoma dark reddish brown; mandibles, petiole, postpetiole and legs lighter; gaster often darker; scapes gradually lightening in color toward their apices; funiculi light reddish brown. Scape, mesosoma and legs relatively rather short compared to other Japanese *Aphaenogaster* species. Head covered with striae and punctures; longitudinal striae on frontal area not reaching occipital carina;

posterior portion of head dull, with irregular striation and punctures. Pronotal humeri angulate. Mesonotum distinctly raised, often higher than pronotum, covered with striae and punctures. Mesopleura dull, covered with minute, dense punctures and parallel striae. Chromosome number $2n=34$.

Foraging workers turn their gasters downwards. This species is found from coastal to inland regions in woodland or its margins. It nests in the soil, under stones or in rotting wood.



A. tokarainsulana

A. rugulosa



A. irrigua

A. osimensis

Aphaenogaster irrigua Watanabe & Yamane

Fig. p 164

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Nansei Is (Tanegashima I., Amami Is. & Okinawa Is.).

Total length of workers around 4 - 6 mm. Head brown to light brown, mesosoma light brown, gaster dark brown to brown, legs light brown. Scapes, mesosoma and legs relatively rather long compared to other Japanese *Aphaenogaster* species. Anterior portion of clypeus with transverse striae. Basal margin of mandibles often weakly serrate. Mesonotum only weakly raised, predominantly covered with punctures. Chromosome number $2n=32$.

Similar to *Aphaenogaster osimensis*, but separable by the presence of shallow, small punctures on the occiput and pronotal dorsum, and the dull surfaces of the propodeum and lateral parts of mesopleura, which are covered with striae and punctures. This species prefers moist situations; it nests in the soil in woodlands, near banks of streams and dry river beds. Foraging workers do not turn their gasters downwards.

Aphaenogaster rugulosa Watanabe & Yamane

Fig. p 164

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Yonaguni I.

Total length of workers around 5 mm. Head and mesosoma blackish brown; antennae, mandibles, legs, petiole, postpetiole and gaster dark brown. Antennae, mesosoma and legs relatively rather short compared to other Japanese *Aphaenogaster* species. Posterior border of head nearly flat in full face view. Head shining, covered with distinct striae and punctures; longitudinal striae on frontal area reaching occipital carina. Striation on pronotal dorsum more distinct than on head, interspaces shining. Pronotal humeri not angulate. Mesosoma distinctly raised, often higher than pronotum, covered with striae and punctures. Lateral portions of mesopleura covered with striae and punctures, but lacking reticulate sculpture. Propodeal spines rather slender, with acute apices. Similar in body shape to *A. japonica* and *A. edentula*. Chromosome number $2n=34$.

Nests in the soil of woodland, including its margins.

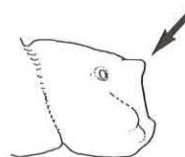
Both gastral turn-down while foraging and death-feigning have been observed in the workers.



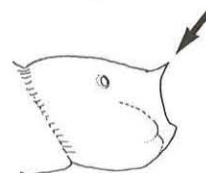
A. japonica



A. rugulosa



A. edentula



A. famelica

Aphaenogaster edentula Watanabe & Yamane

Fig. p 165

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Ogasawara Is (Muko-jima I., Haha-jima I.).

Total length of workers 4 - 6 mm. Body color dark brown; legs, petiole and postpetiole more brownish; mandibles, the four apical antennal segments and tarsi lighter. Head and pronotal dorsum with numerous standing hairs, which are longer and denser than those on gaster. Posterior border of head flat in full face view. Posterior portion of head shining, with simple, sparse striation. Funicular segments strongly constricted between them. Mesonotum raised, but lower than pronotum; covered with striae and shallow punctures. Lateral portions of mesopleurae with strong longitudinal striae and punctures. Propodeal spines weakly developed, low (each shorter than its basal width), with blunt apices.

Nests in the soil in woodland. Known only from the Ogasawara Islands.

Aphaenogaster gracillima Watanabe & Yamane

Fig. p 165

Original Reference: Watanabe, H. & Yamane, S. (1999)

Distribution: Yaeyama Is.

Total length of workers around 3.5 - 8 mm. Head and mesosoma reddish brown; mandibles lighter; scapes, legs and gaster dark brown. Scapes, mesosoma and legs distinctly long and slender. Head elongate behind eyes, in full face view strongly but gradually narrowed posteriorly. The funicular segments each elongate; the apical four lighter in color than the others. Mesonotum weakly raised and covered with irregular striation and punctation. Propodeal spines varying in shape from long and slender to short and broad. Chromosome number $2n=28$. Similar to *A. donann*, but distinguished by worker coloration and male morphology.

This species nests in the soil or rotting wood.

Aphaenogaster tipuna Forel

Fig. p 166

Original Reference: Forel, A. (1913)

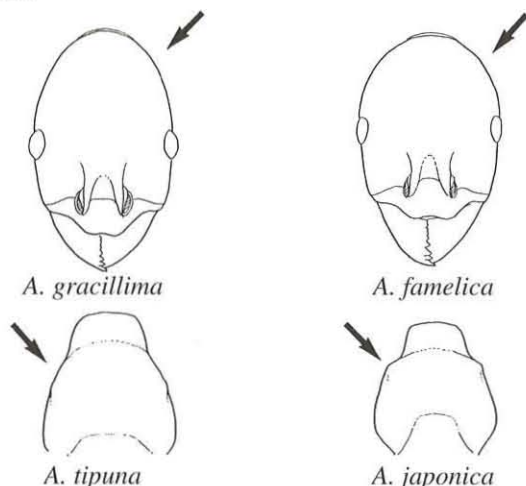
Synonym(s): *Aphaenogaster rothneyi tipuna* Forel (Forel, 1913)

Aphaenogaster tipuna Santschi (Santschi, 1937)

Distribution: Ishigaki I., Iriomote I.; Southern islands of Korea, Taiwan.

Total length of workers around 3 - 5.5 mm. Head and mesosoma reddish brown; gaster dark brown. Scapes, mesosoma and legs relatively rather short compared to other Japanese *Aphaenogaster* species. Posterior border of head flat. Occipital area smooth and shining, covered with shallow punctures. Pronotum shining, with shallow punctures and feeble striae; humeri not angulate. Mesonotum raised but lower than pronotum, forming an angulate convexity covered with striae and punctures. Lateral portions of mesopleurae covered with reticulation and punctures. Propodeal spines slender.

This species nests in the soil, under stones, or in cavities of plant roots.



Aphaenogaster japonica Forel

Fig. p 166

Original Reference: Forel, A. (1911)

Synonym(s): *Aphaenogaster Schmitzi japonica* Forel (Forel, 1911)

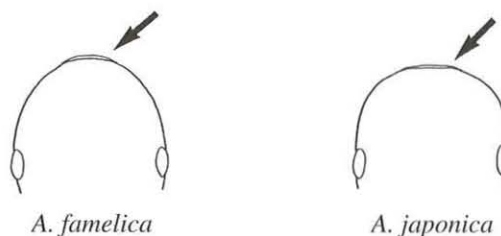
Aphaenogaster (Attomyrma) syriaca japonica Emery (Emery, 1921)

Aphaenogaster (Attomyrma) smythiesi japonica Wheeler (Wheeler, 1928)

Distribution: Hokkaido, Honshu, Izu Is, Shikoku, Tsushima I., Kyushu, Yaku I.; Korean Peninsula, Jeju-do I.

Total length of workers around 3 - 5 mm. Body color dark- to light-brown; legs dark brown to dark yellowish brown. Scapes, mesosoma and legs relatively rather short compared to other Japanese *Aphaenogaster* species. Posterior border of head flat in full face view. Occipital area opaque, covered with punctures. Dorsal surface of pronotum predominantly punctate medially, and with feeble, transverse marginal striae. Pronotal humeri angulate. Mesonotum distinctly raised, sometimes higher than pronotum, forming an angulate convexity covered with punctures and striae. Lateral areas of mesopleurae covered with punctures. Propodeal spines broad, their apices acute.

The ant is found on the plains of eastern Japan (Mizutani & Imamura, 1980), and at higher elevations in the west, nesting in the soil or under stones in woodland or its margins. Chromosome number $2n = 22$ (from Asamushi, Aomori Prefecture: Imai, 1969). Nishizono & Yamane (1990) reported a form with stronger sculpturation from a mountainous region in Kagoshima Prefecture at 400 to 500 m elevation. It has the dorsal surface of the pronotum almost completely transversely striate.



Aphaenogaster osimensis Teranishi

Fig. p 167

Original Reference: Teranishi, C. (1940)

Synonym(s): *Aphaenogaster famelica* var. *osimensis* Teranishi (Teranishi, 1940)

Aphaenogaster lepida? Okamoto (Okamoto, 1966)

Aphaenogaster osimensis Imai (Imai, 1971)

Distribution: Honshu, Izu Is, Ogasawara Is, Shikoku, Kyushu, Nansei Is.

Total length of workers around 4 - 6 mm. Head and gaster dark brown to reddish brown; mesosoma, petiole and postpetiole light brown; legs brown. Scapes relatively rather short compared to other Japanese *Aphaenogaster* species. Clypeus with transverse striae on its anterior portion. Basal margin of mandibles weakly

serrate. Posterior part of head and dorsal part of pronotum smooth and shining, lacking sculpture. Mesonotum not distinctly raised, and with poorly developed striation and punctures. Propodeum and sides of metanotum shining, with little sculpturation.

A. osimensis generally nests in the soil, crevices in rocks, or under stones in open rocky seashore habitats. On small islands the range of occupied habitats is extended to include forests and their margins, or inland rocky areas. Foraging workers turn their gasters downwards. Chromosome number $2n = 32$ (from Manazuru, Kanagawa Prefecture: Imai, 1969).

Aphaenogaster famelica (F. Smith)

Fig. p 167

Original Reference: Smith, F. (1874)

Synonym(s): *Aphaenogaster famelica* Fr. Smith (Fr. Smith, 1874)

Aphaenogaster famelica Mayr (Mayr, 1878)

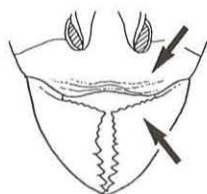
Stenamma (Aphaenogaster) famelicum Wheeler (Wheeler, 1906)

Aphaenogaster (Attomyrma) famelica Emery (Emery, 1921)

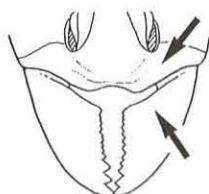
Distribution: Hokkaido, Honshu, Sado I., Izu Is, Shikoku, Kyushu, Iki I., Tsushima I., Tanegashima I., Yaku I.; Mainland China.

Total length of workers around 3.5 - 8 mm. Body color dark reddish brown; head and gaster blackish brown. Scapes, mesosoma and legs relatively long. Pronotum varying from feebly punctate with weak luster to distinctly punctate and opaque. Rugae are sometimes developed on the lateral pronotal surfaces of larger workers. Pronotal humeri not angulate. Mesonotum covered with rugae, and with its dorsum raised to a variable degree. Propodeal spines broad basally and acute apically, their dorsal outlines straight and ventral outlines concave in lateral view.

This is the most common Japanese *Aphaenogaster* species. It is found in lowland areas of eastern Japan, and ranges from lowlands to mountainous areas in the west. Nests are found in open soil or under stones in woodlands and their margins. Gastral turn-down is apparently absent in foraging workers. Chromosome number $2n = 34$ (from Tanzawa, Kanagawa Prefecture: Imai, 1969). *Aphaenogaster erabu*, which inhabits Kuchinoerabu-jima and the Tokara Islands, is distinguished from the *A. famelica* by its yellowish brown body color and elongate propodeal spines, and by the downwards turning of the gasters in foraging workers.



A. osimensis



A. famelica

Stenamma owstoni Wheeler

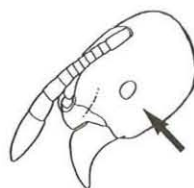
Fig. p 168

Original Reference: Wheeler, W.M. (1906)

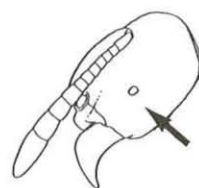
Distribution: Honshu, Shikoku, Kyushu; Mainland China.

Total length of workers around 2.5 - 4 mm. Body color yellowish brown to dark reddish brown. Similar to *S. nipponense*, but the eyes larger (longest diameter exceeding length of 9th antennal segment).

Judging from Arnoldi's (1975) description of the Russian species *S. kurilense*, *S. owstoni* is similar, but *kurilense* is smaller and less slender. Arnoldi indicated that the petiole of *S. kurilense* is shorter and higher than that of *S. owstoni*. But *S. owstoni* is more variable in size, so that the proportions and the shape of the petiole are substantially variable. Thus, the identity of *S. kurilense* versus *S. owstoni* needs examination. *S. owstoni* is found in woodland or its margins, and nests in the soil. Kubota (1988) reported many seeds of the plant *Clethra barbinervis* from a nest. This suggests that *S. owstoni* is a granivore, which harvests seeds for larval food. Forel (1911) recorded it from Hokkaido, but we suppose this record to be a misidentification. The northernmost confirmed distribution record is from Iwate Prefecture (Tanaka, 1974a). A rather rare species.



S. owstoni



S. nipponense

Stenamma nipponense Yasumatsu & Murakami

Fig. p 168

Original Reference: Yasumatsu, K. & Murakami, Y. (1960)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.

Total length of worker 2.5 - 3.5 mm. Body color yellowish-brown to dark reddish-brown. Head and mesosoma covered with irregular reticulation. Antennal scapes reaching posterior margin of head. Eyes small, longest diameter shorter than the 9th antennal segment. Anterodorsal portion of propodeum sometimes marginate.

The species is found in woodland or its margins, and nests in the soil. *Stenamma nipponense* is not rare in Hokkaido, but less common in other regions. Winged reproductives can be observed in late September in Hokkaido. The southernmost record is from Yaku Island (Terayama & Yamane, 1984).

Manica yessensis Azuma

Fig. p 169

Original Reference: Azuma, M. (1955)

Distribution: Hokkaido, Honshu (the central part and northwards).

Total length of workers around 5 - 7 mm. Head and gaster black, other parts brown, yellowish brown, or reddish brown. Mandibles armed with two large apical teeth and 10 or 11 denticles. Anterior clypeal margin slightly concave in the middle. Antennal scapes just

reaching posterior border of head; abruptly bent at the base. Dorsal margin of promesonotum in lateral view smoothly connected with the metanotal groove. Metanotal groove deeply impressed both dorsally and laterally. Both sides of the transition area between the dorsal and declivitous faces of the propodeum slightly raised and obtusely angulate in lateral view. Dorsal faces of head, mesosoma and petiole longitudinally rugose. Standing hairs abundant on body. Tibial spurs of middle and hind legs simple (they are more or less pectinate in the other *Manica* species).

The larvae of this species were described under the name "*Manica* sp." by Wheeler & Wheeler (1977). *M. yessensis* nests in the soil of volcanic mountains at gravelly sites with patchy vegetation, or under stones in dry river-beds. Dietary items include insects and honey dew. Winged reproductives emerge in August. *Manica yessensis* is sporadically distributed, perhaps in relation to its particular habitat preferences.

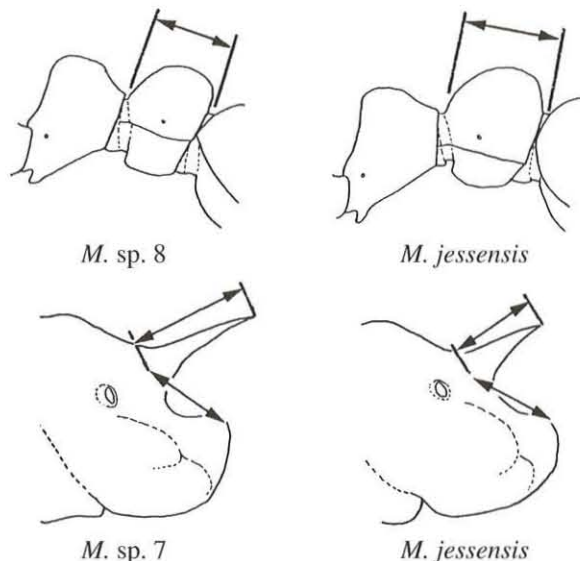
Myrmica sp. 8

Fig. p 169

Distribution: Hokkaido.

Total length of workers around 4 mm. Body color somewhat darkish brown. Anterior margin of clypeus concave in the middle. Antennal scape narrowed near their bases, where they are bent; the angle of the dorsal margin of the bend is about 100 degrees when viewed parallel to the flexing face of the funiculus. The dorsum of the bend is margined at a right-angle to the axis, and has a small, thin, projecting, blackish-brown lamella. Third funicular segment wider than long. Rugae on dorsa of mesosoma and petiole strongly impressed. Metanotal groove impressed, with a broadly U-shaped profile. Propodeal spines shorter than in *M. jessensis*, and in many cases strongly directed upwards. Posterodorsal border of petiolar node angulate.

This species closely resembles *M. jessensis*, but is distinguished by its shorter petiole. It nests in open sites and is found in the mountains of Hokkaido up to higher elevations. Rather rare.



Myrmica sp. 7

Fig. p 170

Distribution: Hokkaido, Honshu (the Kinki District and northwards).

Total length of workers around 4 mm. Body color brown. Anterior margin of clypeus concave in the middle. Antennal scapes bent, each weakly lamellate on the dorsal surface of the bent at a right-angle to its axis. A further extension of this lamella is developed in large workers. The angle of the dorsal margin of the bend is about 120 degrees, viewed parallel to the flexing face of the funiculus. Antennal scape barely narrowed near their bases. Third funicular segment wider than long. Rugae on dorsa of head, mesosoma and petiole strongly impressed; the spaces between them wide. Metanotal groove shallow. Propodeal spines long. Petiolar node low and long.

Myrmica sp. 7 resembles *M. jessensis*, but is distinguished by the morphology of the bent section of the antennal scape and the petiolar structure. This species is rather rare. It is found in forests with sparsely vegetated floors and at the margins of woods in mountainous regions.

