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A Synopsis of the Family Formicidae of Taiwan (Insecta, Hymenoptera)

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——<論　説>——

A Synopsis of the Family Formicidae of Taiwan (Insecta, Hymenoptera)

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Abstract

Taiwanese Formicidae is revised. In total 264 species in 69 genera belonging to 11 subfamilies are recognized. The Taiwanese genera here recognized are as follows: **Subfamily Amblyoponinae:** *Amblyopone, Prionopelta.* **Subfamily Proceratininae:** *Discothyrea, Proceratium, Probolomyrmex.* **Subfamily Ectatomminae:** *Gnamptogenys.* **Subfamily Ponerinae:** *Anochetus, Centromyrmex, Cryptopone, Diacamma, Pachycondyla, Hypoponera, Leptogenys, Myopias, Odontomachus, Odontoponera, Ponera.* **Subfamily Cerapachyinae:** *Cerapachys, Simopone.* **Subfamily Aenictinae:** *Aenictus.* **Subfamily Leptanillinae:** *Leptanilla, Protanilla.* **Subfamily Pseudomyrmecinae:** *Tetraponera.* **Subfamily Myrmicinae:** *Eurhopolothrix, Pyramica, Strumigenys, Lordomyrma, Vollenhovia, Anillomyrma, Carebara, Monomorium, Pheidologeton, Solenopsis, Formosimyrma* **gen. nov.**, *Myrmica, Rhoptromyrmex, Tetramorium, Aphaenogaster, Lophomyrmex, Messor, Pheidole, Palatopula, Crematogaster, Recurvidris, Meranoplus, Cardiocondyla, Temnothorax, Acanthomyrmex, Myrmecina, Pristomyrmex, Metapone, Rhopalomastix.* **Subfamily Dolichoderinae:** *Chronoxenus, Dolichoderus, Iridomyrmex, Ochetellus, Tapinoma, Technomyrmex.* **Subfamily Formicinae:** *Acropyga, Anoplolepis, Lasius, Lepisiota, Paratrechina, Plagiolepis, Prenolepis, Pseudolasius, Camponotus, Polyrhachis, Formica.*

A new genus of the subfamily Myrimicinae, *Formosimyrma* based on *F. lanyuensis* sp. nov., is established from Lanyu island.

Thirty-four species are described as new to science: **Subfamily Amblyoponinae:** *Amblyopone zaojun.* **Subfamily Proceratininae:** *Discotyrea yueshen.* **Subfamily Ponerinae:** *Pachycondyla tianzun, Ponera rishen, P. shennong, P. taiyangshen, P. yuhuang.* **Subfamily Cerapachyinae:** *Simopone huode.* **Subfamily Leptanillinae:** *Protanilla lini.* **Subfamily Myrmicinae:** *Vollenhovia mengshen, V. xingjun, V. shunfenger, Carebara qianliyan, Monomorium zhinu, Aphaenogaster*

xuantian, A. fengbo, A. wangtian, A. baogong, A. wangye, Temnothorax [illegible] *huatuo, T. kuixing, T. leimu, T. leigong, T. tianpeng, T. yanwan, Myrmecina kaigong, Rhopalomastix mazu, Formosimyrma lanyuensis.* **Subfamily Formicinae:** *Acropyga yushi, Paratrechina guanyin, P. kongming, Lepisiota hexiangu, Plagiolepis longwang.*

Messor aciculatus (F. Smith, 1874), *Tetramorium smithi* Mayr, 1878, *Paratrechina ryukyuensis* Terayama, 1999, *P. yaeyamensis* Terayama, 1999, *Camponotus nicobarensis* Mayr, 1865, and *C. kiusiuensis* Santschi, 1937, are recorded from Taiwan for the first time. On the other hand, twenty-one species are excluded from the Taiwanese fauna, and seven are quadrinominal infrasubspecific unavailable names. A list of species and a bibliography of Taiwanese Formicidae are also provided.

Introduction

The family Formicidae, or ants, is a member of Hymenoptera. The first taxonomic paper on ants from Taiwan was made by Wheeler (1909), although a short communication about ecology in Taiwanese ants by Yano (1903) is available. In Wheeler's paper, 20 species in 12 genera are listed including 2 new species and 2 new varieties. After that, there are Matsumura (1910), Yano (1910), Forel (1912, 1913), Wheeler (1921, 1927, 1929, 1930, 1933), and Santsch (1937). In 1939 Sonan listed 168 forms (species, subspecies and varieties) of Taiwanese ants.

Taxonomic studies from 1940's to 1960's were given by Teranishi (1940), Brown (1949), and Hung (1962). Later, several taxonomic papers were provided: e. g. Terayama (1984, 1985a-d, 1986, 1989a, b), Terayama & Kubota (1989), Terayama et. al. (1995, 1996), Ogata et. al. (1995), Lin & Wu (1996, 1998, 2001, 2003), Elmes & Radchenko (1998). Chou & Terayama (1991) listed 182 forms in 62 genera (including *Lophomyrmex* and *Paratopula*, see Lin & Wu, 2003) of Taiwanese ants.

Recently, Lin & Wu (2003) provided subfamily and generic keys, and listed 276 species including unnamed ones. The keys are also available in the online article [http://www.entomol.ntu.edu.tw/~ant/].

Adding new information, current condition of the Taiwanese ant fauna is completed in 264 species in 69 genera belonging to 11 subfamilies. In the present paper, the author revises the family Formicidae of Taiwan consulting with the current taxonomic system.

Study area

The present study covers the Taiwanese mainland and its administrative subsidiary islands, e.g. Lanyu, Lutao, Penghu. Taiwan is situated at the western edge of the Pacific Ocean at latitude 21° 55'- 25° 20'N and longitude of 119° 30'-122° 00'E, and runs in a north-south direction east of mainland China, south of the Japanese Ryukyu Islands, and north of the Philippines (Figs. 1, 2), extending 394 km along its longest axis and stretching 140 km at its broadest transection.

Taiwan island is under largely oceanic subtropical climate in lowland and tropical in southern part and is dominated by forested mountains and almost three fourths of the island is slopland. The Tropic of Cancer transects into almost equal halves. However, the central mountain range with its high altitude encompasses a climatic range from subtropical to subarctic.

Zoogeographically, Taiwan belongs to the Oriental region. This island is a very interesting area in biogeographical sense, especially in two points. First, Taiwan has high mountain region attaining approximately 4,000 m in altitude (3,997 m in the highest peak, Mt. Yushan), more than 200 peaks higher than 3,000 m, and has many Palearctic species in the mountain region in both

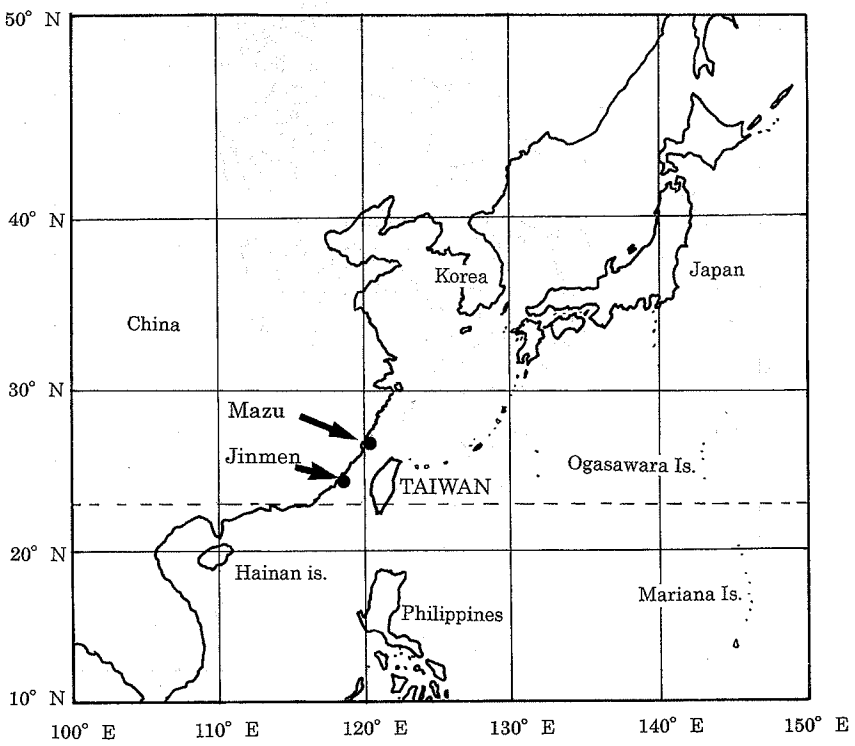


Fig. 1. Geographical location of Taiwan.

Table 1. Altitudinal vegetation zones in central Taiwan.

Aititudinal zone	Equivalent climate	Vegetation zone	Altitude (m)
Alpine	Subarctic	Alpines vegetation	> 3600
Subalpine	Cold-temperate	Evergreen coniferous forests (*Abies* forests)	3100-3600
Upper montane	Cool-temperate	Evergreen coniferous forests (*Tsuga-Picea* forests)	2500-3600
Montane	Temperate	Evergreen broad-leaved forests (*Quercus* forests tend to have deciduous trees)	2000-2500
	Warm-temperate	Evergreen broad-leaved forests (*Quercus* forests)	1500-2000
Submontane & Tropical	Subtropical & Tropical	Subtropical or tropical rain forests	1500 >

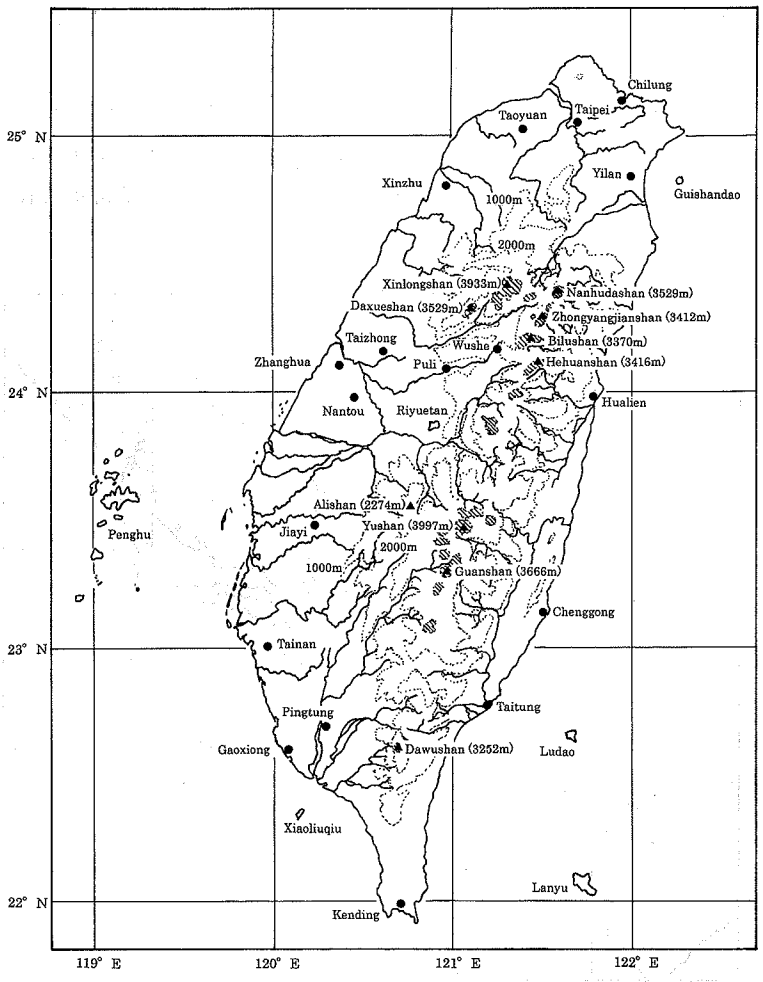


Fig. 2. A map of study area, showing Taiwan.

plants and animals. Therefore, Taiwan has various climate from subtropical climate in the lowland, following warm temperate, cool-temperate, to subarctic or arctic climates (Table 1). Changes of biodiversity are shown along an altitudinal gradient (Fig. 3).

Secondly, Taiwan is interesting from the viewpoint of island biogeography or geographical ecology. Taiwan is an island country and has many small islands. Many aspects of island ecology can be studied; among examples are immigration and extinction of organisms, speciation, subsupeciation, change or stability of community.

It is safely said that Taiwan is an area of high species diversity of insects, and has many endemic species. These endemic species may have been autochtonous in isolation (neoendemism), or confined to an island or islands as a result of the extinction of populations in other localities (epibiotic endemism).

Recently, the environment of Taiwan has so rapidly been changing. To understand and conserve the unique biodiversity of Taiwan, one of the practices needed in the field of biology may be compilation of basic data such as high quality range maps of species along with progress in taxonomy and inventory.

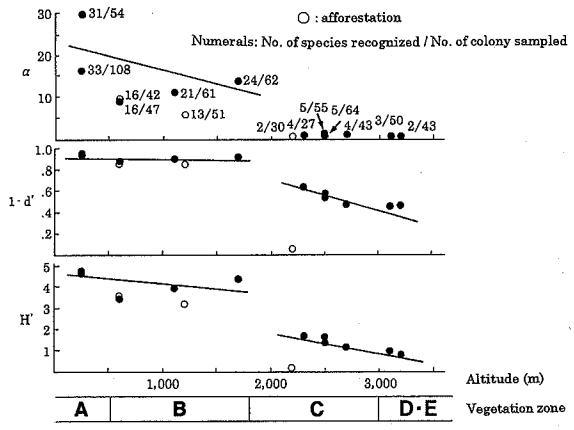


Fig. 3. Comparison of ant species diversity among vegetation zones or an altitudinal gradient in central Taiwan (After Terayama, 2006).

Three indices of species diversity were used: Fisher's index α, $S = \alpha \log (1 + N/\alpha)$; Simpson's index $1 - d'$, $1 - \Sigma\ pi^2$; Shanon-Wiener formulation H', $-\Sigma\ pi \log_2 pi$. Where pi is the relative quantity of species *i*, and N is the total number of ant colonies counted in the sample.

A, subtropical rain forest; B, warm-temperate evergreen broad-leaved forests; C, temperate evergreen broad-leaved forests; D, cool-temperate evergreen coniferous forests; E, cold-temperate bamboo thicket.

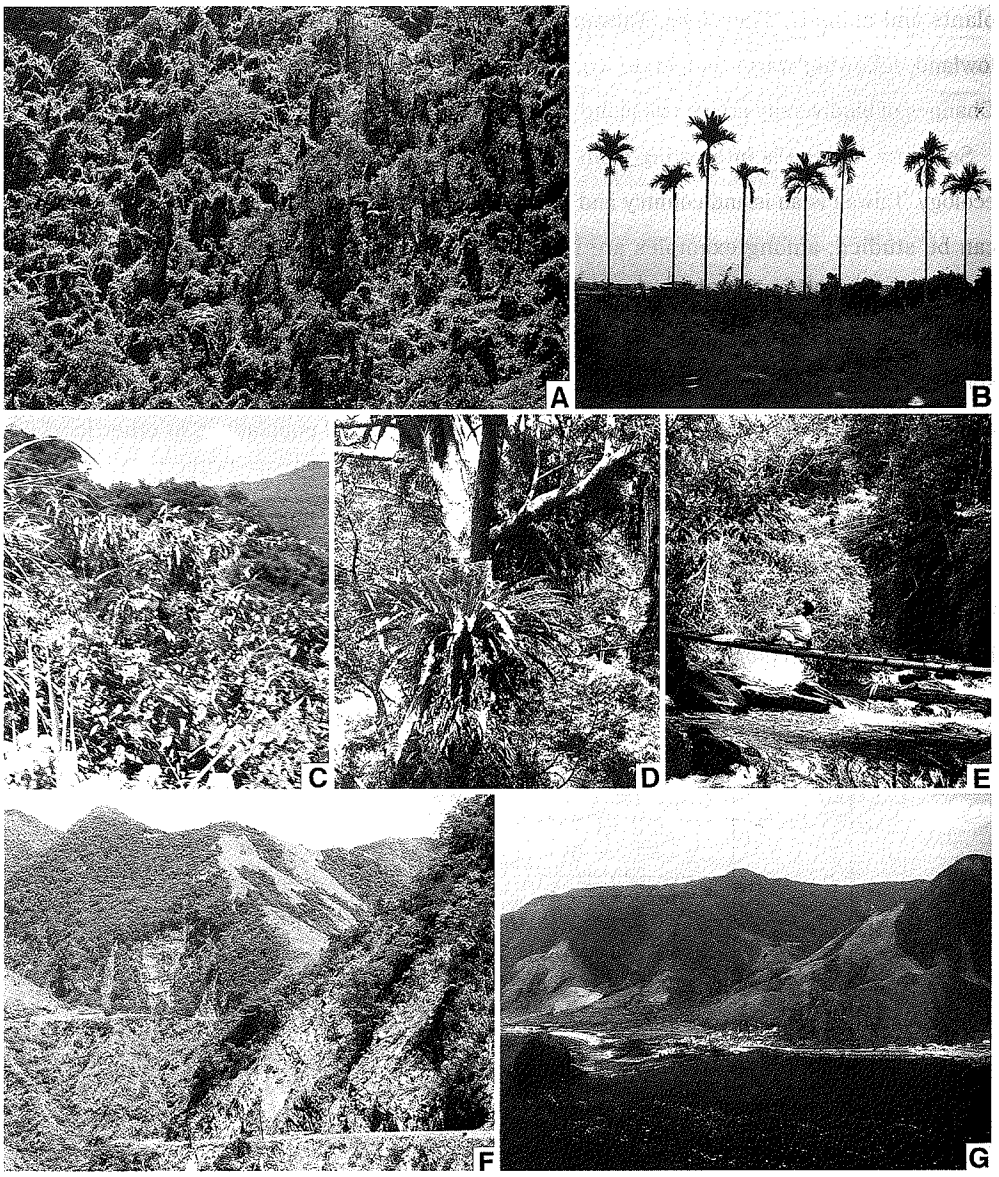


Fig. 4. Vegetations in Taiwan (1).

A, Subtropical rain forest in Ulai, northern Taiwan. B, *Areca catechu* trees in lowland (Liuqui, Kaohsiung Pref.). The native environment of *Areca catechu* is Malay Peninsula. C, *Lantana* (*Lantana camara*) bush in lowland (Chihpenchi, Taitung). D, Large epyiphytic ferns, *Asplenium nidus* (Nanfeng-Cun, Nantou Pref., 700m asl). E, Scondaly vegetation which was converted from natural forest near a stream, Nanshanchi, in Nantou Pref., (ca. 800m asl). F, Submontane zone in central Taiwan (ca. 1,600 m asl). G, Landscape of Lanyu island from an airplane.