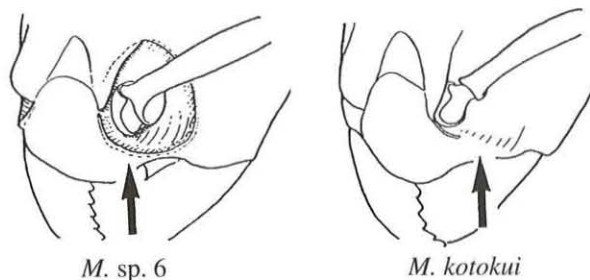
Myrmica sp. 6

Fig. p 170

Distribution: Hokkaido, Honshu (the central part and northwards).

Total length of workers around 3.5 - 4 mm. Body color brown to blackish brown; gaster darker. Posterior margin of clypeus carinate in front of the antennal insertions, so that the latter are each circularly enclosed, as if in a basin. Anterior margin of clypeus almost straight in the middle. Frontal area sculptured with longitudinal rugae. Coarse longitudinal rugae present on pronotal dorsum.

Easily distinguished from other Japanese *Myrmica* species because the posterior margin of its clypeus is carinate and the antennal scape is bent at a right-angle, with the corner rounded. *Myrmica* sp. 6 was referred to as *M. scabrinodis* in Morisita (1945), and by the Japanese name Shiga-kushike-ari in Sonobe (1976) and Myrmecological Society of Japan Editorial Committee (1988). This rather rare species nests under stones at bare sites and in grasslands. Distribution in the mountains of central Honshu is from 500 to 1500 m above sea level.



Myrmica luteola Kupyanskaya

Fig. p 171

Original Reference: Kupyanskaya, A. N. (1995)

Distribution: Hokkaido, Honshu (the central part and northwards); East Siberia, Sakhalin, Taiwan.

Myrmica sp. 5

Total length of workers around 5 - 5.5 mm. Body color ochreous to brown. The gaster of foraging workers often appears waxy. Head relatively broad. Antennal scapes rather strongly curved near their bases and a little thickened at the bend. Anterior margin of clypeus straight or slightly concave in the middle, lacking denticles. Rugae on thoracic dorsum rather weak and irregular. Subpetiolar process developed anteriorly. Ventral border of petiole convex in the middle when viewed laterally. Tibial spurs of middle and hind legs small, essentially simple or with a few spines.

This species resembles *M. kurokii*, but is easily distinguished from it and other species because the ventral border of its petiole is convex in the middle in lateral view, and by the characteristic morphology of the antennal scapes. In the worker, the propodeal spines are long, but in the female they are very small and short, sometimes reduced and merely angulate, to absent. The females are a little smaller than the workers. This species is a temporary parasite of *M. jessensis*. A species "*Manica* sp. 2" (with Japanese name: Tsuya-kushike-ari) was recognized in "Identification Guide III" (Myrmecological Society of Japan, 1992) from a female specimen, which is here identified as *M. luteola*. *M. luteola* nests under stones and around the roots of trees at rocky sites and in sparse woodlands. Workers forage on the leaves of Sasa bamboos and attend aphids. Nuptial flights occur from September to mid October.

Myrmica rubra (Linnaeus)

Fig. p 171

Original Reference: Linnaeus, C. (1758)

Synonym(s): *Formica rubra* Linnaeus, 1758

Myrmica rubra (Linnaeus): Latreille, 1804

Myrmica laevinodis Nylander, 1846

Myrmica laevinodis var. *bruesi* Weber, 1947

Myrmica rubra r. *champlaini* Forel, 1901

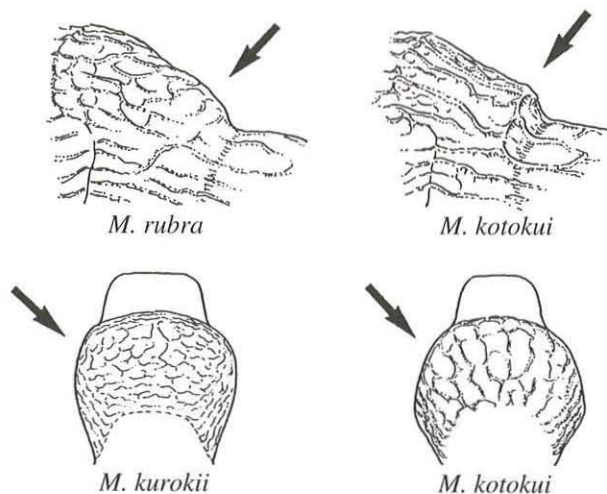
Myrmica longiscapus Curtis, 1854

Distribution: Hokkaido, Honshu (Kyoto Pref.); Sakhalin, Kunashiri I., Mainland China, Korean Peninsula, north Eurasia.

Total length of workers around 4 - 5.5 mm. Body color yellow to yellowish brown. In the field workers are clearly yellowish.

This species closely resembles *M. kotokui*, and is at times difficult to distinguish, due to variation in morphology and color in *M. kotokui*. However, the unraised rugae on the posterodorsal portion of the mesonotum are usually characteristic, though some *M. kotokui* workers have this character. It is best in the field to examine the body coloration of a number of workers from each colony. Also, *M. rubra* has fewer strong rugae, and is more smooth on the lower half of the mesonotal pleura than *M. kotokui*; its propodeal spines are shorter, and the rugae on the anterior basal portion of the

1st gastral tergite are relatively weak and fewer in number. Although Japanese specimens differ morphologically from European *M. rubra* material, and resemble *M. kotokui* in petiolar morphology, the name *Myrmica rubra* is applied to them for the present. This species nests in the soil of grassland on seashores and lowlands (Onoyama, 1989). Rare in Japan.



Myrmica kurokii Forel

Fig. p 172

Original Reference: Forel, A. (1907)

Synonym(s): *Myrmica rubra* subsp. *kurokii* Forel, 1907e

Myrmica kurokii: Emery, 1908a

Distribution: Hokkaido, mountains of central Honshu; Sakhalin, Korean Peninsula.

Total length of workers around 4.5 - 5.5 mm. Body bicolored: head, gaster and legs black, mesosoma reddish brown. Antennal scapes curved rather strongly near the base. Anterior margin of clypeus convex at the center, without projecting denticles. Pronotal dorsum with fine, irregular rugae; mesonotal dorsum with fine rugae, which are in many cases transverse; smooth, shining areas small. Petiolar node short; posterodorsal border in lateral view curving rather gently posteriorly. Subpetiolar process developed, projecting anteriorly.

This species nests in grasslands, under stones at rocky sites, and near the roots of trees. Its altitudinal distribution is the most extreme among Japanese *Myrmica* species - it attains 1900 m or more above sea level in central Honshu (Morisita, 1945) and 1000 m or more on Hokkaido (Hayashida, 1971; Sonobe, 1981).

Myrmica kotokui Forel

Fig. p 172

Original Reference: Forel, A. (1911)

Synonym(s): *Myrmica ruginodis* var. *kotokui* Forel, 1911

Myrmica kotokui: Collingwood, 1976

Myrmica ruginodis kotokui: Onoyama, 1989

Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Yaku I.; Sakhalin, Korean Peninsula.

Total length of workers around 4 - 5.5 mm. Body color brown to blackish brown; legs lighter. Antennal scape gently curved near the base. Anterior margin of clypeus convex in the middle; the clypeal rugae projecting anteriorly to appear as denticles. Thoracic dorsum with strong rugae, many of them longitudinal. Rugae on posterior border of mesonotal dorsum raised. Propodeal spines usually long. Anterior base of 1st gastral tergite with longitudinal rugae.

This species is not very different from the European *M. ruginodis* Nylander and perhaps properly conspecific. Onoyama (1989) suggested that it might best be considered a subspecies of *ruginodis*. Detailed study, including comparison with *ruginodis* specimens from the Far East, is required. Mizutani (1981) stated that the populations of dry riverbeds near Sapporo are polygynous, while those of mountainous regions are monogynous, and that reproductive methods and head width are different in these two areas. He recognized small-female "microgyna" and large-female "macrogyna" variants. Future study is clearly required (no relevant specimens are currently to hand).

This species nests under stones, in the soil, and in fallen rotting logs, etc. It is very common in cool regions. Winged reproductives fly from September to early October.

Myrmica jessensis Forel

Fig. p 173

Original Reference: Forel, A. (1901)

Synonym(s): *Myrmica lobicornis jessensis* Forel, 1901

Myrmica jessensis [!] Collingwood, 1976

Myrmica lobicornis subsp. *littoralis* Weber 1948a

Distribution: Hokkaido, Honshu (the central part and northwards); Sakhalin, Kunashiri I.

Total length of workers around 3 - 4.5 mm. Body color brown to reddish brown, head and gaster relatively dark. Antennal scape bent at the base; the angle of the dorsal margin of the bend about 100 degrees, viewed parallel to the flexing face of the funiculus. Dorsum of the bend margined at a right angle to the axis, and usually with a thin projecting blackish brown lamella. Antennal scape slender near the base. Anterior margin of clypeus concave in the middle. Rugae on the dorsa of head and mesosoma rather weakly impressed, the intervening spaces narrow. Metanotal groove variable, shallow to deep. Propodeal spines rather short. Petiolar node short, posterodorsal border not angular.

This species nests under stones or in the soil of open grasslands or bare lands, and can be abundant in dry riverbeds. It ranges from 200 to 1700 m above sea level in central Honshu (Morisita, 1945), and has been found at 20 m elevation in the dry bed of the Sagami River, Kanagawa Prefecture (Kubota, 1983).



Subfamily LEPTANILLINAE

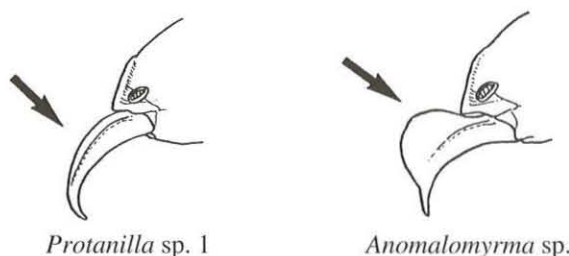
Protanilla sp. 1

Fig. p 173

Distribution: Kyushu, Nansei Is; Taiwan.

Total length of workers around 2.5 mm. Color yellowish to reddish brown. Mandibles long and triangular, down-curved at apical 1/3; inner surface with peg-like setae. Antennal scape slightly exceeding posterior margin of head. Head about 1.3 times as long as broad. Mesosoma slender. Promesonotum weakly arched; metanotal groove deeply impressed. Propodeum almost the same size as pronotum; dorsal surface longer than declivity in profile. Petiole and postpetiole almost matching in size. Ventral portion of petiole rounded, with a small subtrapezoidal projection. First gastral segment large. Sting long, with a triangular structure apically and a small tooth subapically. Body surface almost smooth, shining, without sculpture.

This species has been referred to as "Ponerinae ? sp." (Sonobe, 1972), "Gen. C sp. 1" [Japanese name: Okinawa-juzufushi-ari] and Gen. C sp. 2 [Senkaku-juzufushi-ari] of Myrmecological Society of Japan (1988). A colony collected from Seifaa-utaki, Okinawa I. in March contained one dealate female, 77 adult workers, 168 larvae and 17 eggs (Onoyama, unpublished). The postpetiole of the female is separated from the petiole by a marked constriction. A single, fused sternal plate, like that of *Anomalomyrma*, is not present. Found in Kyushu and the south, and also from Taiwan (Terayama, 1999). Not common.



Anomalomyrma sp. 1

Fig. p 174

Distribution: Honshu, Kyushu.

Color reddish brown. Longitudinal groove on outer surface of mandible running from the base to the terminal quarter of the jaw. Metanotal groove interrupted by several short striae. Petiolar node rounded in profile; ventral portion prominent.

Hölldobler & Wilson (1990: Fig. 16-19, p. 592) published two scanning electron micrographs of this species prepared by Taylor as "*Anomalomyrma kubotai*". That name is a nomen nudum, due to the lack of a formal description. This species is very rare: only three individuals have been collected. A worker from Hikimi, Shimane Prefecture was found on the ground at a woodland margin (Ogata, 1988).

Leptanilla sp. 6

Fig. p 174

Distribution: Okinawa I.

Total length of workers around 1 mm. Mandibles with 3 teeth. Posterior margin of head slightly concave. Similar to *L. morimotoi*, but apical segment of antenna relatively short, shorter than the length of the preceding 10th and 11th segments together.

Leptanilla tanakai Baroni Urbani

Fig. p 175

Original Reference: Baroni Urbani, C. (1977)

Distribution: Yaku I.

Total length of workers around 1 mm. Mandibles with 4 teeth. Posterior margin of head slightly concave. Postpetiole more or less marginate posteriorly, forming a vertical face, so that the posterior portion appears straight, with rounded corners in dorsal view. First gastral segment narrowed anteriorly, its anterior width as broad as postpetiole, or narrower.



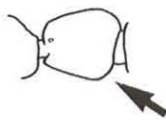
L. tanakai



L. kubotai



L. tanakai



L. kubotai

Leptanilla oceanica Baroni Urbani

Fig. p 175

Original Reference: Baroni Urbani, C. (1977)

Distribution: Ogasawara Is.

Total length of workers around 1 mm. Mandibles with 3 teeth. Anterior margin of clypeus produced, and with a median incision - a configuration unique among Japanese *Leptanilla* species. Posterior margin of head concave.

Leptanilla morimotoi Yasumatsu

Fig. p 176

Original Reference: Yasumatsu, K. (1960)

Distribution: Kyushu (Fukuoka).

Total length of workers around 1 mm. Mandibles with 3 teeth.

Apical segment of antenna longer than length of preceding 10th and 11th segments together. Posterior margin of head concave. First gastral segment with almost parallel sides, and with corners rounded anteriorly in dorsal view.

This was the first *Leptanilla* species discovered in Japan (Yasumatsu, 1960). Known only from the type material.

Leptanilla kubotai Baroni Urbani

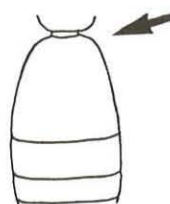
Fig. p 176

Original Reference: Baroni Urbani, C. (1977)

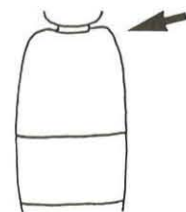
Distribution: Shikoku (Kochi).

Total length of worker ca 1.5 mm. The largest Japanese *Leptanilla* species. Mandibles with 4 teeth. Posterior margin of head almost straight. Ventral portion of petiole not prominent; almost straight (the major distinguishing characteristic of this species). First gastral segment with the sides somewhat convergent.

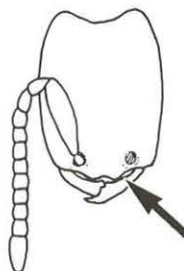
Nests are found in small hollows in the soil (Kondoh, personal communication). Known only from the type locality.



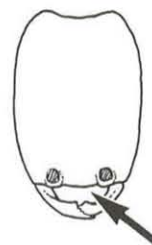
L. kubotai



L. morimotoi



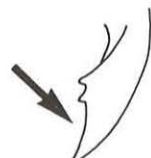
L. oceanica



L. japonica



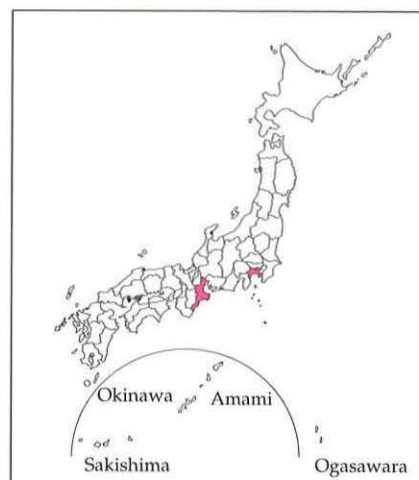
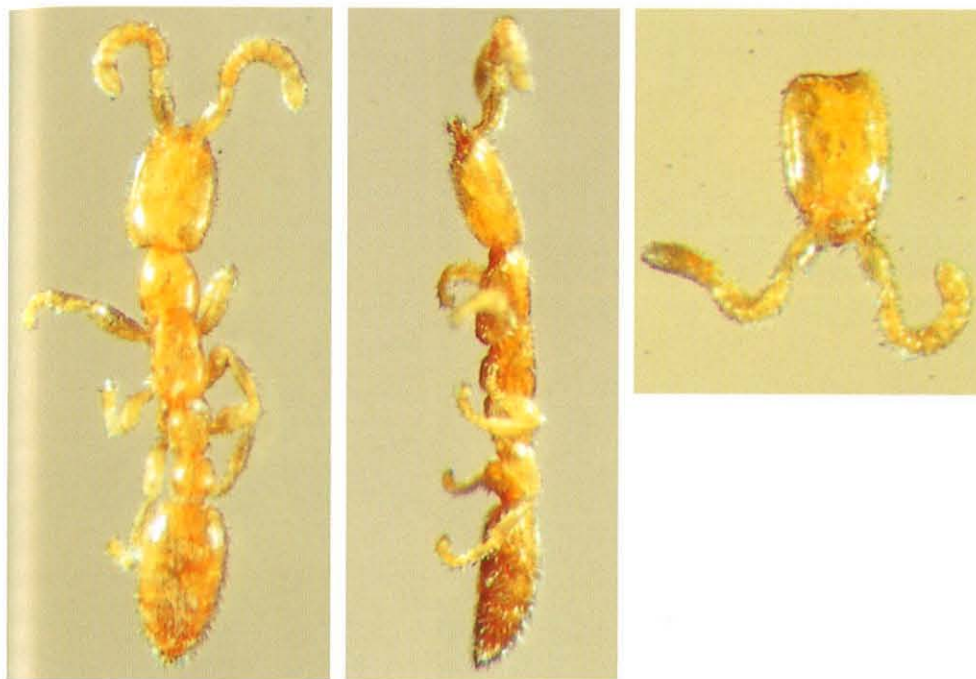
L. japonica



L. morimotoi

LEPTANILLINAE

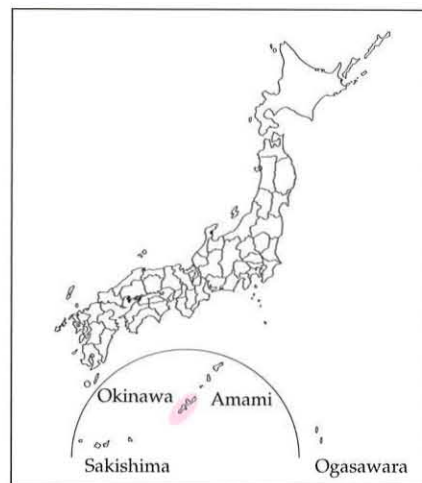
Leptanilla japonica Baroni Urbani



Workers 1 mm. Mandibles 3-toothed. Apical antennomere longer than 2 preceding together (10th + 11th). Occipital border almost straight. First gastral segment with almost parallel sides, not narrowed anteriorly in dorsal view. Distinguished from *L. Morimotoi*, *L. sp. 6*, by 4 teeth on mandible (versus 3). Second tooth from apex, sometimes small, low, obscure.

AENICTINAE

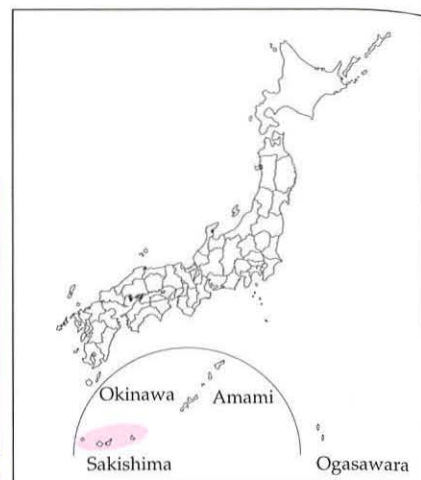
Aenictus ceylonicus (Mayr)



Workers 3 mm. Brown; legs yellow. Mandibles slender, subtriangular, with 5 or 6 teeth. Antennae 10-segmented. Propodeal sides irregularly rugose. Subpetiolar process small, bearing a small lobe.

AENICTINAE

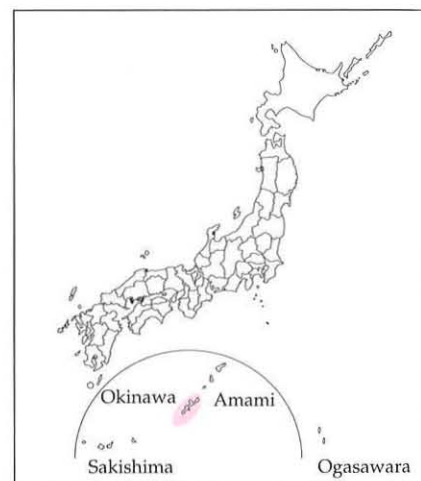
Aenictus lifui Terayama



Worker ca. 2-2.5 mm. Yellowish brown; head, gaster, legs yellow. Mandibles subtriangular, 7-toothed. Antennae 10-segmented. Promesonotal dorsal profile weakly convex. Propodeum: posterodorsal corner angulate; sides without rugae. Subpetiolar process low, a small lobe.

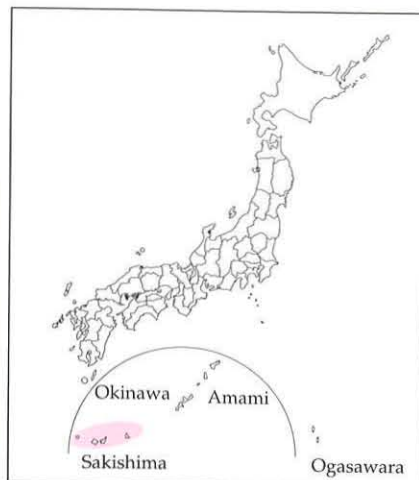
PSEUDOMYRMECINAE

Tetraponera attenuata F. Smith



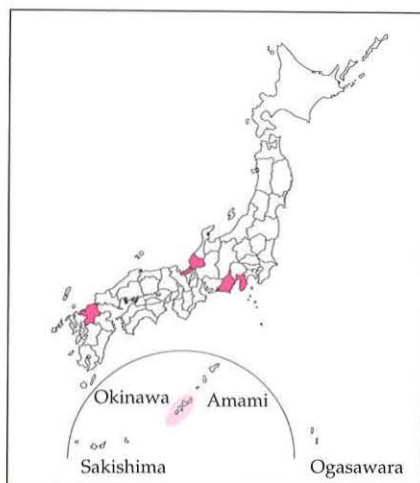
Female ca 10 mm. Black. Mandibles with 5 teeth. Anterior clypeal margin with a pair of low teeth.

CERAPACHYINAE

Cerapachys hashimotoi Terayama

Workers 3.5 mm. The largest Japanese cerapachyine species. Reddish brown. Antennae 12-segmented. Body covered with coarse punctures, interspaces smooth, shining; hairs sparse. Eyes present. Pronotum weakly marginate anteriorly. Petiole ca. as long as wide; subpetiolar process distinct. A distinct constriction between 1st, 2nd gastral segments, second shorter than petiole and 1st gastral segment together.

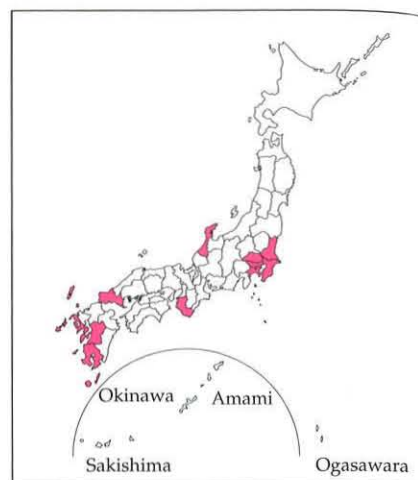
CERAPACHYINAE

Cerapachys daikoku Terayama

Workers 3 mm. Black. Antennae 12-segmented. Body sparsely punctate, interspaces smooth, shining; hairs yellowish. Eyes large, diameter ca. 1/3 head length, situated anteriorly. Areas anterior to eyes each with a longitudinal groove. Pronotum marginate anteriorly. Hind coxa: a small vertical lamella dorsally. Petiole broad, flat above, anterior corners angulate. Second gastral segment shorter than petiole + 1st gastral segment.

CERAPACHYINAE

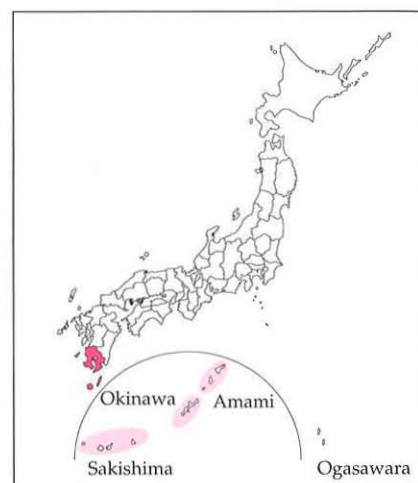
Cerapachys humicola Ogata



Workers ca. 2.5 mm. Reddish brown. Antennae 11-segmented. Body densely, finely reticulate; hairs short, pale yellow. Eyes absent. Pronotum without anterior margination. Petiole about as long as wide, corners rounded; subpetiolar process distinct, projecting ventrally, apex rounded. Constriction between 1st, 2nd gastral segments less distinct than *C. biroi*. Second gastral segment as long as petiole + 1st gastral segment.

CERAPACHYINAE

Cerapachys biroi Forel



Workers ca. 2.5 mm. Reddish brown. Antennae 9-segmented. Body densely, finely punctate; hairs short, pale. Eyes absent. Pronotum weakly marginate anteriorly. Petiole about as long as wide, node rounded; subpetiolar process distinct, projecting ventrally, curved posteriorly. Constriction between 1st, 2nd gastral segments distinct. Second gastral segment longer than petiole + 1st gastral segment.

PONERINAE

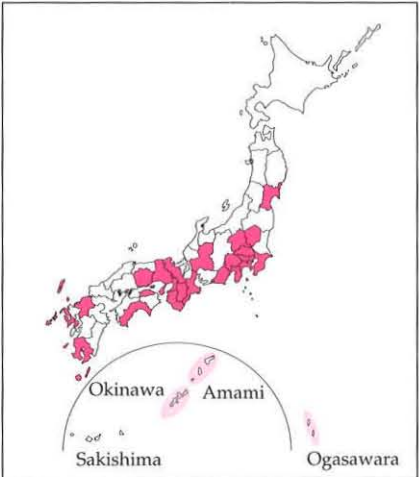
Pachycondyla sakishimensis Terayama



Workers 4.5-5 mm. Mandibles each with a basal pit. General shape, size close to *P. pilosior*; color generally lighter. Subpetiolar process triangular, a major distinguishing feature versus *P. pilosior*. Nests: in soil, forest margins.

PONERINAE

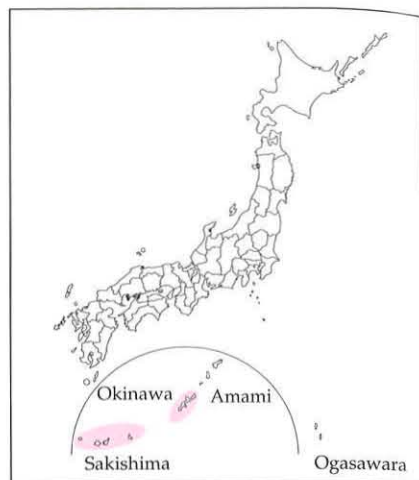
Pachycondyla pilosior (Wheeler)



Workers ca 4.5-5 mm. Dark reddish to blackish brown; antennae, mandibles, legs reddish brown. Head slightly longer than wide in frontal view. Mandibles each with a basal pit. Eyes small, ca. 10 faceted. Subpetiolar process trapezoidal; its anteroventral and posteroventral corners sub-angulate. Relatively rare. Inhabits forest leaf-litter.

PONERINAE

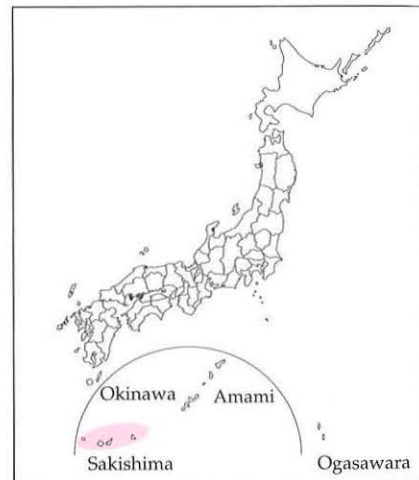
Pachycondyla darwinii (Forel)



Workers: ca 4 mm; females ca 5 mm. Body color yellowish brown. Mandibles with 7 irregular teeth. Basal mandibular pits (found in other Japanese *Pachycondyla* species) lacking. Usually collected as winged females attracted to lights.

PONERINAE

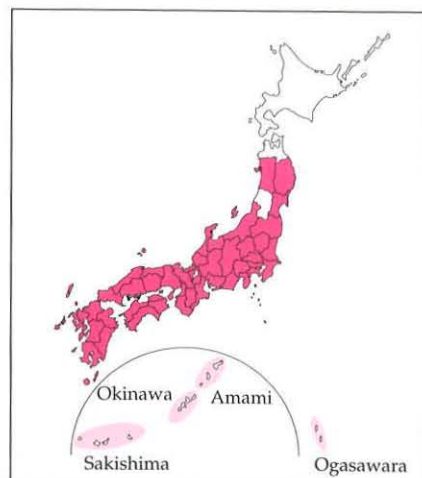
Pachycondyla luteipes (Mayr)



Workers 3.5 mm. Color, habitus similar to *P. chinensis*. Scapes relatively short, exceeding occipital border by less than length of second segment. Propodeum unsculptured, smooth, shining. Males distinguished from *chinensis* by dark color, well developed mandibles.

PONERINAE

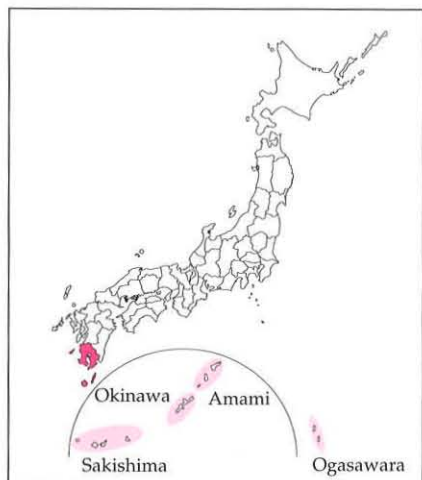
Pachycondyla chinensis (Emery)



Workers 3.5 mm. Black; mandibles, legs light brown. Scapes exceeding posterior occipital border by length of second antennal segment. Lateral surfaces of propodeum more or less sculptured, opaque. Male characteristically pale in color, with reduced mandibles.

PONERINAE

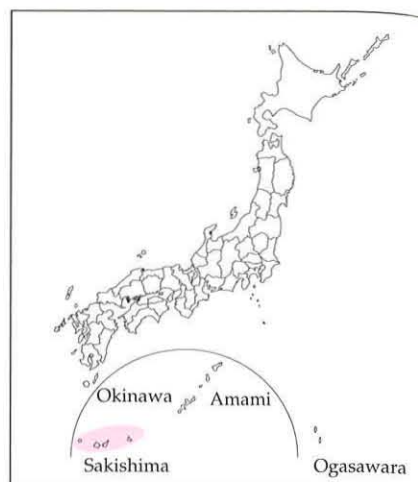
Pachycondyla javana (Mayr)



Workers 7 mm. The largest Japanese ponerine. Generally black. Lateral cephalic margins with blunt keels. Antennae 12-segmented. Head, mesosoma, petiole more or less heavily sculptured; gaster smooth, shining. Mesopleuron subdivided by an oblique furrow. Nests: under stones at forest margins.

PONERINAE

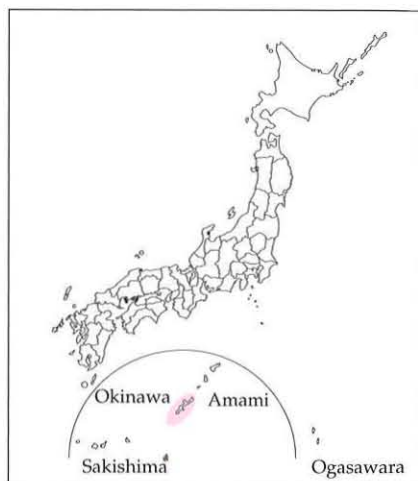
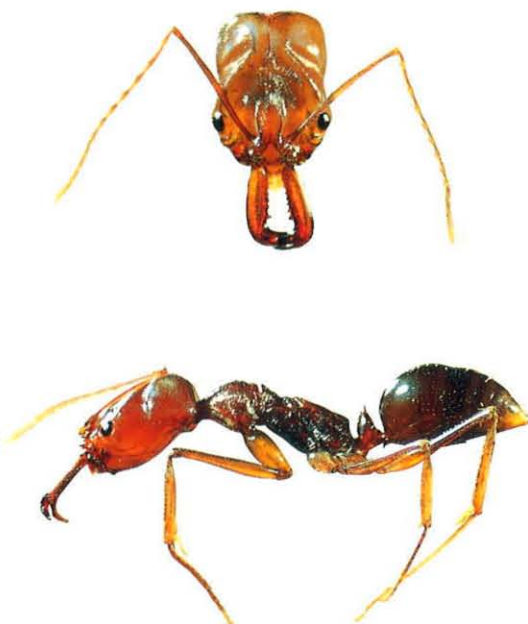
Anochetus shohki Terayama



Workers 4.0 mm. Head, mandibles, antennae brown; mesosoma, petiole dark brown; gaster blackish brown; legs yellowish brown. Mandibles 0.8 x head length, apical portions each with 3 acute teeth; inner margins straight; shafts only weakly broadened anteriorly; dorsal margins without teeth. Scapes failing occipital corners. Eyes moderately large. Anterior pronotal margin carinate. Petiole thin, dorsally carinate; anterior margin straight, posterior margin weakly convex in profile.

PONERINAE

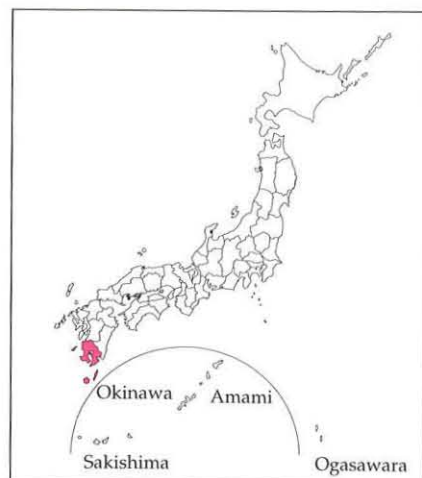
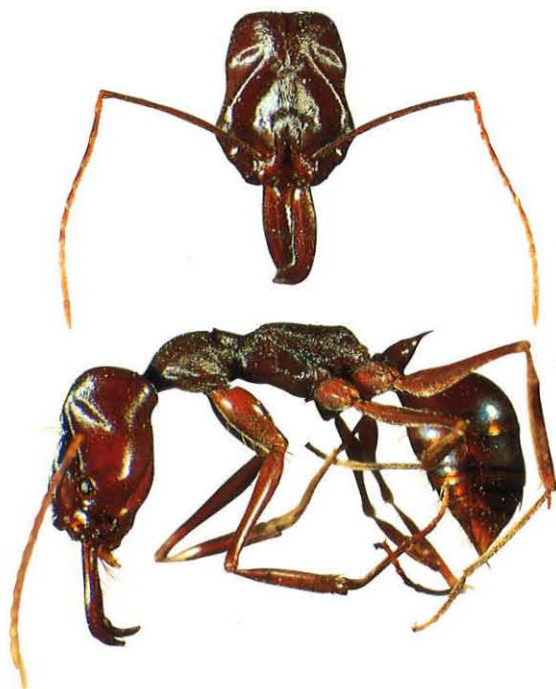
Odontomachus sp. 2



Workers 9 -10 mm. Head, mesosoma brown, gaster blackish brown. Distinguished by elongate subapical mandibular teeth (each about twice as long as wide), almost smooth posterior cephalic dorsum. Female slightly larger than worker. Nests: under stones, in soil near roots of trees. Nuptial flights early-mid- July.