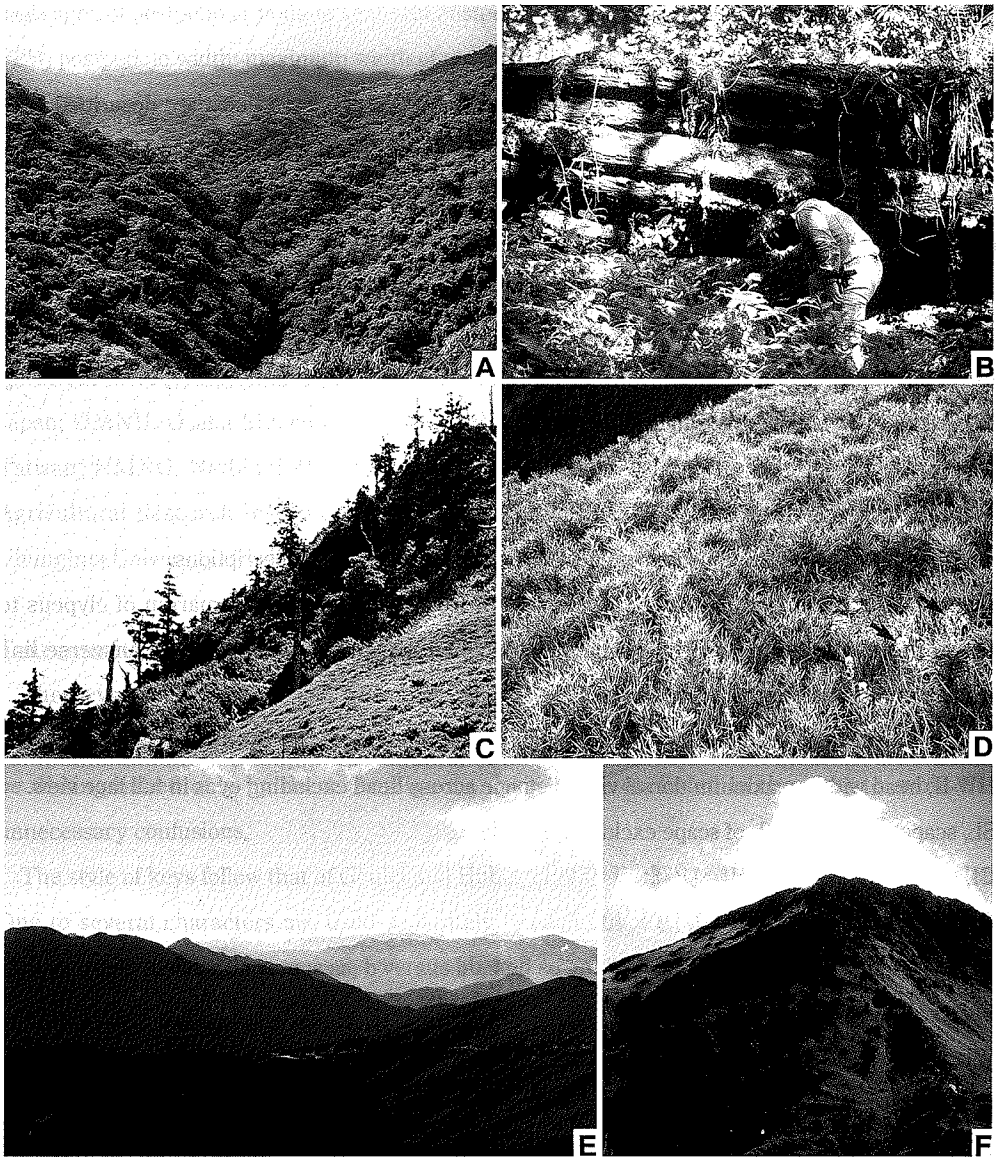


Fig. 5. Vegetations in Taiwan (2).

A, Temperate evergreen broad-leaved forest in central Taiwan (Nantou Pref., ca. 2,000 m asl). B, Forest side in the temperate evergreen broad-leaved forest (Songkang, Nantou Pref., 2,100 m asl). C, Cool-temperate evergreen coniferous forest in Mt. Hehuanshan, central Taiwan (3,000 m asl). D, *Yushania* bamboo thicket in Mt. Hehuanshan, central Taiwan (3,200 m asl). Yellow flowers (arrows) are *Solidago virga-aurea var. leiocarpa*. E, A distance of the Zhongyang Mountains from Mt. Hehuanshan. F, Alpine and subalpine zones of Mt. Hehuanshan, central Taiwan (ca. 3,200 m asl).

Descriptions

Diagnosis of taxa and taxonomic keys are presented and 34 new species are described. The morphological terminology largely follow that of Sneling (1981) and Goulet and Huber (1993). The terms propodeum (true 1st metasomal segment), petiole (2nd metasomal segment), postpetiole (3rd metasomal segment), and gaster (3rd or 4th to terminal segment of true metasoma) are used in this paper (Figs. 4, 5).

Following the new format of higher classification of the family Formicidae (Bolton, 2003), keys to the subfamilies, genera, and species in Taiwan are provided. The number of species excluding fossil taxa of each genus is used in Bolton et al. (2006).

Measurements and indices

The following abbreviations and indices are used in this paper for descriptions.

HL, head length: maximum full face view length from the anteriormost margin of clypeus to the occipital margin of the head (when the occipital margin is concave, to a transverse line connecting its posteriormost extensions).

HW, head width: maximum dorsal view distance across head including eyes in full face view.

HW-II, head width: maximum dorsal view distance across head excluding eyes in full face view.

SL, scape length: length of scape excluding radicle.

CI, cephalic index: HW/HL x 100.

CI-II, cephalic index II: HW-II/HL x 100.

SI, scape index: SL/HW x 100.

SI-II, scape index II: SL/ HW-II x 100.

WL, Weber's length of alitrunk: maximum diagonal distance from the base of anterior slope of pronotum to the propodeal lobe.

PL, petiole length: maximum length of petiole in lateral view, measured from ventral juncture with propodeum to juncture with postpetiole or gaster.

PNL, petiolar node length: maximum diagonal length of the petiolar node in lateral view.

PH, petiole height: maximum height of petiole in lateral view, measured perpendicularly from apex of petiolar node to venter of petiole.

DPW, petiole width: maximum width of petiole in dorsal view.

PPL, postpetiole length: maximum length of postpetiole in lateral view, measured from ventral juncture with propodeum or petiole to juncture with gaster.

PPH, postpetiole height: maximum height of postpetiole in lateral view, measured perpendicularly

from apex of postpetiolar node to venter of postpetiole.

PPW, postpetiole width: maximum width of postpetiole in dorsal view.

TL, total body length: outstretched length from the mandibular apex to the gastral apex.

w, worker(s); f, female(s) or queen(s); af, alate female(s); m, male(s).

Institutions

The following abbreviation of institutions are used: DEI, Deutsches Entomologisches Institute, Germany; NSMT, National Science Museum, Tokyo, Japan; MNHA, Museum of Nature and Human Activities, Hyogo, Japan; NIAES, Institute of Agro-Environmental Sciences, Tsukuba, Japan; OMNH, Osaka Museum of Natural History, Japan; NTU, National Taiwan University, Taiwan; NMNC, National Museum of Natural Science, Taichung, Taiwan; TARI, Taiwan Agricultural Research Institute, Taichung, Taiwan; NCUE, Department of Biology, National Chunghua University of Education, Chunghua, Taiwan.

Taxonomic keys

The keys presented here can be applied only to the Taiwanese species and workers which are easily taken at the field. Queen and male characters are also used when species can be distinguished only by them. Ambiguous species are excluded in the keys to avoid the unnecessary confusions.

The style of keys follow that of Goulet and Huber (1993). Each set of entries is called a couplet. One to several characters are used separately in each couplet; opposing conditions for each character are given as 2a versus aa, b versus bb, and so on.

Family Formicidae

The family Formicidae is distinguished from the other aculeate wasps and bees by the presence of metapleural gland at posteroventral portion of propodeal side and of one or two segments (pedicel) between alitrunk and gaster. Pedicel consists of petiole only, or in some groups also of postpetiole; both are more or less produced dorsally to form nodes. In a few groups, this constriction is relatively obscure and posterior face of petiole is widely attached to the gaster, or very flat with dorsal and ventral margins parallel, not produced dorsally in profile.

All the ant species are eusocial, and a queen(s) and multiple adult ants usually live in a nest together with young. The colony consists of males and females, the latter being divided into two castes: queens and workers. These three types are usually distinctly different in morphology.

The queens (fertile females) are largest, and have wings before copulation. Although workers are genetically females, they have lost or extremely reduced oviposition ability, engaging in a variety of tasks in and outside the colony. Workers are most frequently seen in the field. They usually vary in size even within a colony. In extreme cases, they can be sorted into two or more subcastes. In most cases, virgin queens leave their nests, cut the wings off after copulation, hide somewhere to initiate a new nest.

The ants are thriving animals, occupying a variety of habitats on the land. In the tropical and subtropical areas, especially, they live not only in large numbers of species but also have large biomass.

Twenty-three subfamilies are recognized (Bolton, 2003), and 9,538 species of ants in 296 genera are known by 31 December 1993 (Bolton, 1995), and 11,006 species by 2002 in the world (Sleigh, 2003; Lin & Wu, 2003). The current number of the world fauna consists of 11,477 valid nominative species (plus 2,464 subspecies) in 287 genera belonging to 66 tribes in 23 subfamilies (excluding fossil taxa) up to the cut-off date of 31 December 2005 (Bolton et al., 2006). In Taiwan, 264 species in 69 genera belonging to 11 subfamilies are recorded up the present.

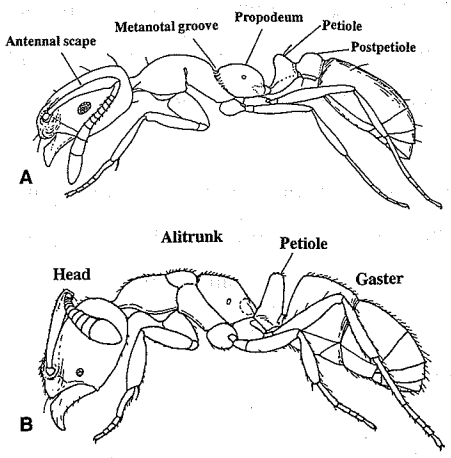


Fig. 5. Profile of workers. A, Myrmicinae; B, Ponerinae.

Key to subfamilies of Taiwanese Formicidae

1a. Petiole broadly attached to 1st gastral segment, without free posterior face.
..... Subfamily Amblyoponinae

aa. Petiole narrowly attached to 1st gastral segment, with a free posterior face.
..... 2

2a. Pygidium laterally, posteriorly, or both armed with a row of short spines or denticles.

b. Lateral portion of anterior clypeal margin with a small process.

..... Subfamily Cerapachyinae

2aa. Pygidium not armed with a row of short spines or denticles.

bb. Lateral portion of anterior clypeal margin without process.

..... 3

3a. Pedicel consisting of one segment (petiole).

..... 4

3aa. Pedicel consisting of two segments (petiole and postpetiole).

..... 8

4a. A distinct constriction present between the gastral segments 1 and 2 (except in the genera *Odontomachus* and *Anochetus*).

b. Sting present and functional.

c. Tergum and sternum of gastral segment 1 fused, forming a tube.

..... 5

4aa. Constriction absent between the gastral segments 1 and 2.

bb. Sting absent.

cc. Gastral segment 1 with the tergum not fused with sternum.

..... 7

5a. Promesonotal suture present on dorsum of propodeum.

..... Subfamily Ponerinae

5aa. Promesonotal suture absent on dorsum of propodeum.

..... 6

6a. With head in full face view, horizontal frontal lobes absent.

b. Antennal socket visible.

..... Subfamily Proceratiinae

6aa. With head in full face view, frontal lobes present.

bb. Antennal socket covered with a lobe.

..... Subfamily Ectatomminae

7a. Apex of gaster with a circular to semicicular acidopore formed from the hypopygium; tip of the hypopygium surrounded by hairs in many genera.

..... Subfamily Formicinae

7aa. Opening at apex of gaster slit-like, with hypopygium lacking an acidopore.

..... Subfamily Dolichoderinae

8a. Antennal socket more or less covered with a frontal lobe (except in the genera *Pristomyrmex* and *Acanthomyrmex*).

b. Propodeal spines present or absent; if antennal insertion exposed, then distinct propodeal spines present.

c. Eyes present (except in the genus *Anillomyrma*).

..... 9

8aa. Antennal sockets completely exposed in full-face view.

bb. Propodeal spines absent.

cc. Eyes absent.

..... 10

9a. Tarsal claws simple, without teeth nor denticles.

b. Diameter of eye shorter than 1/4 times head length excluding mandible.

c. Posterior margin of clypeus convex posteriorly.

..... Subfamily Myrmicinae

9aa. Tarsal clows with pectinate denticles.

bb. Eye large, its maximum diameter longer than 1/3 times head length excluding mandibles.

cc. Posterior margin of clypeus straight, not convex posteriorly.

..... Subfamily Pseudomyrmicinae

10a. Frontal carina present.

b. Promesonotal suture dorsally obscure to absent.

..... Subfamily Aenictinae

10aa. Frontal carina absent or much reduced.

bb. Promosanotal suture dorsally distiuct.

..... Subfamily Leptanillinae

Subfamily Amblyoponinae

Taxonomy and morphology. This subfamily is distinguished from the other subfamilies by the anterior clypeal margin with a series of denticles and the petiole broadly attached to 1st gastral segment, without free posterior face (with a few exception). A phylogenetic hypothesis has proposed that the tribe Amblyoponini should be separated from the subfamily Ponerinae (Ward, 1994). It is formally raised the state from the tribe in the subfamily Ponerinae to the subfamily by Bolton (2003). Recently, Saux et al. (2004) placed the genus *Apomyrma* under the subfamily Amblyoponinae based on the molecular phylogenetic analysis. The further

reexamination of the relationship between Amblyoponinae and Apomyrminae is needed.

Biology. Species in this subfamily are carnivorous, they are predators of soil arthropods including centipedes and insects.

Distribution. Amblyoponinae sensu Saux et al. (2004) comprise about 100 species in 10 genera including the genus *Opamyrma* described in 2008, and are thriving in the tropics. The Taiwanese amblyoponinaes include 5 species in 2 genera.

Key to genera of Amblyoponinae

1a. Mandible sickle-shaped, strongly projecting beyoud clypeus when closed, with a series of teeth.
..... Genus *Amblyopone*

1aa. Mandible short, with 3 teeth.
..... Genus *Prionopelta*

Genus *Amblyopone* Erichson, 1842

Taxonomy and morphology. Total length 1-10 mm. This genus is characteristic by the petiole which is broadly attached to 1st gastral segment, the sickle-shaped mandibles with a series of denticles, and the denticulate anterior clypeal margin.

Biology. These ants inhabit the forest floor, and nesting the soil, dead stumps, or under dead wood. They are predators of soil arthropods.

Distribution. Sixty-nine species have been known in the world, and 4 in Taiwan.

Taiwanese species: *Amblyopone bruni* (Forel, 1912) (= *Stigmatomma bruni* Forel, 1912; = *Stigmatomma brunni juergi* Forel, 1922); *A. sakaii* Terayama, 1989; *A. silvestrii* (Wheeler, 1928); *A. zaojun* **sp. nov.**

Key to species of *Amblyopone*

1a. Anterior clypeal margin with 12 rectangular denticules (Antenna with 12 segments).
..... *Amblyopone bruni* (Forel, 1912)

1aa. Anterior clypeal margin with 5-8 triangular denticules.
..... 2

2a. Antenna with 12 segments.

b. Total body length more than 3 mm.

c. Body reddish brown.

..... 3

2aa. Antenna with 11 segments.

bb. Total body length approximately 2.0 mm.

cc. Body yellowish brown.

..... *Amblyopone sakaii* Terayama, 1989

3a. Smaller species, head length less than 0.80 mm.

b. Head longer than wide in full face view.

c. Genal tooth present, but small.

..... *Amblyopone silvestrii* (Wheeler, 1928)

3aa. Larger species, head length more than 1.00 mm.

bb. Head broad, almost as long as wide in full face view.

cc. Genal tooth developed.

..... *Amblyopone zaojun* **sp. nov.**

Amblyopone zaojun sp. nov.

(Figs. 10, 11)

Diagnosis. This species resembles *A. silvestrii* (Wheeler, 1928) from Japan, Taiwan, Korera and China, and *A. octodentata* Xu, 2006, from China (Yunnan Province) but is easily separated from the latter two by the large body size (HL 1.15 mm, HW 1.10 mm, whereas ca. 0.85 mm and 0.70 mm in *silvestrii* worker and 0.93 mm and 0.80 mm in *octodentata* worker), and the wide head with convex lateral margins, and the developed genal teeth.

Description. Holotype worker. Head wide in this genus, slightly longer than wide, with slaightly concave posterior margin and convex sides in full face view; front and vertex strongly microreticulate. Mandible with 6 row of triangle teeth and acute subapical and apical teeth. Anterior margin of clypeus with 8 triangular denticules. Antenna with 12 segments; SI = 54. Eye small, 0.05 mm in length.

Pro- and mesonota microreticulate. Propodum with straight dorsal margin in profile and concave posterior margin in dorsal view; dorsal disc microreticulate, lateral surface with transverse rugae. Petiole longer than high, with very weakly concave anterior margin and straight dorsal margin in profile; node in dorsal view as long as wide, with convex anterior margin and weakly convex sides; subpetiolar process with convex anterior margin and posterior tooth.

Gaster microreticulate.

Measurements (mm). Worker: HL 1.15, HW 1.10, SL 0.65, WL 1.18, PNL 0.80, PH 0.70, DPW

0.61, TL 5.2. Possible female: HL 1.20, HW 1.15, SL 0.67, WL 1.92, PNL 0.76, PH 0.76, DPW 0.66, TL 6.4.

Color. Body reddish brown; gaster and legs lighter than head and alitrunk.

Holotype. Worker, Deji, Taichung Hsien, 28. vii-2. viii. 1988.

Possible female. 1af, Anma Shan, 2630 m alt., Hoping Hsiang, Taichung Hsien, 19. x. 1989, Y. Nishikawa leg.

Type depository. The type is preserved in NIAES.

Etymology. The specific epithet is the Chinese noun Zaojun (灶君), which is the name of a Taiwanese goddess.

Remarks. The holotype was taken at the Berlese funnel in evergreen broad-leaved forest. A possible female individual is distinctly larger than *A. silvestrii* female (HL 1.20 mm, HW 1.15 mm, whereas ca. 0.90 mm and 0.75 mm in *silvestrii* female).

Genus *Prionopelta* Forel, 1905

Taxonomy and morphology. Small ants, total length 1-2 mm. Head rectangular, longer than wide. Anterior margin of clypeus with several denticles. Eye small. Petiole broadly attached to 1st gastral segment, so without a free posterior face. It is separated from the genus *Amblyopone* by the short mandibles which have 3 teeth.

Biology. These ants inhabit the forest floor, and nesting the soil, dead stumps, or under dead wood. The wall papering behavior is seen. That is, papering over some of the rooms and galleries with fragments of pupal coccons.

Distribution. This is a small genus, contains 13 species, and is distributed in the tropical to subtropical areas in the world. A single species has been known from Taiwan, and one collecting record (Liuguei, Kaohsiung Pref.) is available only.

Taiwanese species: *Prionopelta kraepelini* Forel, 1905.

Subfamily Proceratiinae

Taxonomy and morphology. This subfamily is distinguished from the other subfamilies by the one-segmented pedicel, the distinct constriction between the 1st and 2nd gastral segments, the absence of promesonotal suture on the dorsum of alitrunk, the small frontal lobes, and the presence of functional sting. Some of genera have a peculiar gaster; 1st and 2nd terga swollen, and subsequent portion of gaster strongly bent with the tip directed anteriorly. Recently, it is raised

the state from the tribe Proceratiini in the subfamily Ponerinae to the subfamily Proceratiinae by Bolton (2003).

Biology. They are egg predators of insects, centipedes and spiders.

Distribution. This subfamily comprises about 128 species in 3 genera, and are thriving in the tropics. There are 5 species in 3 genera in Taiwan.

Key to genera of Proceratiinae

1a. Second gastral tergum extremely swollen dorsally.
b. Gaster strongly bent ventrally.
..... 2

1aa. Second gastral tergum only weakly larger than the sternum.
bb. Gaster not bent ventrally.
..... Genus *Probolomyrmex*

2a. Antenna 12-sgmented; terminal segment shorter than the other funicular segments together.
b. Mandibles not overhung by clypeus.
c. Mandible with 3 or more teeth.
..... Genus *Proceratium*

2aa. Antenna 9-segmented or less; terminal segment strongly bulbous, almost as long as or longer than the other funicular segments together.
bb. Mandibles partly hidden by projecting clypeus.
cc. Mandible edentate.
..... Genus *Discothyrea*

Genus *Probolomyrmex* Mayr, 1901

Taxonomy and morphology. Small and slender ants. Anterior margin of clypeus produced so as to completely cover the mandibles in full face view. Antennal socket not covered with a frontal lobe; the sockets positioned closely and separated each other by a vertical septum. Workers without eyes. Body lacking distinct erect hairs, except on mandibles and some other parts.