PONERINAE

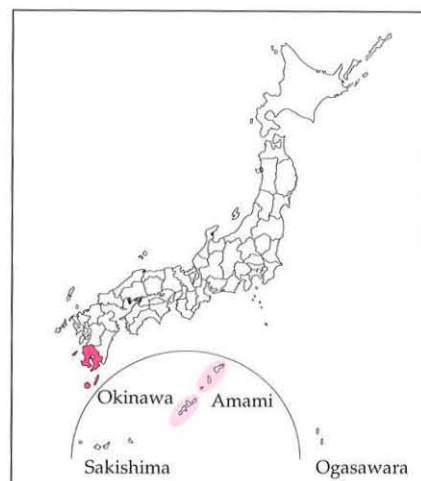
Odontomachus monticola Emery



Workers 10-13 mm. Blackish brown-dark brown. Truncate (subapical) tooth of apical mandibular dentition short, only about 1.5 times as long as wide. Posterior cephalic dorsum covered with fine striae. Nests: under stones, rotten wood.

PONERINAE

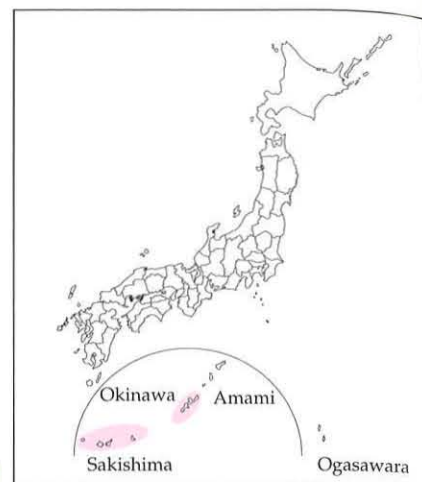
Leptogenys confucii Forel



Workers 4.5 mm. Dark reddish brown-blackish brown; legs yellow. Head slender, anterior clypeal margin triangular. Mandibles elongate, toothless. Eyes large, placed anteriorly on cranium. Mesosoma slender; pro- and mesonota slightly convex dorsally; metanotal groove distinct. Petiole long, narrow, dorsal profile convex. Legs long, tarsal claws pectinate (a feature unique among ants to *Leptogenys*). Nests: under stones rotting wood, forest leaf-litter.

PONERINAE

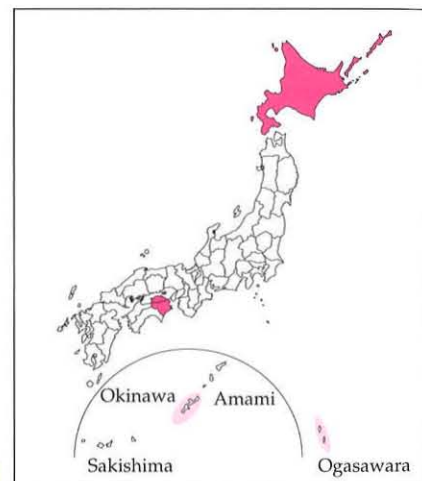
Hypoponera gleadowi (Forel)



Workers 2.5 mm. Yellow-yellowish brown. Scapes failing occipital border. Eyes 1-3 faceted, very near posterior clypeal margin (separation 2x eye diameter). Petiole thick, 1.5 times broader than long. Subpetiolar process subtriangular. Distinguished from *H. bondroiti*, by thick petiole, location of eyes. Nests: soil. Rare.

PONERINAE

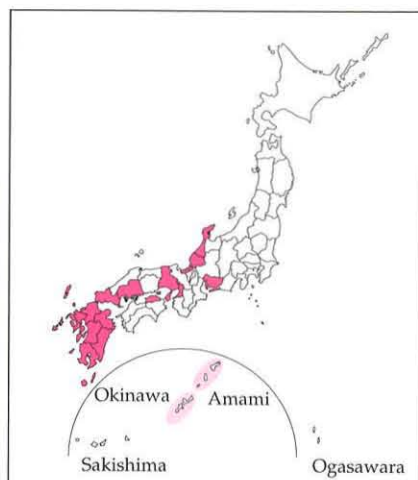
Hypoponera bondroiti (Forel)



Workers 2.5 mm. Yellow-reddish brown. Scapes failing occipital border. Eyes 1-3 faceted, separated from posterior clypeal margin by 3-4x eye diameter. Petiole narrow, 2x as broad as long. Subpetiolar process subtriangular. Nests: in soil, polycalic, polygynic. Queens of two types, winged and apterous. Males also dimorphic: large, apterous, dark brown; or small, apterous, yellow. Rare.

PONERINAE

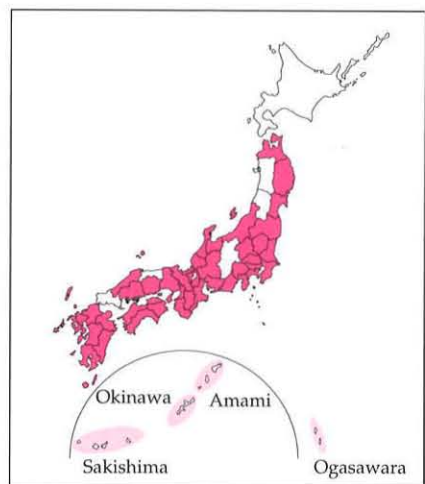
Hypoponera beppin Terayama



Workers 3 mm. Brown-blackish brown. Eyes 1 faceted, black; separated from posterior clypeus by 4-5x eye diameter. Club 6-segmented, sixth subapical segment indistinctly swollen (5-segmented in other Japanese species). Metanotum slightly constricted. Propodeal declivity: lateral borders angulate. Petiole narrow in posterior view; dorsal surface slightly pointed. Subpetiolar process subtriangular. Nests: in soil. Rare.

PONERINAE

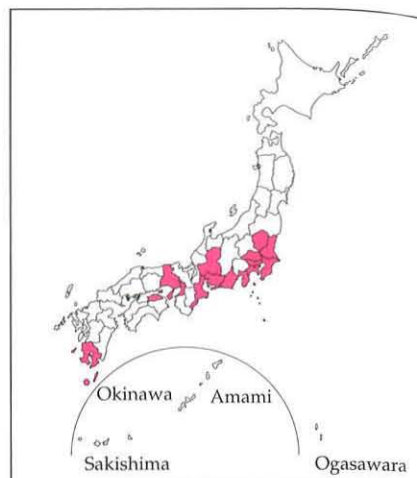
Hypoponera sauteri Onoyama



Workers 2 mm. Pale yellow-yellowish brown. Eyes unpigmented, 1 faceted, separated from clypeus by 4-5 times eye diameter. Subpetiolar process rounded posteroventrally, without lateral carinae. Female: slightly larger than worker. Nests: under stones, in rotting logs, soil, especially humus layer. Generally common.

PONERINAE

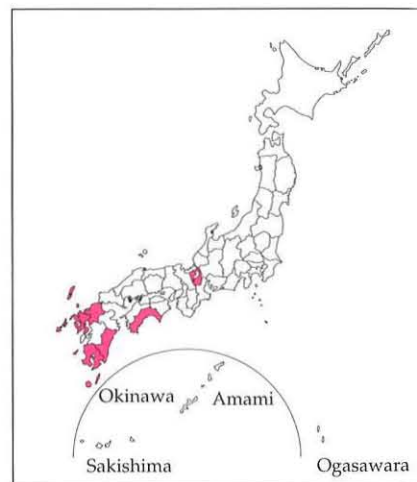
Hypoponera nubatama Terayama & Hashimoto



Workers 2.5 mm. Dark brown-black. Eyes 3 faceted; separated from clypeus by 2x eye diameter. Mesonotal-mesopleural suture indistinct, obscured by pubescence. Metanotum constricted. Propodeal declivity laterally angulate. Petiole thin, 2x as broad as long; dorsum narrow, convex above. Subpetiolar process trapezoidal, with posteroventral lateral carinae. Distinguished from *H. opaciceps*, by smaller size, narrow petiole, essentially lacking a dorsal face. Ergatoid males known.

PONERINAE

Ponera kohmoku Terayama



Workers 3.5-4 mm. The largest Japanese *Ponera*. Black. Distinguished from *P. scabra*, *P. yakushimensis*, by large eyes with 20 or more facets; and by posterior petiolar surface, viewed dorsally, being straight, not concave. Nests: soil. broad-leaved forest. Alate queens collected in mid August. Rare.

PONERINAE

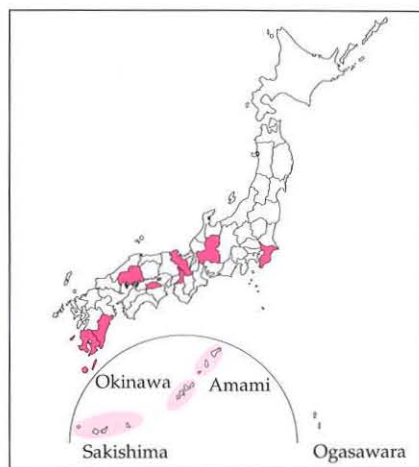
Hypoponera zwaluwenburgi (Wheeler)



Workers 2.5 mm. Yellow. Distinguished from other *Hypoponera* species by presence of a circularly margined swelling on posterodorsal corner of mesopleuron, and by petiolar structure. Eyes absent. Lateral borders of propodeal declivity rounded.

PONERINAE

Hypoponera nippona (Santschi)



Workers ca. 2.5 mm. Yellow-yellowish brown. Eyes 1 faceted, separated from clypeus by +5x eye diameter. First gastral tergite twice as wide as petiole. Metanotum prominently, deeply constricted. Petiole broad, elliptical in posterior view.

PONERINAE

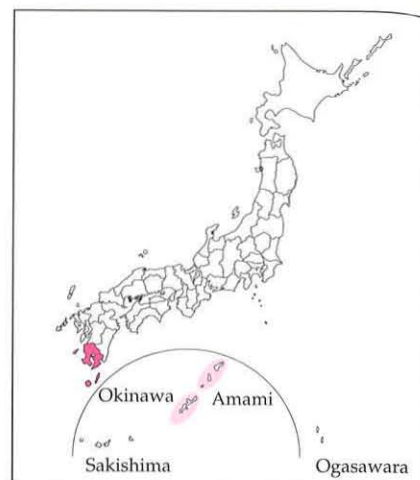
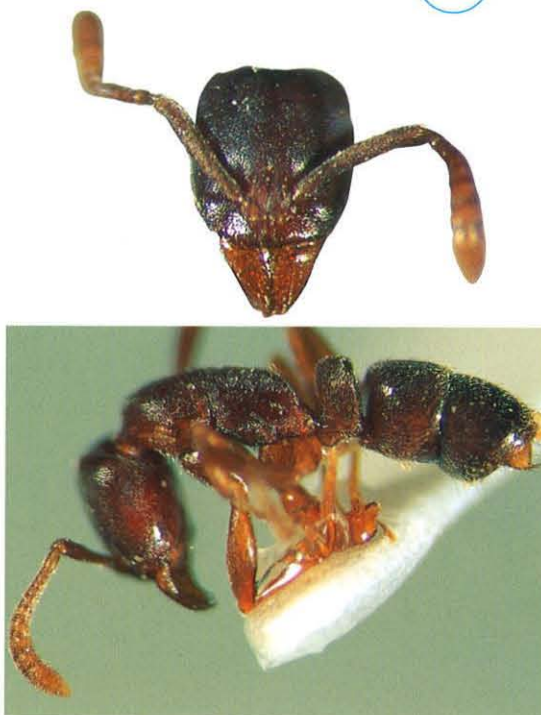
Ponera tamon Terayama



Workers 2.5 mm. Blackish brown. Distinguished from *P. japonica*, by wider head, thinner petiole; from *P. bishamon* by morphology of first gastral segment, head structure, subpetiolar process.

PONERINAE

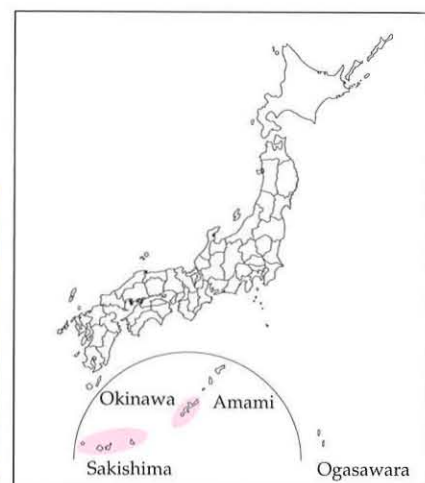
Hypoponera opaciceps (Mayr)



Workers 3 mm. Dark brown-blackish brown. Eyes 4-5 faceted, separated from clypeus by 2x eye diameter. Mesonotal-mesopleural suture shallow, indistinct, obscured by pubescence. Lateral borders of propodeal declivity angulate. Petiole 2x as broad as long. Subpetiolar process trapezoidal. Distinguished from *H. nubatama*, by larger size, petiole less narrowed above. Winged and apterous forms in both queens and males. Rare.

PONERINAE

Ponera bishamon Terayama



Workers 2 mm. Brown-black. Distinguished from *P. japonica*, *P. tamon*, by slender first gastral tergite, distinctly longer than wide in dorsal view; thick petiole; relatively small, blunt, bilaterally paired teeth on subpetiolar process. Nests: soil. Rare.

PONERINAE

Ponera takaminei Terayama



Workers 3-3.5 mm. Yellowish brown-dark reddish brown. Eyes small, several indistinct facets. Petiole thick, raised in lateral view; posterior surface more distinctly projecting above than below; dorsal surface flat; posterior border strongly concave in dorsal view. Body sculpture coarse; propodeal declivity and posterior surface of petiole sculptured. Nests: in soil. Rare.

PONERINAE

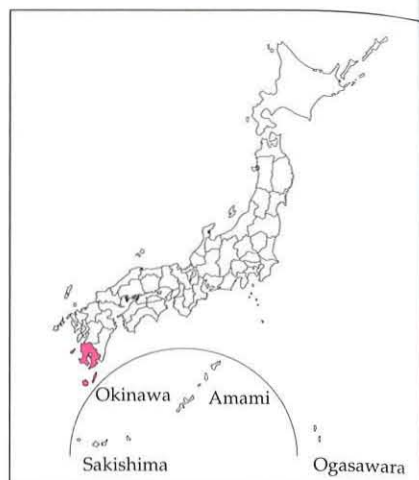
Ponera swezeyi (Wheeler)



Worker: less than 2 mm. Yellow. Suture between mesonotum, mesopleuron lacking. Body surfaces smooth, with few punctures. Known from broad-leaf forest, Ogasawara Islands.

PONERINAE

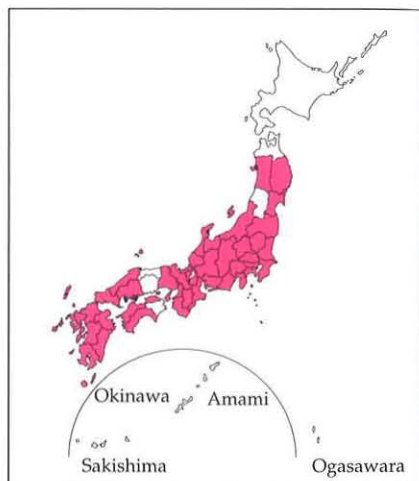
Ponera yakushimensis Tanaka



Workers 3.5 mm. Blackish brown. Distinguished from *P. scabra* by parallel anterior, posterior petiolar surfaces, the posterior surface angulate above in lateral view; second gastral tergite more shallowly, sparsely punctate than first; dorsal and posterior propodeal surfaces and petiole more sparsely punctate. From *P. kohmoku* by small eyes (several indistinct facets); posterior petiolar border distinctly concave in dorsal view. Nests: under moss.

PONERINAE

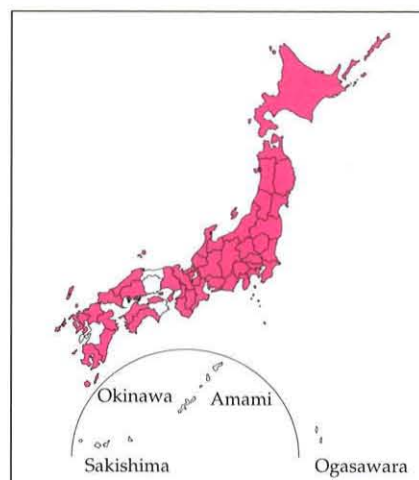
Ponera scabra Wheeler



Workers 3.5 mm. Blackish brown-black. Eyes small (several indistinct facets). Petiole trapezoidal in side view; posterior border distinctly concave in dorsal view. Nests: soil. Larvae spin cocoons. Not rare in some localities.

PONERINAE

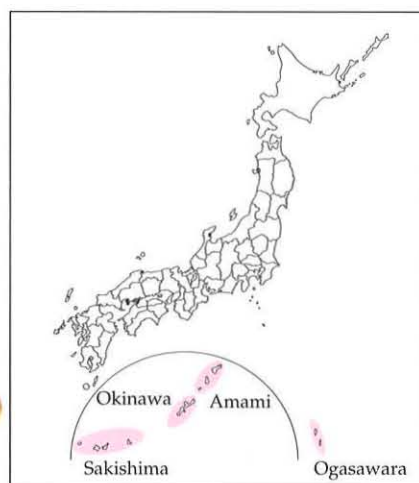
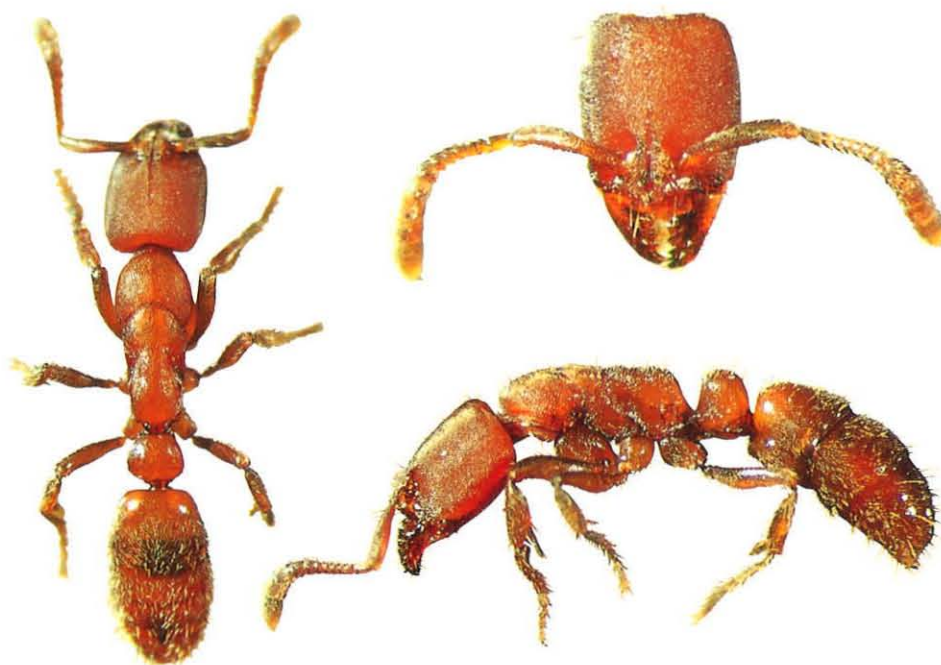
Ponera japonica Wheeler



Workers 2.5 mm. Brown-blackish brown. Scapes failing median occipital border by at least 1/5 maximum scape thickness. Nests: under stones, soil, especially in humus. Larvae do not spin cocoons, pupae are thus naked (a characteristic rare among ponerines).

PONERINAE

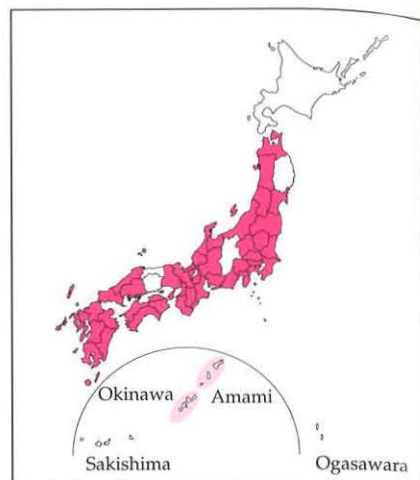
Cryptopone tengu Terayama



Workers 3.5-4 mm. Yellowish brown-reddish brown. Mandibles 8-toothed, apical 4 teeth largest. Dorsal clypeal profile produced, right-angled in side view. Petiolar node thick; subpetiolar process a small rounded projection anteriorly, the remaining ventral petiolar margin straight. Distinguished from *C. sauteri* by configuration of clypeus, petiolar node, subpetiolar process. Nests: leaf litter, soil, forests.

PONERINAE

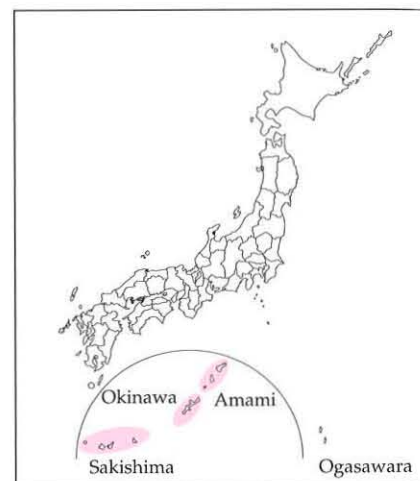
Cryptopone sauteri (Wheeler)



Workers 3.5-4 mm. Yellow-yellowish brown. Body covered thickly with golden hairs. Mandibles 9-10 toothed. Dorsal clypeal outline gently sloping in side view. Subpetiolar process subtriangular, ventral tip angled. Nests: rotting wood, leaf litter, forests.

PONERINAE

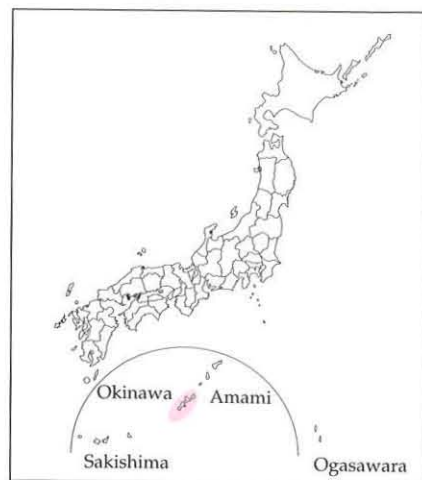
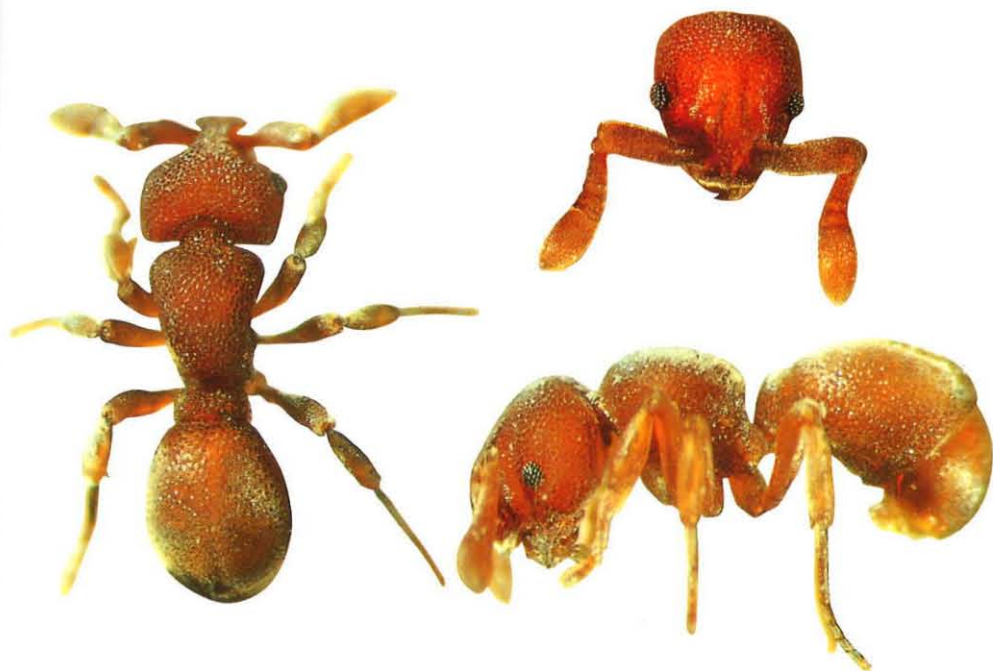
Diacamma sp.



Workers 10 mm. Black, mandibles, legs reddish brown. Hairs sparse, erect, light brown. Distinctive paired spines directed posterodorsally on petiolar dorsum. Head regularly longitudinally striate; mesosoma, petiole striate; anterior portion of 1st gastral segment with striae in concentric arches pointing forwards; remaining gaster smooth, shining. Male: characterized by toothed tarsal claws, distinct median spines at terminal end of last gastral tergum.

PONERINAE

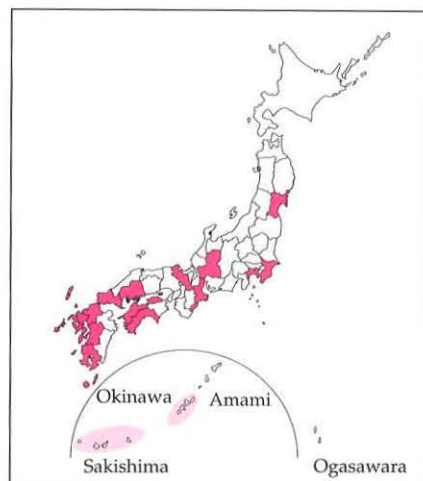
Discothyrea kamiteta Kubota & Terayama



Workers slightly > 2 mm. Slightly larger than *D. sauteri*. Reddish brown. Antennae 9-segmented. Eyes large, prominently protruding. Mesosoma shorter, higher than sauteri. Punctures on gastral tergites etc. deeper, more distinct, wider spaces between punctures. Inhabits floor of broad-leaved forest.

PONERINAE

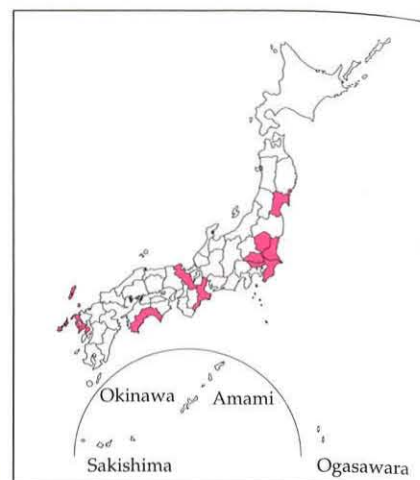
Discothyrea sauteri Forel



Workers 2 mm. Yellowish brown-reddish brown. Antennae 8-segmented. Eyes small (several facets), not notably protrusive. Petiole short, broadly attached to first gastral segment; dorsum weakly raised. Punctures on first gastral tergite shallow, indistinct. Rare.

PONERINAE

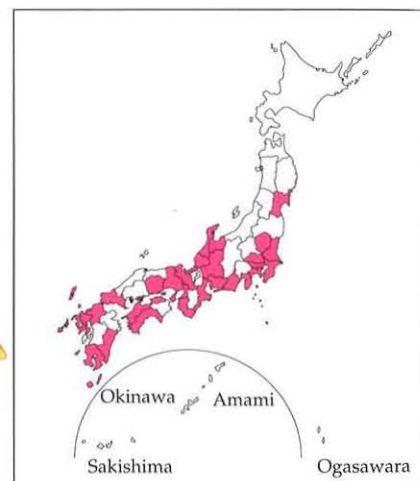
Proceratium morisitai Onoyama & Yoshimura



Workers 3-3.5 mm. Reddish brown. Similar to *P. itoi*: frontal carinae narrower, overhanging antennal insertions more vertically; subpetiolar process larger, with tip usually acutely pointed. Anterodorsal paired projections of petiole prominent; in dorsal view emargination between them dark-colored. Rare.

PONERINAE

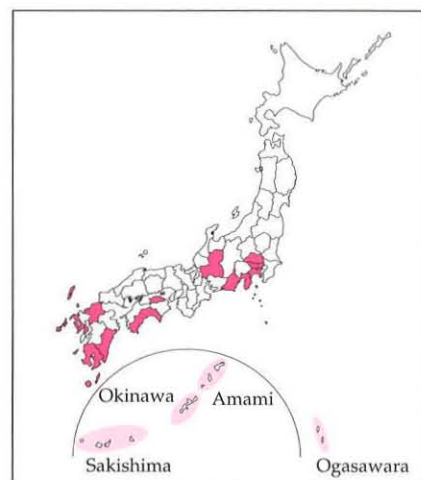
Proceratium watasei (Wheeler)



Workers 3.5-4 mm. The largest Japanese *Proceratium* species. Light yellowish brown-reddish brown. Anterior clypeal border projecting anteriorly in middle. Scapes nearly reaching occipital border - relatively the longest among Japanese *Proceratium*. Petiole relatively long, slender, dorsal face weakly raised medially.

PONERINAE

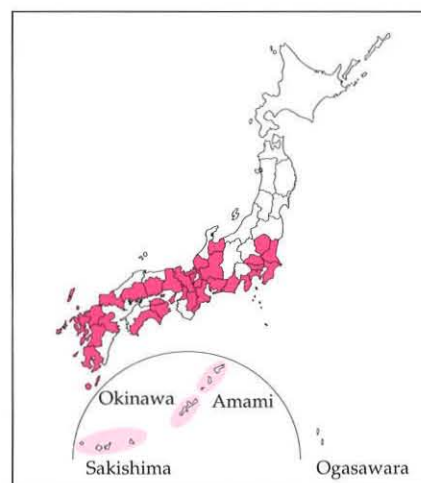
Proceratium japonicum Santschi



Workers 2.5 mm. The smallest Japanese *Proceratium* species. Yellow-yellowish brown. Anterior clypeal margin straight, not projecting anteriorly in middle. Frons with weak median longitudinal carina. Scapes short, reaching about $3/4$ length of head. Petiole scale-like; anterior, posterior faces nearly vertical; shorter than other Japanese *Proceratium*.

PONERINAE

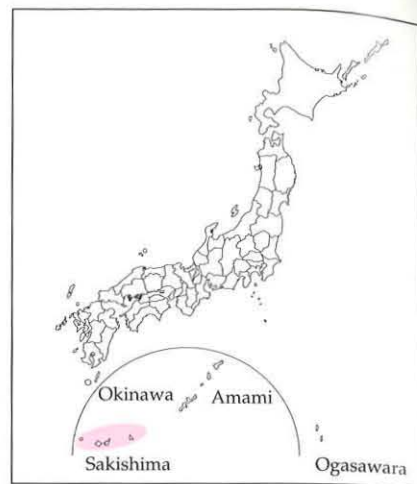
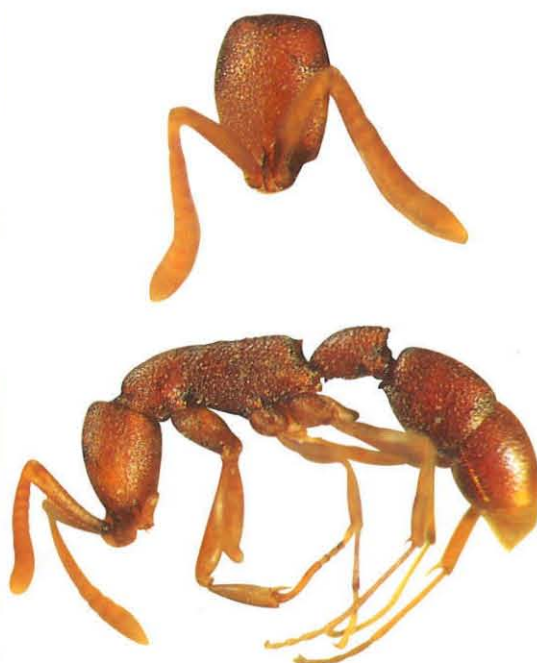
Proceratium itoi (Forel)



Workers 3 mm. Yellowish brown-reddish brown. Similar to *P. morisitai*: anterior clypeal margin projecting in middle, frontal carinae wider, more horizontally overhanging antennal insertions. Scapes short, reaching about $2/3$ length of head. Posterior emargination of propodeum in dorsal view usually not prominent, sometimes with dorsolateral protrusion. Petiole in side view subtriangular, anterior face gently sloping. Subpetiolar process small to well-developed.

PONERINAE

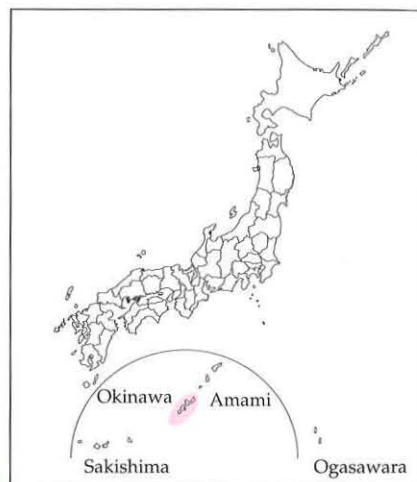
Probolomyrmex longinodus Terayama & Ogata



Sole known worker ca. 2.5 mm. Reddish brown. Slender. Scapes long, reaching clearly beyond midlength of head. Petiole long, narrow, longer than high. Subpetiolar process low, with small anteroventral projection.

PONERINAE

Probolomyrmex okinawensis Terayama & Ogata



Workers 2 mm. Smaller than *P. longinodus*. Reddish brown. Scapes shorter than longinodus, reaching only to midlength of head. Petiole short, higher than long. Subpetiolar process more developed, forming a vertical lamella. Rare.

PONERINAE

Amblyopone sakaii Terayama



Workers 2 mm. Yellowish brown. Antennae 11-segmented. Mandibles with denticles in double rows. Subpetiolar process well developed, produced in middle in lateral view.

PONERINAE

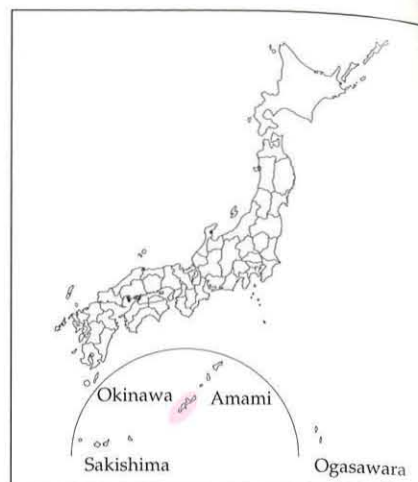
Amblyopone caliginosa Onoyama



Workers 2 mm. Yellowish brown. Antennae 11-segmented. Anterior clypeal margin with 5 denticles. Mandibles each with 7 denticles in a single row. Subpetiolar process prominent, produced anteriorly. Rare.