Biology. *Probolomyrmex* species are collected in the soil of the floor of broad-leaved evergreen forests, forest edges, or bamboo forests. They are predators of polyxenid millipedes.

Distribution. This is a small genus, comprising 16 species, of which one have been known from Taiwan. It is known from the tropical to subtropical areas in the world.

Taiwanese species: *Probolomyrmex longinodus* Terayama et Ogata, 1988.

Genus *Proceratium* Roger, 1863

Taxonomy and Morphology. The ants have a peculiar gaster; 1st and 2nd terga swollen, and subsequent portion of gaster strongly bent with the tip directed anteriorly. Antenna consisting of 12 segments, without segmented club. Anterior margin of clypeus not covering mandibles.

Biology. *Proceratium* species nest in the dead wood or soil, and are predators of eggs of arthropod, e.g. centipeds or spiders.

Distribution. Eighty species have been known from the temperate to tropical areas in the world. In Taiwan, 2 species are recorded.

Taiwanese species: *Proceratium japonicum* Santschi, 1937 (= *P. formosicola* Terayama, 1985); *P. itoi* (Forel, 1917).

Key to species of *Proceratium*

1a. Petiole scale-shaped, thin and high.

b. Anterior margin of clypeus straight, without median projection.

..... *Proceratium japonicum* Santschi, 1937

1aa. Petiole node-shaped, as long as high in lateral view.

bb. Anterior margin of clypeus with a median projection.

..... *Proceratium itoi* (Forel, 1917)

Genus Discothyrea Roger, 1863

Taxonomy and morphology. Small and robust ants. Apical segment of antenna disproportionately large, longer than the preceding funicular segments combined. Antenna with 8 or 9 segments in the Taiwanese species. Gaster as in *Proceratium*; 1st and 2nd segments swollen, subsequent segments pointing anteriorly.

Biology. The species of this genus nest underground or in rotten wood on the forest floor. *D. sauteri* is reported to be a predator of eggs of centipedes or spiders (Brown, 1957, 1958).

Distribution. Thirty-two species are known in the temperate to tropical areas of the world. Two species are recorded in Taiwan, of which one is new to science.

Taiwanese species: *Discothyrea sauteri* Forel, 1912; *D. yueshen* **sp. nov.**

Remarks. Two syntypes of *Discothyrea globus sauteri* are preserved in DEI (labeled Pilam, II. 1908, Sauter leg.), and 1 syntype in TARI (labeled Pilam, II. 1908, [Col. T. Shiraki]).

Key to species of *Discothyrea*

1a. Antenna with 8 segments.

b. Frontal lobe long, longer than wide.

..... *Discothyrea sauteri* Forel, 1912

1aa. Antenna with 9 segments.

bb. Frontal lobe wide and short, truncated posterior margin.

..... *Discothyrea yueshen* **sp. nov.**

Discothyrea yueshen sp. nov.

(Figs. 20, 21)

Diagnosis. It is easily separated from *D. sauteri* described by Forel in 1912 from Pilam (= Taitung Pref.) by the 9-segmented antenna (8-segmented in *sauteri*). Rather it is resembling *D. kamiteta* Terayama & Kubota, 1999, from Okinawa island, the Ryukyus, Japan. However, it is separated from the latter by the small eyes, short frontal lobe, weakly punctuated 1st gastral tergum, and a little smaller body.

Description. Head oval, slightly wider than long, with convex posterior margin in full face view; frons and vertex densely punctate. Anterior margin of clypeus convex. Antenna 9-segmented; terminal segment large, 1.7 times as long as wide; SI = 56. Frontal lobe wide, as long as wide, with truncate posterior margin. Eye small, consisting of several facets, and weakly produced.

Alitrunk robust and short, 1.7 times as ling as high in profile; surface densely punctate. Propodeum with a dull teeth posterodorsally. Petiole high and thin, with convex anterior margin and straight posterior margin. Subpetiolar process with convex ventral margin.

First gastral tergum with shallow weak punctures.

Measurements (mm). HL 0.53, HW 0.63, SL 0.35, WL 0.63, PL 0.13, PH 0.25, DPW 0.25, TL 1.7.

Color. Body reddish brown; legs and terminal segment of antenna yellowish.

Holotype. Worker, Xinzheng, Pingdong Pref., 28.vii-2.viii.1988.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Yueshen (月神), which is the name of a Taiwanese goddess.

Subfamily Ectatomminae

Taxonomy and morphology. This subfamily is distinguished from the other subfamilies by the one-segmented pedicel, the distinct constriction between the 1st and 2nd gastral segments, the absence of promesonotal suture on the dorsum of alitrunk, the distinct frontal lobes, and the presence of functional sting. Some of genera have a peculiar gaster; 1st and 2nd terga swollen, and subsequent portion of gaster strongly bent with the tip directed anteriorly. Recently, it is raised the state from the tribe Ectatommini in the subfamily Ponerinae to the subfamily Ectatomminae by Bolton (2003). This subfamily resembles to Proceratiinae, but is separated from the antennal socket covered with a developed frontal lobe (frontal lobe very small or absent, so that the antennal socket visible in full face view in Proceratiinae).

Biology. Species in this subfamily are carnivorous, they are general predators of soil arthropods and forage in leaf litter.

Distribution. This subfamily comprises about 260 species in 3 genera, and are thriving in the tropics. A single species has been known in Taiwan alone.

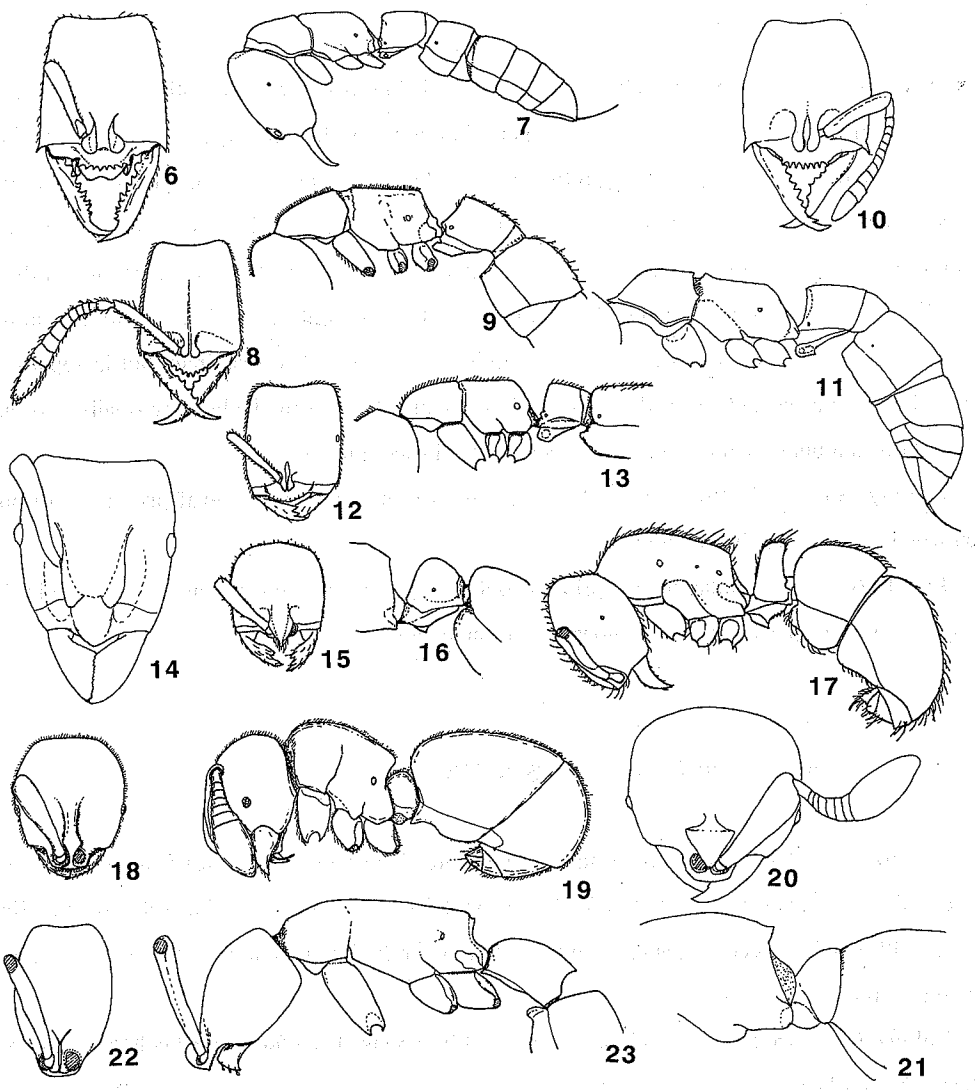
Genus *Gnamptogenys* Roger, 1863

Taxonomy and morphology. Small to moderate-sized ants. Head with frontal lobes, and antennal sockets covered in the lobes. Promesonotal suture absent from dorsal alitrunk. Hind coxae with a spine. Second gastral segment strongly arched and vaulted so that the remaining segments point anteriorly.

Biology. Nests are found in soil, or rotten wood in forests. They form small colonies with less than 1,000 workers.

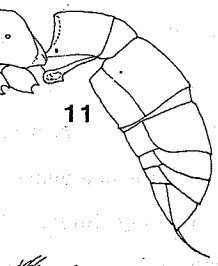
Distribution. This genus compreises about 139 species, which are distributed in the Oriental region, and a few in the Nearctic region. A single species, *G. taivanensis*, has been known in Taiwan, and two records are available only (Nanshanchi, Nantou Pref., and Fenqihu (Funkiko), Taizhong Pref.).

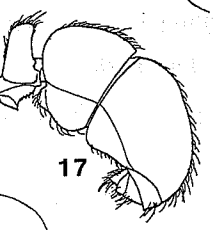
Taiwanese species: *Gnamptogenys taivanensis* (Wheeler, 1929) (= *Stictoponera taivanensis* Wheeler, 1929).