PONERINAE

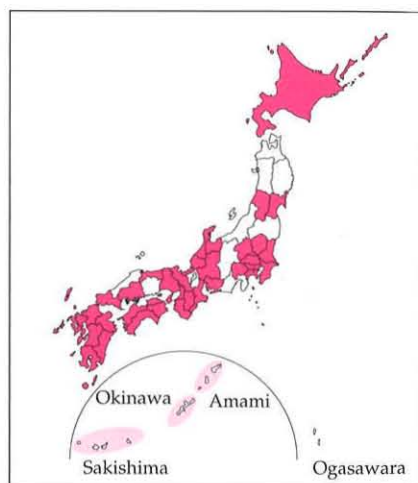
Amblyopone fulvida Terayama



Workers ca. 1.5mm. Pale yellow. Distinguished from other Japanese species by small size; 10-segmented antennae. Mandibles each with 6 denticles in a single row (a relatively small number). Subpetiolar process small, produced anteriorly. Dorsa of body tagmata covered densely with short hairs. Rare.

PONERINAE

Amblyopone silvestrii (Wheeler)



Workers 3.5-4.5 mm. Yellowish brown-reddish brown. The largest Japanese *Amblyopone* species. Distinguished from others by 12-segmented antennae; mandibular dentition of numerous double-ranked denticles. Frontal lobes well separated; covering antennal insertions.

Leptanilla japonica Baroni Urbani

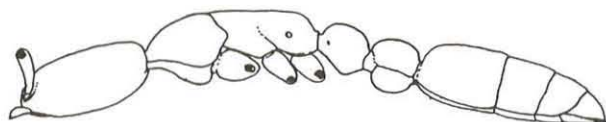
Fig. p 185

Original Reference: Baroni Urbani, C. (1977)

Distribution: Honshu (Manazuru, Kanagawa Pref.; Kii Nagashima, Mie Pref.)

Total length of workers around 1 mm. Mandibles each with 4 teeth. Apical segment of antenna longer than total length of preceding 2 segments (10th + 11th). Posterior margin of head almost straight in frontal view. First gastral segment with almost parallel sides, not narrowed anteriorly in dorsal view.

Similar to *L. morimotoi* and *L. sp. 6*, but distinguished in having 4 teeth on the mandible (where *morimotoi* and *sp. 6* have 3). The second tooth, counting from the apex, is sometimes small, low and obscure. *L. japonica* nests in small hollows in the soil (Kondoh, pers. comm.). Masuko (1989) reported that workers sometimes feed on exudations of larval haemolymph (LHF: larval haemolymph feeding), secreted from a special gland on the 3rd larval abdominal segment, and that the queens are nourished by LHF alone.



L. japonica

Subfamily AENICTINAE

Aenictus ceylonicus (Mayr)

Fig. p 185

Original Reference: Mayr, G. (1866)

Distribution: Okinawa I.; South and Southeast Asia, Australia.

Total length around 3 mm. Body brown; legs yellow. Mandibles slender and subtriangular, with 5 or 6 teeth in the Okinawa population. Antennae 10-segmented. Propodeal sides with irregular rugae. Subpetiolar process small, bearing a small lobe.

The Okinawa population is provisionally assigned to the widely distributed and highly variable *A. ceylonicus*.

Aenictus lifuiae Terayama

Fig. p 186

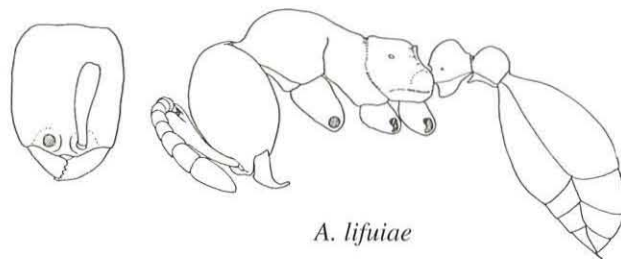
Original Reference: Terayama, M. (1984)

Distribution: Nansei Is (Iriomote I.); Taiwan.

A relatively small *Aenictus* species: total body length about 2 - 2.5 mm. Color yellowish brown; head, gaster and legs yellow. Mandibles subtriangular, with 7 teeth. Antennae 10 segmented. Promesonotal dorsum weakly convex in profile; posterodorsal cor-

ner of propodeum angulate; propodeal sides without rugae. Subpetiolar process low, forming a small lobe.

Found in evergreen broad-leaved forests and their margins. *A. lifuiae* nests in soil and is rare. Known in Japan only from Iriomote Island. A male from Taiwan was collected during August.



A. lifuiae

Subfamily PSEUDOMYRMECINAE

Tetraponera attenuata F. Smith

Fig. p 186

Original Reference: Smith, F. (1877)

Synonym(s): *Sima attenuata* var. *tenuissima* Emery, 1900: 675. [Synonymy by Forel, 1912b: 54]

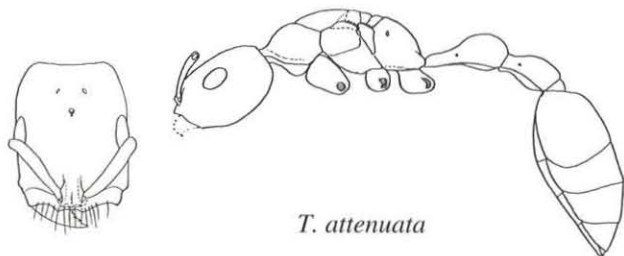
Sima birmana Forel, 1902: 245. [Synonymy by Ward, 2001: 622]

Sima attenuata var. *thagatensis* Forel, 1902: 249. [Synonymy by Ward, 2001: 622]

Distribution: Okinawa I. (Mt. Yonaha-dake).

Known in Japan only from a single dealated female collected in northern Okinawa. The specimen was identified by Ward (2001). A large species: total length of female around 10 mm. Body color black. Mandibles with 5 teeth. Anterior margin of clypeus with a pair of low teeth.

T. attenuata is distributed widely in Asia, ranging from north-east India, through continental and insular SE Asia to southern China, Taiwan and Japan. The known female was collected by sweep-net and has the head and mandibles partly broken. It might have flown to the collection site from elsewhere. Workers have not been collected in Japan.



T. attenuata

Subfamily CERAPACHYINAE

Cerapachys hashimotoi Terayama

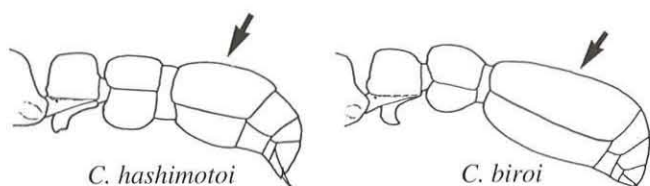
Fig. p 187

Original Reference: Terayama, M. (1996)

Distribution: Nansei Is (Iriomote I.).

Total length of workers around 3.5 mm. The largest species among Japanese cerapachyines. Body color reddish brown. Antennae 12-segmented. Body surface covered with coarse punctures, the interspaces smooth and shining. Body hairs sparse. Eyes present. Pronotum weakly marginate anteriorly. Petiole almost as long as wide; subpetiolar process distinct. Constriction between 1st and 2nd gastral segments distinct. Second gastral segment shorter than total length of petiole + 1st gastral segment.

The true status of this species is uncertain. It is similar to *C. reticulatus* Emery from Taiwan, *C. dohertyi* Emery from Sumatra and Borneo, and *C. salimani* Karavaiev from Java. Very rare.



Cerapachys daikoku Terayama

Fig. p 187

Original Reference: Terayama, M. (1996)

Distribution: Honshu (Izu Peninsula).

Total length of workers around 3 mm. Body color black. Antennae 12-segmented. Body surface sparsely covered with punctures with smooth, shining interspaces; hairs yellowish. Eyes large, about 1/3 the length of head in diameter, situated anteriorly. Lateral areas anterior to eyes each with a longitudinal groove. Pronotum marginate anteriorly. Hind coxa with a small vertical lamella dorsally. Petiole broad, flat above, with angulate anterior corners. Second gastral segment shorter than total length of petiole + 1st gastral segment.

Very rare. An apparently undescribed species belonging to the group formerly assigned to genus *Lioponera* (now a synonym of *Cerapachys*). Other "*Lioponera*" species are known to be arboreal, nesting in hollow twigs.

Cerapachys humicola Ogata

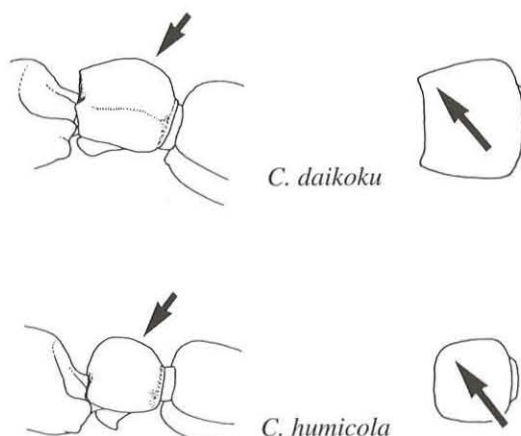
Fig. p 188

Original Reference: Ogata, K. (1983)

Distribution: Honshu (the Kanto District and southwards), Kyushu, Tsushima I.

Total length of workers about 2.5 mm. Body color reddish brown. Antennae 11-segmented. Body surface densely covered with fine reticulation and short pale yellowish hairs. Eyes absent. Pronotum without anterior margination. Petiole almost as long as wide, with rounded corners; subpetiolar process distinct, projecting ventrally, apex rounded. Constriction between 1st and 2nd gastral segments less distinct than in *C. biroi*. Second gastral segment as long as total length of petiole + 1st gastral segment.

Found on the floor of broad-leaved forest. Colonies include several tens of workers. Rare.



Cerapachys biroi Forel

Fig. p 188

Original Reference: Forel, A. (1907)

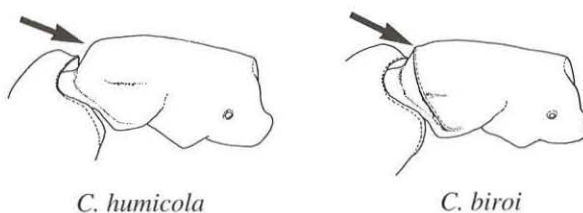
Synonym(s): *Cerapachys* (*Syscia*) *silvestrii* Wilson & Taylor (Wilson & Taylor, 1967)

Syscia typhla Sonobe (Sonobe, 1973)

Distribution: Nansei Is (Amami-oshima I. and southwards); Mainland China, Taiwan, SE Asia, India, Polynesia, West Indies.

Total length of workers about 2.5 mm. Color reddish brown. Antennae 9-segmented. Body surface densely covered with fine punctures and short pale hairs. Eyes absent. Pronotum weakly marginate anteriorly. Petiole almost as long as wide, node rounded; subpetiolar process distinct, projecting ventrally and curved posteriorly. Constriction between 1st and 2nd gastral segments distinct. Second gastral segment elongate, longer than total length of petiole + 1st gastral segment.

A widespread tropical and subtropical species. In Japan, *C. biroi* occurs in the Nansei Islands, and is found on the floor of broad-leaved forests, nesting in soil or under stones. Colonies may include a few hundred workers and ergatoid queens.



Subfamily PONERINAE

Pachycondyla sakishimensis Terayama

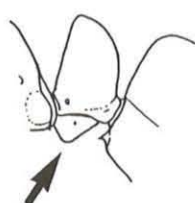
Fig. p 189

Original Reference: Terayama, M (1999a)

Distribution: Nansei Is (Miyako I. and the Yaeyama Is).

Total length of workers around 4.5 - 5 mm. Mandibles each with a basal pit. General shape and body size close to *Pachycondyla pilosior*, but the color generally lighter. Subpetiolar process triangular, providing the major feature distinguishing this species from *P. pilosior*.

P. sakishimensis nests in soil. Single foraging workers are often observed on the ground at forest margins.



P. sakishimensis



P. pilosior

Pachycondyla pilosior (Wheeler)

Fig. p 189

Original Reference: Wheeler, W. M. (1928)

Synonym(s): *Euponera* (*Trachymesopus*) *sharpi pilosior* Wheeler, 1928

Euponera (*Trachymesopus*) *chosenensis* Teranishi, 1940

Trachymesopus pilosior Brown, 1963

Distribution: Honshu, Shikoku, Kyushu, Tsushima I., Nansei Is (Okinawa I. and northwards); Korean Peninsula.

Total body length of workers about 4.5 - 5 mm. Color dark reddish brown to blackish brown; antennae, mandibles and legs reddish brown. Head almost square in frontal view, slightly longer than wide. Mandibles each with a basal pit. Eyes small, each with about 10 facets. Subpetiolar process trapezoidal, with sub-angulate anteroventral and posteroventral corners.

This species is relatively rare. It inhabits forest leaf-litter.

Pachycondyla darwinii (Forel)

Fig. p 190

Original Reference: Forel, A. (1893)

Synonym(s): *Belonopelta Darwinii* Forel (Forel, 1893)

Trachymesopus darwini Wilson (Wilson, 1958)

Distribution: Nansei Is (Okinawa I., Iriomote I.); S. Africa, S. Asia, SE Asia, Melanesia, northern Australia.

This species was originally described from alate females and there are few known worker/female collections. Terayama (1990) discovered a colony including a single worker in the Ryukyus. The specimen is smaller in size (total length ca 4 mm) than females (ca 5 mm), but has the same basic morphology, body color, and number of mandibular teeth. It also lacks the basal mandibular pits found in other Japanese *Pachycondyla* species.

P. darwinii is widely distributed from southern Africa, through Southeast Asia to Melanesia and northern Australia. Alate queens are often collected at lights. Japanese distribution is apparently limited to the Ryukyus (Terayama, 1985).

Pachycondyla luteipes (Mayr)

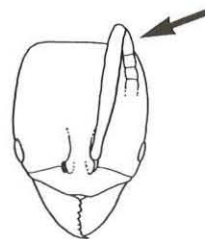
Fig. p 190

Original Reference: Mayr, G. (1862)

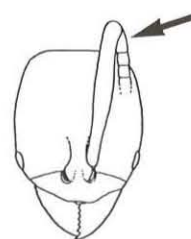
Distribution: Nansei Is.

Total length of workers around 3.5 mm. Body color and habitus similar to *Pachycondyla chinensis*, but *luteipes* has relatively short antennal scapes which exceed the posterior margin of the head by less than the length of the second antennal segment. Its propodeum is unsculptured, smooth and shining.

Males are easily distinguished from *P. chinensis* in having the body darkly colored and the mandibles well developed. This species was recognized as *Brachyponera* sp.2 in Japan Myrmecological Society (1989) and first identified from Japan by Terayama (1999).



P. luteipes



P. chinensis

Pachycondyla chinensis (Emery)

Fig. p 191

Original Reference: Emery, C. (1895)

Synonym(s): *Ponera solitaria* Fr. Smith (Fr. Smith, 1874)

Euponera (*Brachyponera*) *nigrita chinensis* Emery (Emery, 1894)

Brachyponera chinensis Brown (Brown, 1958)

Distribution: Honshu, Shikoku, Kyushu, Nansei Is, Ogasawara Is; Mainland China, Korean Peninsula, Taiwan, New Zealand (introduced).

Total length of workers around 3.5 mm. Body color black, with light brown mandibles and legs. Antennal scape exceeding posterior margin of head by the length of the second antennal segment. Lateral surface of propodeum more or less sculptured, opaque.

The male is characteristically pale in colored and has reduced mandibles. Teranishi (1929) suggested that *P. chinensis* is a predator of termites, but there are no relevant field observations. *P. chinensis* is found at the margins of woodlands. It is common in southern Honshu and the more southern Japanese islands.

Pachycondyla javana (Mayr)

Fig. p 191

Original Reference: Mayr, G. (1867)

Synonym(s): *Pachycondyla (Ectomomyrmex) japonica* Emery, 1902)

Ectomomyrmex japonicus: Santsche, 1925

Ectomomyrmex javanus Mayr, 1867

Pachycondyla (Ectomomyrmex) javana: Emery, 1900

Pachycondyla (Ectomomyrmex) japonica Emery, 1902

Ectomomyrmex japonicus: Santsche, 1925

Pachycondyla (Ectomomyrmex) astuta cambodjana Forel, 1911

Ectomomyrmex denticeps Wheeler, 1929

Pachycondyla (Ectomomyrmex) horni Forel, 1913

Ectomomyrmex javanus race *maternus* Forel, 1900

Ectomomyrmex sundaicus Mayr, 1867

Distribution: Kyushu (southern part), Tsushima I., Nansei Is; Mainland China, Korean Peninsula, Taiwan, and part of SE Asia.

The largest known Japanese ponerine ant. Total length of workers around 7 mm. The body generally black in color. Lateral margins of head forming blunt keels. Antennae 12-segmented. Head, mesosoma and petiole more or less heavily sculptured; the gaster smooth and shining. Mesopleuron subdivided by an oblique furrow.

P. javana nests under stones at forest margins. Workers may be found foraging individually on the ground; they do not form trails, and are able to sting painfully. The male is characterised by the presence of a distinct V-shaped carination on the dorsal surface of the propodeum, derived from its anterior margin. *P. javana* is distributed mainly in tropical Asia. In Japan it was originally described from Tsushima I. as *Pachycondyla japonica* Emery. Wheeler (1928) recorded it from Honshu, but queried its true identity. *P. javana* is rather common on Tsushima I., but is not known from northern Kyushu. Its nomenclature is still uncertain. Yasumatsu (1962), for example, suggested that the species epithet *sauteri* was a possible synonym of *javana*, while Collingwood (1976) considered *javana* a junior synonym of *astuta* F. Smith. Terayama (1999) believed the Japanese species to be different from true *P. javana*, and identified it as *Pachycondyla* sp. The provisional species name *javana* is retained here, because the species is a member of the *P. javana* complex.

Anochetus shohki Terayama

Fig. p 192

Original Reference: Terayama, M. (1996)

Distribution: Ishigaki I.

Total length of workers around 4.0 mm. Head including mandibles and antennae brown, mesosoma and petiole dark brown, gaster blackish brown, legs yellowish brown. Mandibles 0.8 times head length, with straight dorsal inner margins; shafts only weakly broadened anteriorly; dorsal margins without teeth; apical portions each with 3 acute teeth. Antennal scapes not reaching the posterolateral corner of head. Eyes moderate in size. Pronotum with a carinate anterior margin. Petiole thin, carinate dorsally, with straight anterior margin and weakly convex posterior margin in profile.