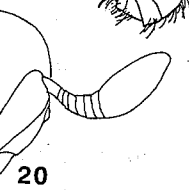


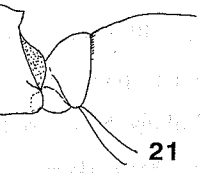
Figs. 6-13, Subfamily Amblyoponinae. Fig. 14, Subfamily Ectatomminae. Figs. 15-21, Subfamily Proceratiinae.

6, 7, *Amblyopone silvestrii* (Wheeler, 1928); 8, 9, *Amblyopone sakaii* Terayama, 1989; 10, 11, *Amblyopone zaojun* **sp. nov.**; 12, 13, *Prionopelta kraepelini* Forel, 1905; 14, *Gnamptogenys taivanensis* (Wheeler, 1929); 15, 16, *Proceratium itoi* (Forel, 1917), 16, petiole, lateral view; 17, *Proceratium japonicum* Santschi, 1937; 18, 19, *Discothyrea sauteri* Forel, 1912; 20, 21, *Discothyrea yueshen* **sp. nov.**; 22, 23, *Probolomyrmex longinodus* Terayama & Ogata, 1988.









minae. Figs. 15-21,

erayama, 1989; 10, 11,
005; 14, *Gnamptogenys*
petiole, lateral view; 17,
912; 20, 21, *Discothyrea*
88.

Subfamily Ponerinae

Taxonomy and morphology. This subfamily is distinguished from the other subfamilies by the one-segmented pedicel, the presence of promesonotal suture on the dorsum of alitrunk, the completely fused tergum and sternum of 1st gastral segment, the distinct constriction between the 1st and 2nd gastral segments (except in the genera *Odontomachus* and *Anochetus*), and the presence of functional sting.

Biology. Many species are carnivorous, and form a relatively small colony consisting of tens to hundreds of adults. The sting is painful in some species.

Distribution. Ponerinae comprise about 1,300 species in 25 genera, and are thriving in the tropics. The Taiwanese ponerines include 39 species in 11 genera are recorded.

Key to genera of Ponerinae

1a. Petiole armed with a pair of spines posterodorsally.

b. Alitrunk with a conspicuous pocket-like excavation on the lateral surface above mesopleuron. ..... *Diacamma*

1aa. Petiole without spines dorsally.

bb. Alitrunk without a pocket-like excavation above the mesopleuron. 2

2a. Anterior clypeal margin with 7-9 acute to blunt teeth.

b. Pronotum with a pair of laterally directed triangular teeth. ..... *Odontoponera*

2aa. Anterior clypeal margin without a series of teeth.

bb. Pronotum unarmed. 3

3a. Anterior clypeal margin strongly produced medially.

b. Tarsal claws pectinate (with a few exceptions). ..... *Leptogenys*

3aa. Anterior clypeal margin straight or weakly convex.

bb. Tarsal claws simple, not pectinate. 4

4a. Mandibles long and linear, inserted closely on the anterior margin of head.

b. Head in full face view constricted behind eyes.

..... 5

4aa. Mandibles more or less triangular, inserted at anterolateral corners of head.

bb. Head with upper portion of sides straight or convex in full face view.

..... 6

5a. Nuchal carinae (separating dorsal from posterior surface of head) converging in a V at the midline.

b. Larger species; total body length more than 7mm.

..... *Odontomachus*

5aa. Nuchal carinae forming a broad uninterrupted curve across the posterodorsal extremity of the head.

bb. Smaller species; total body length less than 5mm.

..... *Anochetus*

6a. Outer surface of middle tibia with numerous spines.

..... 7

6aa. Outer surface of middle tibia not spinose.

..... 8

7a. Basal portion of mandible with a distinct circular or oval pit dorsolaterally.

b. Small eyes present.

..... *Cryptopone*

7aa. Basal portion of mandible without dorsolateral pit nor fovea.

bb. Eyes lacking.

..... *Centromyrmex*

8a. Hind tibia with 2 spurs: a large pectinate spur and a simple small one.

..... 9

8aa. Hind tibia with a single large pectinate spur.

..... 10

9a. Antennal sockets very close to or at anterior clypeal margin.

b. Mandible linear.

..... *Myopias*

9aa. Antennal sockets well behind anterior clypeal margin.

bb. Mandible more or less triangular.

..... *Pachycondyla*

10a. Subpetiolar process with a fenestra (small round window).

b. Subpetiolar process with a pair of posteroventral small teeth (obscure in a few species).

c. Maxillary and labial palps each comprising 2 segments.
..... *Ponera*

11aa. Subpetiolar process without a fenestra.

bb. Subpetiolar process round or rectangular, without any tooth.

cc. Maxillary and labial palps each comprising one segment.
..... *Hypoponera*

Genus *Diacamma* Mayr, 1862

Taxonomy and morphology. Large species. Head in full face view oval, with triangular anterior clypeal margin. Eye large and developed. Petiole large, with a pair of teeth posterodorsally. Head, alitrunk, and gaster covered with linear or circular strong striae.

Biology. *Diacamma* species nests in the soil and under stones. Colonies of the Taiwanese species have no winged queen, but has an ergatoid queen in a colony.

Distribution. The genus contains 44 species including many subspecies, distributed in the Oriental and Australian regions. A detailed taxonomic revision is earnestly desired.

Taiwanese species: *Diacamma* sp.

Species excluded from the Taiwanese fauna: *Diacamma rugosum* var. *anceps* Matsumura & Uchida, 1926.

Quadrinominal infrasubspecific unvaliable name: *Diacamma rugosum geometricum* var. *anceps* Emery, 1897.

Remarks. A single species has been known to occur in Taiwan. The scientific name *D. rugosum geometricum* var. *anceps* or *D. rugosum* var. *anceps* have been applied to the species from Taiwan, but it is no doubt different from the *rugosum* complex.

Recently, the specimens from the Ryukyu Islands, south of Japan, were identified as *D. indica* on the basis of male genitalia, the morecular analysis using microsatellite and mitochondrial markers indicated that high genetic differentiation between true *D. indica* and the Japanese population (Viginier et al., 2004). It may be conspecific with the Taiwanese and the Japanese *Diacamma*, which are morphologically very similar, the molecular comparison are needed between these populations.

Genus *Odontoponera* Mayr, 1862

Taxonomy and morphology. Moderate-sized species. Anterior clypeal margin with 8-10 teeth.

Mandible triangular. Eye relatively large and convex. Pronotum with a pair of tooth anterodorsally.

Biology. Nests are found in soil in forest or forest margin.

Distribution. This is a small genus, comprises 4 species and is distributed in the Oriental region. In Taiwan, a single species, *O. transversa*, has been known to occur from Penghu island (Sonan, 1915). This species is widely distributed from India through southeast Asia to southern China including Hainan island, Hong Kong, and Taiwan.

Taiwanese species: *Odontoponera transversa* (F. Smith, 1857).

Genus *Pachycondyla* F. Smith, 1858

Taxonomy and morphology. Moderate to large ants, with relatively small eyes. In profile dorsum of alitrunk largely straight except in some species (formerly species in the genus *Brachyponera*), anternnal sockets well behind anterior clypeus margin, mandible more or less triangular, not linear, hind tibia with 2 spures, that is a large pectinate spure and a simple one. In some species mesepisternum posterodorsally with a small lobe. The genera *Ectomomyrmex, Trachymesopus, Bothroponera* and *Brachyponera* were synonymized with the genus *Pachycondyla* by Bolton (1995).

Biology. These species usually nests in the soil of forest floor, and in some species are also collected from under stones in open areas such as road sides or agricultural fields.

Distribution. This is a large genus for the subfamily Ponerinae, and contains 289 species around the world. Seven species have been known to occur in Taiwan.

Taiwanese species: *Pachycondyla luteipes* (Mayr, 1862) (= *Euponera luteipes* (Mayr, 1862)); *P. chinensis* (Emery, 1894) (= *Euponera solitaria* F. Smith, 1874; = *Brachyponera chinenis* Emery, 1895); *P. horni* Forel, 1913 (= *Ectomomyrmx denticeps* (Wheeler, 1929); = *Ectomomyrmex sauteri* Forel, 1912, provisionally); *P. darwinii* (Forel, 1893) (= *P. darwinii* var. *indica* (Emery, 1900), provisionally); *P. nigrita* (Emery, 1895); *P. stigma* (Fabricius, 1804) (= *Ponera stigma quadridentata* F. Smith, 1858); *P. tianzun* **sp. nov.**

Nomen nudum: *Brachyponera luteipes luteiped-jerdoni* Forel, 1913.

Undetermined species: *Pachycondyla sauteri* Forel, 1912 [Unresolved junior primary homonym of *Pachycondyla* (*Pseudoponera*) *sauteri* Wheeler, 1906. Provisional synonymy of *Ectomomyrmex javanus* (Mayr, 1867) by Yasumatus, 1962.]

Species excluded from the Taiwanese fauna: *Pachycondyla javana* (Mayr, 1867); *P. sharpi* (Forel, 1901); *P. astuta* F. Smith, 1858.

Remarks. It is suggested that *Pachycondyla javana* includes several species, and the

Taiwanese one is not true *javana* in the recent study. I tentatively applied the name *P. horni* (Forel, 1913) to the Taiwanese species. *Pachycondyla astuta* by Zhou (2001) from China, Taiwan, Hainan, Hong Kong and Amoi is also conspecific with *P. javana*, and thought to be not true *javana*. Although Terayama (1990) recorded *P. sharpi* (= *Trachymesopus sharpi*) from Taiwan, by the recent comparison between *sharpi* from Malaysia, Hong Kong and the Taiwanese population is concluded that the Taiwanese one is a separate species, which describe as a new to science herein. *Brachyponera* sp. in Terayama (1990) is *P. nigrita* (See Yamane, 2007).