Known only from Ishigaki Island, Nansei Islands.

Odontomachus sp. 2

Fig. p 192

Distribution: ~~Kuchinoerabu~~-jima I., Okinawa I.

OKinocerabu-jima

Total length of workers around 9 -10 mm. Head and mesosoma brown, and gaster blackish brown. *O. sp. 2* is easily recognized by the elongate subapical teeth (each about twice as long as wide) on its mandibles and the almost smooth posterior cephalic dorsum. Female slightly larger than worker.

This species was reported in Terayama (1999) as "*O. sp. Polygynous*". It nests under stones and in soil near the roots of trees. The nuptial flight apparently occurs in early to mid-July on Okinawa.

Odontomachus monticola Emery

Fig. p 193

Original Reference: Emery, C. (1892)

Synonym(s): *Myrtoterus kuroiwa* Matsumura, 1912

Odontomachus monticola var. *formosae* Forel, 1912

Distribution: Kyushu (Kagoshima Pref.), Yaku I., Tanegashima I., Kuchinoerabu-jima I.; Mainland China, Taiwan, SE Asia, Myanmar, India.

A large ponerine ant: total length of workers around 10 - 13 mm. Body color blackish brown to dark brown. Truncate (subapical) tooth of apical mandibular dentition short, only about 1.5 times as long as wide. Posterior dorsum of head covered with fine striation.

This species nests under stones and rotten wood. When escaping, workers will often jump backwards for some centimeters propelled by the force of their jaws snapping on the ground. On Yaku Island it occurs at altitudes as high as 1200m. *O. monticola* is widespread in Asia, including India, Myanmar, mainland China and Taiwan. In China, its range extends north of Beijing to beyond 40 degrees N latitude (Teranishi, 1936, the species there reported as *O. haematodus* Linnaeus; see also Yasumatsu, 1962).

Leptogenys confucii Forel

Fig. p 193

Original Reference: Forel, A. (1912)

Distribution: Kyushu (Cape Sata, Kagoshima Pref.), Nansei Is; Taiwan.

Total body length of workers around 4.5 mm. Body dark reddish brown to blackish brown; legs yellow. Head slender, anterior margin of clypeus triangular. Mandibles elongate, toothless. Eyes well developed, situated anteriorly on the head capsule. Mesosoma slender; pro- and mesonota slightly convex dorsally; metanotal groove distinctly incised dorsally. Petiole long, with convex dorsal outline in profile; narrow in dorsal view. Legs long, tarsal claws pectinate (a feature unique in ants to *Leptogenys*).

Nests are found under stones or rotting wood, or in forest leaf-litter. They include only a few tens of workers. When nests are breached the workers disperse rapidly, so it is difficult to census colonies. Reproductive females are ergatoid. Males are winged and typically ponerine in habitus, but with pectinate tarsal claws.

Hypoponera gleadowi Forel

Fig. p 194

Original Reference: Emery, C. (1895)

Synonym(s): *Ponera gleadowi* Forel in Emery, 1895

Ponera gleadowii Forel: Forel, 1900

Ponera japonica r. *formosae* Forel, 1913

Not *Ponera gleadowii* Forel: Azuma, 1952, 1953

Ponera gleadowi Forel: Wilson, 1958

Hypoconeropsis gleadowi (Forel): Taylor, 1967

Distribution: Shikoku, Nansei Is (Tokashiki I., Ishigaki I., Iriomote I.); Korean Peninsula, Taiwan, India, Hawaii, North America.

Total length of workers around 2.5 mm. Body color yellow to yellowish brown. Scapes not reaching median posterior border of head. Eyes of 1 - 3 facets, situated very near the posterior margin of clypeus (the distance from clypeus to anterior margin of eyes is twice the eye diameter). Petiole thick, 1.5 times as broad as long. Subpetiolar process subtriangular.

Very similar to *H. bondroiti*, but distinguished by the thick petiole and the location of the eyes. *H. gleadowi* nests in the soil. A rare species, first reported after publication of "A List of the Ants of Japan with Common Japanese Names" (Myrmecological Society of Japan Editorial Committee, 1988).



H. gleadowi



H. sauteri

Hypoconeropsis bondroiti Forel

Fig. p 194

Original Reference: Forel, A. (1911)

Synonym(s): *Ponera ergatandria* subsp. *Bondroiti* Forel, 1911

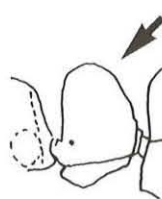
Ponera bondroiti Forel: Santschi, 1937

Hypoconeropsis bondroiti (Forel): Onoyama, 1989

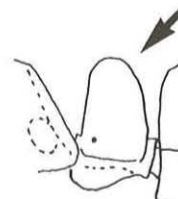
Distribution: Hokkaido (shore of Lake Kussharo), Nansei Is (Okinawa I.), Daito Is (Kita-daito I., Minami-daito I.), Ogasawara Is (Chichi-jima I., Nishi-jima I.); Taiwan, Belgium (possibly introduced elsewhere from tropical America).

Total length of workers around 2.5 mm. Body color yellow to reddish brown. Scapes not reaching median posterior border of head. Eyes each with 1 - 3 facets, situated at the sides of the head, somewhat separated from posterior margin of clypeus (the distance between anterior margins of eyes and posterior margin of clypeus is 3 - 4 times eye diameter). Petiole narrow, twice as broad as long. Subpetiolar process subtriangular.

H. bondroiti nests in the soil. A rare species. It was cited as "*Hypoconeropsis* sp. 7" in "A List of the Ants of Japan with Common Japanese Names" (Myrmecological Society of Japan Editorial Committee, 1988). Nests in the soil. Polygynic and polycalic. Two types of queen are present, winged and apterous. Males are also dimorphic, they may be, large, apterous and dark brown, or small, apterous and yellow.



H. gleadowi



H. bondroiti

Hypoconeropsis beppin Terayama

Fig. p 195

Original Reference: Terayama, M. (1999)

Distribution: Honshu (the Chubu District and southwards), Shikoku, Kyushu, Nansei Is, Senkaku Is; Taiwan

Total length of workers around 3 mm. Body color brown to blackish brown. Eyes each a single black facet; the distance from posterior margin of clypeus to anterior margin of eyes 4 - 5 times eye diameter. Antennal club 6-segmented, the sixth segment from the apex indistinctly swollen (antennal clubs are 5-segmented in other Japanese species). Metanotum slightly constricted. Lateral borders of propodeal declivity angulate. Petiole narrow in posterior view; its dorsal surface slightly pointed. Subpetiolar process subtriangular.

This species corresponds to *Hypoconeropsis* sp. 6 of Myrmecological Society of Japan Editorial Committee (1988). Nests in the soil. Rather rare.

Hypoponera sauteri Onoyama

Fig. p 195

Original Reference: Onoyama, K. (1989)

Synonym(s): *Ponera Gleadowi* R. *decipiens* v. *Sauteri* Forel, 1912

Not *Ponera excoecata*: Wheeler, 1928

Ponera excoecata Wheeler, 1928

Hypoponera excoecata? : Onoyama, 1976

Hypoponera sauteri Onoyama, 1989

Hypoponera excoecata [sic]: Bolton, 1995

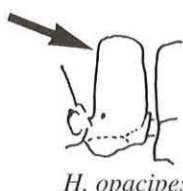
Distribution: Hokkaido (Okushiti-to I.), Honshu, Shikoku, Kyushu, Tsushima I., Nansei Is; Korera, Taiwan.

Total length of workers around 2 mm. Body color pale yellow to yellowish brown. Eyes each a single unpigmented facet, situated away from the posterior clypeal border (distance from clypeus to anterior margin of eyes 4 - 5 times eye diameter). Subpetiolar process rounded posteroventrally, without lateral carinae. The female is a little larger than the worker.

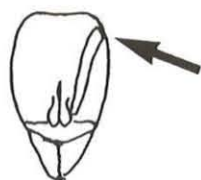
H. sauteri was designated "*Hypoponera* sp. 5" in "A List of the Ants of Japan with Common Japanese Names" (Myrmecological Society of Japan Editorial Committee, 1988). Most of the Japanese ants formerly identified as *H. excoecata* are in fact this species (*H. excoecata* was originally described from China; none of its former records from Japan are now considered valid). It nests under stones, in rotting logs and in the soil, especially the humus layer. Common at many places in Japan.



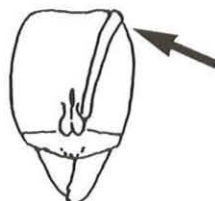
H. sauteri



H. opacipes



H. sauteri



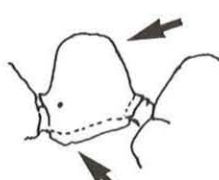
H. nippona



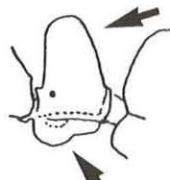
H. nubatama



H. beppin



H. zwaluwenburgi



H. nippona

Hypoponera nubatama Terayama & Hashimoto

Fig. p 196

Original Reference: Terayama, M. & Hashimoto, Y. (1996)

Distribution: Honshu (the Kanto District and southwards).

Total length of workers around 2.5 mm. Body color dark brown to black. Eyes each consisting of 3 facets; situated near the posterior margin of clypeus (the distance from posterior margin of clypeus to anterior margin of eyes is twice the eye diameter). Suture between mesonotum and mesopleuron shallow, indistinct, obscured by pubescence. Metanotum constricted. Lateral borders of propodeal declivity angulate. Petiole thin, twice as broad as long; its dorsal surface narrow, convex above. Subpetiolar process trapezoidal, with posteroventral lateral carinae.

Very similar to *H. opaciceps*, distinguished by smaller size and the petiole being narrowed above, essentially lacking a dorsal face. Ergatoid males are known.

Ponera kohmoku Terayama

Fig. p 196

Original Reference: Terayama, M. (1996)

Distribution: Honshu (southern parts), Shikoku, Tsushima I., Kyushu, Yaku I., Kuchino-erabu I.

The largest Japanese *Ponera* species: total length of workers around 3.5 - 4 mm. Body color black. Similar to *P. scabra* and *P. yakushimensis*, but distinguished by the large eyes, each consisting of 20 or more facets, and by the posterior petiolar surface in dorsal view being straight, not concave.

This species inhabits the floor of the broad-leaved forest, and nests in the soil. Alate queens have been collected in the middle August on Yaku Island. Rather rare.

Hypoponera zwaluwenburgi (Wheeler)

Fig. p 197

Original Reference: Wheeler, W. M. (1933)

Synonym(s): *Pseudocryptopone zwaluwenburgi* Wheeler, 1933

Ponera zwaluwenburgi (Wheeler): Wilson, 1957

Hypoponera zwaluwenburgi (Wheeler): Taylor, 1967

Distribution: Okinawa I.; Taiwan, Hawaii, Polynesia.

Total length of workers around 2.5 mm. Body color yellow. Easily distinguished from other species of *Hypoponera* by the presence of a circularly margined swelling on the posterodorsal corner of the mesopleuron and by petiolar morphology. Eyes absent. Lateral border of propodeal declivity rounded. Petiole 1.5 or less times as broad as long; its dorsal face distinctly defined; anterior and posterior borders tapering in lateral view.

Reproductive alates apparently emerge in June on Okinawa. Rare.

Hypoconera nippona (Santschi)

Fig. p 197

Original Reference: Santschi, F. (1937)

Synonym(s): *Ponera nippona* Santschi, 1937

Hypoconera nippona (Santschi): Ogata, 1987

Distribution: Honshu (the Kanto District and southwards), Shikoku, Kyushu, Nansei Is; Taiwan

Total length of workers averaging slightly less than 2.5 mm. Body color yellow to yellowish brown. Eyes each a single facet, situated well away from posterior margin of clypeus (the distance from clypeus to anterior margin of eyes is more than 5 times the eye diameter). First gastral tergite twice as broad as petiole. Metanotum prominently and deeply constricted. Petiole broad and elliptical in posterior view.

Some specimens formerly identified as *H. excoecata* are in fact this species. *H. nippona* is monogynous and monocalic. It nests in the soil and is rather rare. Reproductive alates are attracted to light and fly during late August in Kyoto.

Ponera tamon Terayama

Fig. p 197

Original Reference: Terayama, M. (1996)

Distribution: Kyushu (Cape Sata), Yaku I., Nansei Is; Taiwan.

Total length of workers around 2.5 mm. Body color blackish brown. Similar to *P. japonica*, distinguished by the wider head and thinner petiole. *Ponera tamon* differs from *P. bishamon* in the morphologies of the first gastral segment, head and subpetiolar process.

This species nests in the soil. Larvae spin cocoons within which they pupate. Common in the Nansei Islands.

Hypoconera opaciceps (Mayr)

Fig. p 198

Original Reference: Mayr, G. (1887)

Synonym(s): *Ponera opaciceps* Mayr, 1887

Hypoconera opaciceps (Mayr): Taylor, 1967

Ponera perkinsi Forel, 1899

Ponera andrei Emery, 1900

Distribution: Amami-oshima I., Iwo-torishima I., Okinawa I., Hateruma I.; Taiwan, Philippines, New Caledonia, Polynesia, Brazil.

Total length of workers around 3 mm. Body color dark brown to blackish brown. Eyes each of 4 or 5 facets, situated near posterior margin of clypeus (the distance from the posterior margin of clypeus to the anterior margin of eyes is twice the eye diameter). Suture between mesonotum and mesopleuron shallow and indistinct, obscured by pubescence. Lateral borders of propodeal declivity angulate. Petiole twice as broad as long. Subpetiolar process trapezoidal.

Very similar to *H. nubatama*, distinguished by larger size and

the petiole not being so narrowed above. Winged and apterous forms occur in both queens and males. A rare species.

Ponera bishamon Terayama

Fig. p 198

Original Reference: Terayama, M. (1996)

Distribution: Nansei Is (Okinawa I., Ishigaki I., Iriomote I., Yonaguni I.).

Total length of workers around 2 mm. Body color brown to black. Similar to *P. japonica* and *P. tamon*, distinguished by the first gastral tergite being slender and distinctly longer than wide in dorsal view, the thick petiole, and the bilaterally paired teeth on the subpetiolar process being relatively small and blunt.

This rare species nests in the soil.

Ponera takaminei Terayama

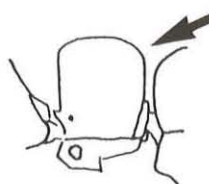
Fig. p 199

Original Reference: Terayama, M. (1996)

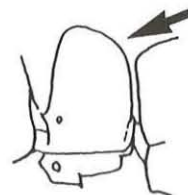
Distribution: Nansei Is (Okinawa I., Miyako I.); Taiwan.

Total length of workers around 3 - 3.5 mm. Body color yellowish brown to dark reddish brown. Eyes small, each consisting of several indistinct facets. Petiole thick, raised in lateral view; its posterior surface more distinctly projecting above than below; dorsal surface flat; posterior border strongly concave in dorsal view. Body sculpture coarse; propodeal declivity and posterior surface of petiole sculptured.

This rare species nests in the soil.



P. takaminei



P. scabra

Ponera swezeyi (Wheeler)

Fig. p 199

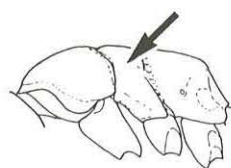
Original Reference: Wheeler, W. M. (1933)

Synonym(s): *Pseudocryptopone swezeyi* Wheeler, 1933

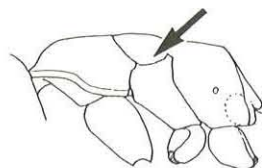
Distribution: Ogasawara Is (Chichi-jima, Haha-jima); Hawaii,

Small ants: total length less than 2 mm. Body color yellow. Suture between mesonotum and mesopleuron absent. Body surface smooth, with few punctures.

Known from the floor of broad-leaf forest in the Ogasawara Islands.



P. swezeyi



P. japonica

Ponera yakushimensis Tanaka

Fig. p 200

Original Reference: Tanaka, M. (1974)

Distribution: Yaku I.

Total length of workers around 3.5 mm. Body color blackish brown. Similar to *P. scabra* and *P. kohmoku*. *P. yakushimensis* is distinguished from *P. scabra* by the anterior and posterior petiolar surfaces being parallel and the posterior petiolar surface being angulate above in lateral view, by the second gastral tergite being more shallowly and sparsely punctate than the first, and by the dorsal and posterior surfaces of the propodeum and petiole being more sparsely punctate. *P. yakushimensis* is distinguished from *P. kohmoku* by its small eyes, consisting of only several indistinct facets, and by its posterior petiolar border being distinctly concave in dorsal view.

P. yakushimensis nests under moss, and is known only from mountainous sites on Yaku Island.

Ponera scabra Wheeler

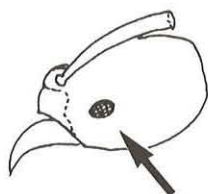
Fig. p 200

Original Reference: Wheeler, W. M. (1928)

Distribution: Honshu, Shikoku, Kyushu, Tsushima I.; Korean Peninsula.

Total length of workers around 3.5 mm. Body color blackish brown to black. Eyes small, each consisting of several indistinct facets. Petiole more or less trapezoidal in lateral view; its posterior border distinctly concave in dorsal view.

This species nests in the soil. The larvae spin cocoons (Okamoto, 1972). Not rare in some localities.



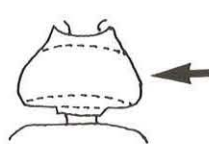
P. kohmoku



P. scabra



P. japonica



P. tamon

Ponera japonica Wheeler

Fig. p 201

Original Reference: Wheeler, W. M. (1906c)

Synonym(s): *Ponera japonica* var. *crocea* Santschi (Santschi, 1941)

Distribution: Hokkaido, Honshu, Shikoku, Kyushu; Korean Peninsula, Malaysia(?), Indonesia(?).

Total length of workers around 2.5 mm. Body color brown to blackish brown. Scapes not reaching median posterior border of head, failing to do so by at least 1/5 maximum scape thickness.