Key to species of *Pachycondyla*

1a. In profile promesonotum much higher than propodeum.
..... 2

1aa. In profile dorsal outline of alitrunk almost straight, or gently curved.
..... 4

2a. Antennal scape exceeding posterior margin of head by the length of 2nd antennal segment.

b. Lateral face of propodeum microreticulate, not shining.
..... 3

2aa. Antennal scape short, not exceeding posterior margin of head by the length of 2nd antennal segment.

bb. Lateral face of propodeum smooth and shining.
..... *Pachycondyla luteipes* (Mayr, 1882)

3a. Antennal scape longer, surpassing the posterior margin of head by more than 1/4 of its total length.

b. Large species: head width 1.04-1.06 mm.
..... *Pachycondyla nigrita* (Emery, 1895)

3aa. Antennal scape shorter, surpassing the posterior margin of head by less than 1/4 of its total length.

bb. Smaller specis: head width less than 1.00 mm.
..... *Pachycondyla chinensis* (Emery, 1894)

4a. Mesepisternum with an oblique furrow.

b. Large species; total body length about 7 mm.
..... *Pachycondyla horni* (Forel, 1913).

4aa. Mesepisternum without oblique furrow.

bb. Smaller species; total body length < 5 mm.

..... 5

5a. Mandible with a small oval pit near the base.

b. Body castaneous to blackish brown.

..... 6

5aa. Mandible without a pit near the base.

bb. Body yellowish brown.

..... *Pachycondyla darwinii* (Forel, 1913)

6a. Petiolar node with flat dorsal margin in profile.

6b. Body blackish brown.

..... *Pachycondyla tianzun* **sp. nov.**

6aa. Petiolar node with acutely convex dorsal margin in profile.

6bb. Body castaneous.

..... *Pachycondyla stigma* (Fabricius, 1804)

Pachycondyla tianzun sp. nov.

(Figs. 31-35, 38)

Trachymesopus sharpi: Terayama, 1990. Bull. Toho Gakuen, 4: 34. [Misidentification.]

Diagnosis. This species is separated from *P. sharpi* (Forel, 1901) by the angulate posterodorsal corner and much steeply sloped posterior margin of propodeum. Rather it resembles to *P. sakishimensis* Terayama, 1998, from the Ryukyus, Japan, and *P. pilosior* (Wheeler, 1928) from Japan and Korea. But it is separated from the latter two by the narrow dorsal surface of propodeum and triangular subpetiolar process.

Description. Holotype worker. Head rectangular, longer than wide (CI = 91), with concave posterior margin in full face view. Mandible with 10 teeth, and with a basal mandibular pit. Anterior margin of clypeus weakly convex. Antennal scape slightly exceeding the posterior margin of head; SI = 74. Eye small, consist of 6-7 facets, 0.04 mm in diameter.

Alitrunk with straight dorsal margin in profile. Propodeum with angulate posterodorsal corner and steeply sloped posterior margin in profile; in dorsal view dorsal surface relatively wide. Petiole higher than long in profile; subpetiolar process triangular, with dully angulate ventral corner.

Measurements (mm). Worker: HL 1.18, HW 1.08, SL 0.80, WL 1.65, PNL 0.40, PH 0.75, DPW 0.57, TL 4.7. Female: HL 1.20, HW 1.10, SL 0.85, WL 1.80, PNL 0.42, PH 0.80, DPW 0.59, TL 5.2.

Color. Body dark reddish brown to blackish brown; head darker than alitrunk; antenna, mandible and legs reddish brown.

Holotype. Worker, Nanshanxi, Nanfeng-Cun, Nantou Pref., 12. viii. 1980, M. Terayama leg.

Paratypes. 1w, same data as the holotype; 1w, Chipen, Taitung City, 21. vii. 1982, M. Terayama leg.; 1f, same locality, 5. viii. 1980, M. Terayama leg.; 1f, Chipen wenchen, Taitung Pref., 21. viii. 1980, M. Terayama leg.; 1f, Puli, Nantou Pref., 4. viii. 1980, M. Terayama leg.

Type depository. Holotype in NIAES, and paratypes in TARI.

Etymology. The specific epithet is the Chinese noun Tianzun (天尊) which is the name of a Taiwanese god.

Remarks. Nests are found in soil, or under stone. Number of mandibular tooth varies 9 or 10 in workers.

Genus *Myopias* Roger, 1861

Taxonomy and morphology. Moderate to large-sized ants. Head rectangular. Mandible linear, attached outer potion of head, teeth present at anterior half. Antennal scape long. Antennal sockets very close to or at the anterior clypeal margin. Frontal lobes reaching or overhanging the anterior clypeal margin on each side. Truncate clypeal lobe projecting in front of them (a few species absent). Eyes usually present (Taiwanese species *M. nobs* lacking). Petiole thick, with convex dorsal margin. Hind tibia with 2 spurs, consisting of a large pectinate and a small simple spurs.

Biology. Most species live in soil of forests, and constitute small colonies consisting of 1 female and several tens workers. It is likely that they are ant predators (Willey & Brown, 1983).

Distribution. Thirty-six species have been known in the Oriental and the Australian regions. One species is known in Taiwan.

Taiwanese species: *Myopias nops* Willey & Brown, 1983.

Remarks. Taiwanese species, *M. nops*, is dull yellowish and modest-sized (TL 4.4 mm), and lacks eyes. It is rare species and one individual is collected in Mt. Lalashan, Taipei, only.

Genus *Cryptopone* Emery, 1892

Taxonomy and morphology. Moderate to small ponerine ants. Eye very small or absent (small eyes present in the Taiwanese species). Mandible with a basal pit. Middle tibia bearing strong stout hairs on the outer face. Middle and hind tibiae each with a pairs of tibial spurs, one simple and the other pectinate.

Biology. The species nests in rotten wood or soil in forests, and predates mainly on dipterous and coleopterous larvae.

Distribution. Fourteen species have been recorded mostly in tropical and subtropical Asia, and one species from North America. Two species are known in Taiwan.

Taiwanese species: *Cryptopone taivanae* (Forel, 1913) (= *Euponera taivanae* Forel, 1913; = *Cryptopone takahashii* Wheeler, 1930, **syn. nov.**); *C. butteli* Forel, 1913.

Remarks. No distinct differences were observed between females of *Cryptopone taivanae* and *C. takahashii* (one syntype in TARI (Type No. 610)). *Cryptopone taivanae* also resembles to *C. sauteri* (Wheeler, 1906) from Japan and Korea, but is separated from the latter by the rounded ventral margin of subpetiolar process as in Figs. 71 and 72 (dully angulate in *sauteri* as in Figs. 69 and 70) and narrower dorsal surface of petiolar node (broader in *sauteri*).

Key to species of *Cryptopone*

1a. Subpetiolar process developed, forming an obtuse triangle.

b. Mandible with 9 or 10 teeth.

c. Total body length ca. 3.5 mm.

..... *Cryptopone taivanae* (Forel, 1913)

1aa. Subpetiolar process low and small, with the ventral margin almost straight.

bb. Mandible with 4 teeth.

cc. Smaller species, TL ca. 2 mm.

..... *Cryptopone butteli* Forel, 1913

Genus *Centromyrmex* Mayr, 1866

Taxonomy and morphology. Moderate-sized species. Head rectangular, without eyes. Female also lacks ocelli and compound eyes. Mandible long and triangular. Antenna relatively long, with 12 segments; scape flat. Propodeum thin, anterior and posterior margins rounded in dorsal view. Dorsal (outer) surface of middle tibia with numerous strong cuticular spines or peg-like teeth.

Biology. The nests are found in termite nests, probably they are predators of termites.

Distribution. Fifteen species are known in the tropics of which 4 species are recorded from the Oriental region. A single species has been known to Taiwan.

Taiwanese species: *Centromyrmex feae* (Emery, 1889).

Remarks. Taiwanese species, *C. feae*, has ca. 6 mm in total body length and yellowish brown

body. Rare species in Taiwan.

Genus *Ponera* Latreille, 1804

Taxonomy and morphology. Small to medium-sized ants with the total length around 1-4 mm. Eye small (lacking in a Taiwanese species). Middle and hind tibiae each with a pectinate tibial spur. Subpetiolar process with a small window (fenestra) anteriorly and a pair of minute teeth posteroventrally (absent in some species).

Biology. *Ponera* species mostly inhabits the floor of the forest, and nests in the soil.

Distribution. The genus comprises 55 species, mainly distributed in the Oriental and Australian regions. In Taiwan, 8 species have been known including 4 new species which are described herein.

Taiwanese species: *Ponera alisana* Terayama, 1986; *P. chiponensis* Terayama, 1986; *P. takaminei* Terayama, 1996; *P. tamon* Terayama, 1996; *P. rishen* **sp. nov.**; *P. shennong* **sp. nov.**; *P. taiyangshen* **sp. nov.**; *P. yuhuang* **sp. nov.**

Key to species of *Ponera*

1a. In profile, upper portion of posterior margin of petiolar node produced backward. 2

aa. In profile, posterior margin of petiolar node not produced backward. 3

2a. Posterior margin of petiole straight, without dorsal disc in dorsal view.

b. Body blackish brown to black. ..... *Ponera rishen* **sp. nov.**

2aa. Posterior margin of petiole strongly concave, with a dorsal disc in dorsal view.

bb. Body reddish brown. ..... *Ponera takaminei* Terayama, 1996

3a. Antennal scape long, exceeding posterior margin of head in full face view.

b. Metanotal groove present and distinctly incised dorsally (body reddish borown). ..... *Ponera alisana* Terayama, 1986

aa. Antennal scape not reaching posterior margin of head in full face view.

bb. Metanotal groove absent, not incised dorsally. 4

4a. Subpetiolar process without posterior tooth in lateral view.
..... 5

4aa. Subpetiolar process with a distinct posterior tooth in lateral view.
..... 6

5a. Smaller species; total body length ca. 1.0 mm (body yellow).
b. Posteroventral margin of subpetiolar process with a dull angle.
c. Eye lacking.
..... *Ponera shennong* **sp. nov.**

5aa. Larger species; total body length > 2.0 mm (body brown).
bb. Posteroventral margin of subpetiolar process convex, without an angle.
cc. Small eye present.
..... *Ponera yuhunag* **sp. nov.**

6a. First gastral tergum long, distinctly longer than wide in dorsal view.
b. Mesometanotal suture absent on dorsum of alitrunk.
c. Body yellow.
..... *Ponera chiponensis* Terayama, 1986

6aa. First gastral tergum as long as wide in dorsal view.
bb. Mesometanotal suture present on dorsum of alitrunk.
cc. Body black.
..... 7

7a. Petiolar node trapezoidal, posterodorsal corner forming an angle in lateral view.
..... *Ponera taiyangshen* **sp. nov.**

7aa. Petiolar node triangular, posterodorsal conrer not forming an angle in lateral view.
..... *Ponera tamon* Terayama, 1996

Ponera yuhuang sp. nov.