P. japonica nests under stones and in the soil, especially in the humus layer. Okamoto (1972) reported that larvae do not spin cocoons and the pupae are thus naked. This species is widely distributed from Hokkaido to Kyushu. It is found from low-lying to mountainous sites in Hokkaido and Honshu, but mainly on mountains in Shikoku and Kyushu. It has been recorded from Malaysia and Indonesia, but the records are questionable.

Cryptopone tengu Terayama

Fig. p 201

Original Reference: Terayama, M. (1999)

Distribution: Nansei Is (Amami-oshima I. and southwards), Ogasawara Is.

Total length of workers around 3.5 - 4 mm. Body color yellowish brown to reddish brown. Mandibles each with 8 teeth, the apical 4 larger than the others. Dorsal outline of clypeus distinctly produced, forming a right-angle in lateral view. Petiolar node thick; subpetiolar process present on anterior portion, forming a small rounded projection; the remaining ventral margin of petiole straight.

This species resembles *C. sauteri*, but is easily distinguished by the configuration of the clypeus, petiolar node, and subpetiolar process. *Cryptopone* sp. of Onoyama (1976) and *C. sp. 2* in Myrmecological Society of Japan Editorial Committee (1989) correspond to this species. It is distributed on Amami-oshima Island and southwards, and nests in the leaf litter and soil in forests. Relatively common in the Nansei Islands.

Cryptopone sauteri (Wheeler)

Fig. p 202

Original Reference: Wheeler, W. M. (1906c)

Synonym(s): *Pachycondyla (Trachymesopus) sauteri* Wheeler (Wheeler, 1906)

Euponera (Pseudoponera) sauteri (Wheeler) (Emery, 1909)

Euponera (Trachymesopus) sauteri (Wheeler) (Emery, 1911)

Cryptopone sauteri (Wheeler) (Brown, 1963)

Distribution: Honshu, Shikoku, Kyushu, Tsushima I., Yaku I., Nansei Is (Amami-oshima I. and northwards); Korean Peninsula.

Total length of workers around 3.5 - 4 mm. Color yellow to yellowish brown. Body covered thickly with golden hairs. Mandibles with 9 or 10 teeth. Dorsal outline of clypeus gently sloping in lateral view. Subpetiolar process developed, subtriangular and with an angled ventral tip.

This species nests in rotting wood and leaf litter in forests. Colony size is relatively large compared to other Japanese ponerine ants. *C. sauteri* is a predator of dipterous and coleopterous larvae (Murata, 1988). It is commonly collected in appropriate sites.

Diacamma sp.

Fig. p 202

Distribution: Nansei Is (Amami-oshima I., Tokunoshima I., Kume I., Okinawa I.).

Large ponerine ant. Total length of workers around 10 mm. Body color black, mandibles and legs reddish brown. Hairs sparse, erect, light brown. Distinctive paired spines on petiolar dorsum, directed posterodorsally. Head regularly longitudinally striate; trunk and petiole striate; anterior portion of 1st gastral segment with all striae in concentric arches pointing forwards; the rest of gaster smooth and shining.

The male of this species is large, characterized by toothed tarsal claws and distinct median spines at the terminal end of the last gastral tergum. On Okinawa this species is found in limestone areas, nesting in the soil, tree cavities or spaces between rocks at forest margins (Fukumoto, 1983). Colonies comprise 20 to 400 workers. Nesting sites are frequently changed under unfavorable conditions (Fukumoto & Abe, 1983; Abe & Uezu, 1977). This species is found on several islands of the Nansei Archipelago, but its distribution is rather sporadic. Recent karyological studies of *Diacamma* show that there are many possible sibling species in tropical Asia (Imai et al., unpublished). Wilson (1958b) synonymized many names under *D. rugosum* Le Guillou, but this nomenclature needs reappraisal, since morphological features distinguishing species can be very subtle. The Japanese species has often been cited as *D. rugosum* or *D. rugosum geometricum* v. *anceps*. Its morphology is consistent with *D. rugosum*, in the broad sense proposed by Wilson, but its exact status nomenclature must await better understanding of the genus at large, including karyological analysis of all possible taxa.

Discothyrea kamiteta Kubota & Terayama

Fig. p 203

Original Reference: Kubota, M. & Terayama, M. (1999)

Distribution: Okinawa I.

Total length of workers slightly greater than 2 mm. Similar to *D. sauteri* but a little larger. Body color reddish brown. Antennae 9-segmented. Eyes large, prominently protruding. Mesosoma shorter and higher than in *D. sauteri*. Punctures on gastral tergites etc. deeper and more distinct, spaces between punctures wider.

Inhabits the floor of broad-leaved forest. Known only from Okinawa. This species corresponds to *D. sp. 2* of Myrmecological Society of Japan Editorial Committee (1988).



D. kamiteta



D. sauteri

Discothyrea sauteri Forel

Fig. p 203

Original Reference: Forel, A. (1912)

Synonym(s): *Discothyrea globus* var. *sauteri* Forel, 1912

Discothyrea sauteri: Brown, 1958

Distribution: Honshu (the Kanto District and southwards), Shikoku, Kyushu, Nansei Is, Senkaku Is; Taiwan.

Total length of workers around 2 mm. Body color yellowish brown to reddish brown. Antennae 8-segmented. Eyes small, composed of several facets, not notably protrusive. Petiole short, broadly attached to first gastral tergite; the dorsum weakly raised. Punctures on first gastral tergite shallow and indistinct.

This species feeds on the eggs of spiders and centipedes (Masuko, 1981). It nests in rotting stumps. Rare.

Proceratium morisitai Onoyama & Yoshimura

Fig. p 204

Original Reference: Onoyama, K. & Yoshimura, M. (2002)

Distribution: Honshu, Iki I.

Total length of workers around 3 - 3.5 mm. Body color reddish brown. Similar to *P. itoi*, but the frontal carinae are narrower and overhang the antennal insertions more vertically than in *P. itoi*. Anterodorsal paired projections of petiole prominent; in dorsal view the margination between them dark-colored. Subpetiolar process larger than in *P. itoi*, with the tip usually acutely pointed (though variable).

This recently named species corresponds to *P. sp. 4* of Myrmecological Society of Japan Editorial Committee (1988). Sometimes formerly reported as *P. itoi*. For example, Sonobe's (1974) figure of "*P. itoi*" in fact depicts *P. morisitai*. The distribution overlaps that of *P. itoi*, but *morisitai* is more sporadic. Rare.

Proceratium watasei (Wheeler)

Fig. p 204

Original Reference: Wheeler, W. M. (1906c)

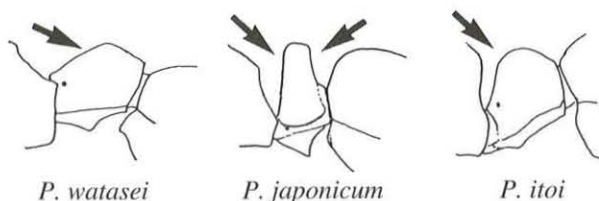
Synonym(s): *Sysphincta watasei* Wheeler, 1906

Proceratium watasei (Wheeler): Brown, 1958

Distribution: Honshu, Shikoku, Kyushu; Korean Peninsula.

Total length of workers around 3.5 - 4 mm. The largest Japanese *Proceratium* species. Body color light yellowish brown to reddish brown. Anterior clypeal margin projecting anteriorly in the middle. Antennal scapes nearly reaching the posterior margin of head - relatively the longest in any Japanese *Proceratium* species. Petiole relatively long and slender, the dorsal face weakly raised medially.

P. watasei lives in the soil of glossy-leaved evergreen forests.



Proceratium japonicum Santschi

Fig. p 205

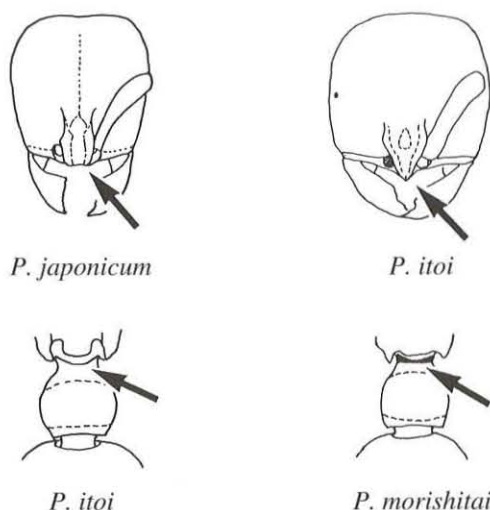
Original Reference: Santschi, F. (1937)

Synonym(s): *Proceratium formosicola* Terayama, 1985

Distribution: Honshu (the Kanto District and southwards), Shikoku, Kyushu, Nansei Is.

Total length of workers around 2.5 mm. The smallest Japanese *Proceratium* species. Body color yellow to yellowish brown. Anterior clypeal margin straight, not projecting anteriorly in the middle. Frons with a weak median longitudinal carina. Antennal scapes short, reaching about 3/4 the length of head. Petiole scale-like in form; shorter than in other Japanese *Proceratium* species; its anterior and posterior faces nearly vertical.

P. japonicum lives on the ground in evergreen forests.



Proceratium itoi (Forel)

Fig. p 205

Original Reference: Forel, A. (1918)

Synonym(s): *Sysphincta itoi* Forel, 1918

Proceratium itoi (Forel): Brown, 1958

Distribution: Honshu (the Kanto District and southwards), Shikoku, Kyushu, Nansei Is.; Mainland China (?), Korean Peninsula.

Total length of workers around 3 mm. Body color yellowish brown to reddish brown. Similar to *Proceratium morishitai*. Anterior clypeal margin projecting in the middle. Frontal carinae wider and overhanging the antennal insertions more horizontally than in *P. morishitai*. Antennal scapes short, reaching about 2/3 the length of head. Posterior margination of propodeum in dorsal view usually not prominent, but in some cases there is much dorsolateral protrusion of the propodeum. Petiole in lateral view subtriangular, its anterior face gently sloping. Subpetiolar process usually small, but sometimes well-developed.

P. itoi lives in the soil of glossy-leaved evergreen forests. Recent records from China (Tang, Wu & Wang) require confirmation.

Probolomyrmex longinodus Terayama & Ogata

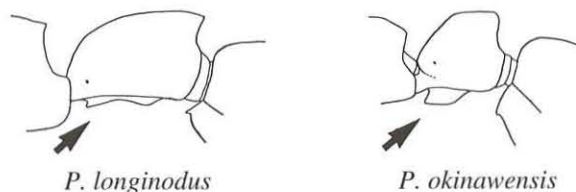
Fig. p 206

Original Reference: Terayama, M. & Ogata, K. (1988)

Distribution: Nansei Is (Ishigaki I., Yonaguni I.); Taiwan.

A slender species. Total length of sole known worker around 2.5 mm. Body color reddish brown. Antennal scapes long, reaching more than midlength (about 3/4) of head. Petiole long and narrow, longer than high. Subpetiolar process low, with a small anteroventral projection.

P. longinodus is very rare and known in Japan only from Ishigaki and Yonaguni Islands. The holotype was collected from the floor of broad-leaved forest. Corresponds to sp. 2 in Myrmecological Society of Japan Editorial Committee (1988).



Probolomyrmex okinawensis Terayama & Ogata

Fig. p 206

Original Reference: Terayama, M. & Ogata, K. (1988)

Distribution: Okinawa I.

Total length of workers around 2 mm. Smaller than *P. longinodus*. Body color reddish brown. Antennal scapes shorter than in *longinodus*, reaching only to the midlength of the head. Petiole short, higher than long. Subpetiolar process more developed, forming a vertical lamella.

P. okinawensis is found on the floor of broad-leaved forest. It is rare, and known only from Okinawa. Corresponds to sp. 1 in Myrmecological Society of Japan Editorial Committee (1988).

Amblyopone sakaii Terayama

Fig. p 207

Original Reference: Terayama, M. (1989)

Distribution: Okinawa I. (Naha).

Total length of workers around 2 mm. Body color yellowish brown. Antennae 11-segmented. Mandibles with denticles in double rows. Subpetiolar process well developed, produced in the middle in lateral view.

This species corresponds to *A. sp. 4* of Myrmecological Society of Japan Editorial Committee (1988), and "*Amblyopone sp. B*" of Onoyama (1976). Known only from a single specimen collected under a stone.

Amblyopone caliginosa Onoyama

Fig. p 207

Original Reference: Onoyama, K. (1999)

Distribution: Honshu (Cape Manazuru, Kanagawa Pref.), Kyushu (Kirishima Mountains).

Total length of workers around 2 mm. Body color yellowish brown. Antennae 11-segmented. Anterior margin of clypeus with 5 denticles. Mandibles each with 7 denticles in a single row. Subpetiolar process prominent, produced anteriorly.

This species was reported from Mt. Kirishima by Sonobe (1972) as "*Amblyopone sp.*", and corresponds to the *Amblyopone sp. 3* of Myrmecological Society of Japan Editorial Committee (1988). Rare.

Amblyopone fulvida Terayama

Fig. p 208

Original Reference: Terayama, M. (1987)

Distribution: Okinawa I. (Naha), Heianza-jima I. (type locality).

Total length of workers a little less than 1.5mm. Body color pale yellow. *A. fulvida* is distinguished from other Japanese species by its small size and 10-segmented antennae. Mandibles each with 6 denticles in a single row (a relatively small number). Subpetiolar process small, produced anteriorly. Dorsa of body tagmata covered densely with short hairs.

Rare, known at present only from the 2 records cited above.

Amblyopone silvestrii (Wheeler)

Fig. p 208

Original Reference: Wheeler, W. M. (1928)

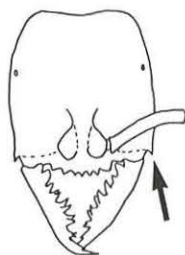
Synonym(s): *Stigmatomma silvestrii* Wheeler, 1928

Amblyopone silvestrii (Wheeler): Brown, 1960

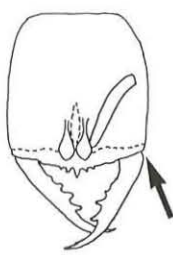
Distribution: Hokkaido, Honshu, Shikoku, Kyushu, Tsushima I., Nansei Is; Korean Peninsula, Taiwan.

Total length of workers around 3.5 - 4.5 mm. Body color yellowish brown to reddish brown. The largest Japanese *Amblyopone* species, distinguished from the rest by its 12-segmented antennae and mandibular dentition, with numerous denticles double-ranked denticles. The frontal lobes cover the antennal insertions and are well separated.

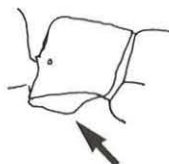
A. silvestrii apparently feeds mainly on centipedes (Masuko, 1981). Masuko (1986) discovered the peculiar habit of larval haemolymph feeding, whereby queens wound larvae non-lethally and imbibe their haemolymph as food. Distributed quite widely from near Sapporo in Hokkaido (Onoyama, 1989a) to Iriomote Island, but relatively rare.



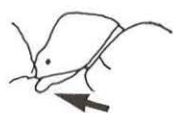
A. silvestrii



A. caliginosa



A. sakaii



A. caliginosa

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<i>omotoensis</i>	103, 112	<i>sachalinensis</i>	31, 39	<i>suehiro</i>	96, 108		
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Errata in "Ants of Japan"

p.16 (Key to the genera: DOLICHODERINAE)

Linepithema p70, 83 → *Ochetellus* P 73, 85 →

Ochetellus p 73, 85 → *Linepithema* P 70, 83 →

p.25

Camponotus keihittoi Forel

Insert the image of the head in frontal view, supplied here



p.104

Vollenhovia nipponica Kinomura & Yamauchi

Insert at end of text:

" The size of *V. nipponica* females is 2.2 mm.

p.104

Vollenhovia yambaru Terayama

Insert at end of text:

" The size of *V. yambaru* workers is 2.5 mm.

p.112

Vollenhovia nipponica Kinomura & Yamauchi

Insert at end of text:

" The size of *V. nipponica* females is 2.2 mm. "

Vollenhovia yambaru Terayama

Insert at end of text:

" those of *V. okinawana* are winged. The size of *V. yambaru* workers is 2.5 mm.

p.138

Cardiocondyla kagutuchi Terayama

→ *Cardiocondyla kagutsuchi* Terayama

kagutuchi → *kagutsuchi*

node generally narrower anterodorsally (sometimes undependable). *C. kagutsuchi* has 27 chromosomes, *C. nuda* 28. Male caste systems differ: *kagutsuchi* is dimorphic, with both alate and ergatoid males, *nuda* is known only to have ergatoid males.

p.153

Cardiocondyla kagutuchi Terayama

→ *Cardiocondyla kagutsuchi* Terayama

C. kagutuchi → *C. kagutsuchi*

C. kagutuchi → *C. kagutsuchi*

C. kagutuchi → *C. kagutsuchi*

Cardiocondyla kagutsuchi Terayama

C. kagutsuchi and *C. nuda* are so similar that their morphological descriptions given here are almost identical. However, *C. kagutsuchi* has 27 chromosomes, while *C. nuda* has 28 (Imai & Yamauchi, unpublished). Also, the male caste system of *C. kagutsuchi* differs from that of *C. nuda*. The former is dimorphic, and has both alate and ergatoid males, while *C. nuda* is believed to have only ergatoid males.

p.162

Aphaenogaster erabu Nishizono & Yamane

Insert: Workers 3.5-6 mm.

p.177

Aphaenogaster erabu Nishizono & Yamane

Insert:

chromosome number ($2n=32$ vs. $2n=34$). Total length of workers 3.5-6 mm.

The population on Kuroshima I. is undoubtedly closely related to the others listed above, but there is some uncertainty concerning its relative taxonomic status. *A. erabu* nests underground in forests. Workers turn their gasters downwards while foraging.

p.188

Cerapachys humicola Ogata

→ *Cerapachys humicola* Ogata

p.195

Hypoconera sauteri Onoyama

→ *Hypoconera sauteri* Onoyama

p.223

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kagutuchi → *kagutsuchi*

138, 153