(Figs. 52-54)

Diagnosis. This species is easily separated from the Taiwanese congeners by the absent of posteroventral teeth of subpetiolar process, the small body size (TL 2.2 mm), and the brown body.

Description. Holotype worker. Head coarsely microreticulate, 1.23 times as long as wide, with concave posterior margin in full face view. Antennal scape relatively short, not reaching posterior margin of head; SI = 82; club consist of 4 segments. Eye small, consisting of a single facet. Petiolar node with parallel anterior and posterior margins and weakly convex dorsum in

profile: posterodorsal corner forming a dull angle; posterior margin in dorsal view almost straight. Subpetiolar process without posteroventral teeth.

Measurements (mm). HL 0.49, HW 0.40, SL 0.33, WL 0.70, PNL 0.15, PH 0.30, DPW 0.20, TL 2.2.

Color. Brown; legs and mandible yellowish brown.

Holotype. Worker, Nanshan-Anleng, Yilan Pref., 28. vii. -2. viii. 1988.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Yuhuang (玉皇), which is the name of a Taiwanese god.

Ponera rishen sp. nov.

(Figs. 49-51)

Diagnosis. Resembles to *P. takaminei* Terayama, 1996, from the Ryukyus in Japan and Taiwan, but is separated from the latter by the straight posterior margin of petiolar node and the black body color.

Description. Holotype worker. Head densely punctate, with straight posterior margin and convex sides in full face view. Antennal scape reaching posterior margin of head, SI = 75; club consist of 5 segments. Eye small.

Pro- and mesonota moderately punctate, posterolateral corner of propodeum forming an angle. Petiolar node large and wide, upper portion of posterior margin produced backward in profile; in dorsal view, dorsal disc 0.5 times as long as wide, with convex anterior margin and almost straight posterior margin. Subpetiolar process with strong posteroventral teeth.

Measurements (mm). HL 0.73, HW 0.60, SL 0.45, WL 0.95, PL 0.25, PH 0.53, DPW 0.45, TL 3.2.

Color. Body black, mandible and antenna brown, legs yellow.

Holotype. Worker, Riyuetan, Nantou Pref., 28. vii.- 2. viii. 1988.

Paratypes. 6 workers, same data as the holotype.

Type depository. The holotype is deposited in NIAES, and paratypes in NIAES, NSMT and TARI.

Etymology. The specific epithet is the Chinese noun Rishen (日神), which is the name of a Taiwanese god.

Ponera shennong sp. nov.

(Figs. 55-58)

Diagnosis. It is easily separated from the Taiwanese congeners by the minute body size and yellowish body color.

Description. Holotype worker. Head long, 1.36 times as long as wide, with very weakly convex dorsal margin and almost straight lateral margins. Antennal scape very short, SI = 77; 2nd to 8th segments short; club thick, consist of 4-segments. Eye lacking.

Alitrunk with flat dorsum; mesometanotal suture distinct on the dorsum; posterolateral corner of propodeum dully angulate. Petiolar node rectangular, with a posterodorsal angle; in dorsal view, dorsal disc thick and trapezoidal, with weakly concave posterior margin. Subpetiolar process with a dull angle at midlength of ventral margin, and without posteroventral teeth.

First and 2nd gastral terga long; 1st segment as long as wide in dorsal view, 2nd segment slightly wider than long.

Measurements (mm). HL 0.30, HW 0.28, SL 0.21, WL 0.48, PL 0.15, PH 0.18, DPW 0.15, TL 1.5.

Color. Yellowish brown; legs yellow.

Holotype. Kending, Pingdong Pref., 28. vii. -2. viii. 1988.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Shennong (神農), which is the name of a Taiwanese god.

Remarks. The specimen examined was taken from the leaf litter samples by Berlese funnels.

Ponera taiyangshen sp. nov.

(Figs. 59-61)

Diagnosis. It is easily separated from *Ponera tamon* Terayama, 1996, commonly distributed in Taiwan by the shape of petiolar node (rectangular in profile and wide dorsal disc). Rather this species seems most closely related to *P. japonica* distributed from Hokkaido to Kyushu in Japan. However, it is separated from the latter by the longer head with concave dorsal margin.

Description. Holotype worker. Head microreticulate, 1.21 times as long as wide, with concave posterior margin and parallel sides. Antennal scape short, not reaching the posterior margin of head; SI = 73; club consist of 5 segments. Eye small.

Alitrunk with straight dorsal margin; posterodorsal corner of propodeum dully angulate. Petiolar node rectangular, with parallel anterior and posterior margins and weakly convex dorsal margin; posterodorsal corner forming an angle; in dorsal view, dorsal disc with convex anterior

margin and straight posterior margin. Subpetiolar process with dorsoventral teeth.

Measurements (mm). HL 0.50, HW 0.41, SL 0.30, WL 0.69, PL 0.16, PH 0.30, DPW 0.24, TL 2.1.

Color. Brown; head darker than alitrunk; mandible, antenna and legs yellow.

Holotype. Worker, Taipingshan, Yilan Pref., 28. vii. -2. viii. 1988.

Type depository. 11 workers, same data as the holotype.

Etymology. The specific epithet is the Chinese noun Taiyangshen (大陽神), which is the name of a Taiwanese god.

Genus *Hypoponera* Santschi, 1938

Taxonomy and morphology. Yellow to blackish brown small ants. Eye small, or absent in some species. Mandible with 3 or 4 apical teeth followed by several denticles. Middle and hind tibiae each with a pectinate spure. Subpetiolar process without a small window nor posteroventral teeth. This genus most resembles the genus *Ponera*, but it is distinguished from the latter by the structure of subpetiolar process. The body size tends to be smaller than the *Ponera* species.

Biology. *Hypoponera* species usually inhabits the floor of the forest, and nests in the soil. Some species are known as predator of on collembolans.

Distribution. This genus comprises 171 species and widely distributed mainly in the tropical and subtropical regions around the world. Nine species have been known in Taiwan.

Taiwanese species: *Hypoponera beppin* Terayama, 1999; *H. biroi* (Emery, 1900); *H. schauinslandi* (Emery, 1899) (= *H. bondroiti* (Forel, 1911)); *H. gleadowi* (Forel, 1895) (= *Ponera japonica formosae* Forel, 1913); *H. nippona* (Santschi, 1937); *H. opaciceps* (Mayr, 1887) (= *Ponera perkinsi* Forel, 1889); *H. sauteri* Onoyama, 1989; *H. truncata* (F. Smith, 1861); *H. zwaluwenburgi* (Wheeler, 1933).

Quadrinominal infrasubspecific unavailable name: *Ponera gleadowi decipiens* var. *sauteri* Forel, 1912.

Key to species of *Hypoponera* (*H. biroi* and *H. truncata* are excluded in this key, since taxonomically ambiguous.)

1a. Petiole thick with round dorsum in profile.

b. Subpetiolar process low and small.

..... *Hypoponera zwaluwenburgi* (Wheeler, 1933)

1aa. Petiole thin and high in profile.

bb. Subpetiolar process developed.

..... 2

2a. Antennal scape long, reaching or exceeding the posterolateral corner of head in full face view.

..... 3

2aa. Antennal scape short, not reaching the posterolateral corner of head in full face view.

..... 5

3a. Petiolar node with parallel anterior and posterior margins in lateral view.

b. Anterodorsal corner of petiolar node angulate in lateral view.

c. Eye consisting of 4-5 facets.

..... *Hypoponera opaciceps* (Mayr, 1887)

3aa. Petiolar node narrowed dorsally in profile.

bb. Anterodorsal corner of petiolar node round, not forming a distinct angle in profile.

cc. Eye consisting of a single facet alone.

..... 4

4a. Antennal segments 9-11 relatively long, each longer than wide or as long as wide.

b. Body yellow.

..... *Hypoponera nippona* (Santschi, 1937)

4aa. Antennal segments 9-11 shorter, each wider than long.

bb. Body brown to dark brown.

..... *Hypoponera beppin* Terayama, 1999

5a. Lower half of posterolateral edge of propodeum carinate.

..... *Hypoponera sauteri* Onoyama, 1989

aa. Posterolateral edge of propodeum rounded, not carinate.

..... 2

6a. Petiole thin.

b. Eye situated rather far from the posterior margin of clypeus; the distance 3-4 times as long as eye diameter.

..... *Hypoponera schauinslandi* (Emery, 1899)

6aa. Petiole thick.

bb. Eye situated near the posterior margin of clypeus; the distance 2.0 times as long as eye diameter.

..... *Hypoponera gleadowi* (Forel, 1895)

Genus *Leptogenys* Roger, 1861

Taxonomy and morphology. Slender ants. Anterior margin of clypeus strongly produced medially. Antennal scape long, easily exceeding the posterior margin of head. Eye developed. Mandibles not covered by clypes, usually sickle-shaped. Mandibular teeth usually obscure. Pro- and mesonotal dorsum more or less convex. Middle and hind tibiae each with two spurs, one being long and needle-shaped and the other pectinate. Tarsal craws pectinate in many species.

Biology. The ants of this genus are carnivorous, and move quickly on the forest floor. They are predators of soil arthropods including Diplopoda, Isopoda and termites.

Distribution. This genus comprises 248 species, which are distributed in the tropical and subtropical areas in the world. Four species have been known to occur in Taiwan.

Taiwanese species: *Leptogenys confucii* Forel, 1912; *L. diminuta* (F. Smith, 1857); *L. kitteli* Mayr, 1870; *L. chinensis* (Mayr, 1870).

Species excluded from the Taiwanese fauna: *Leptogenys diminuta palliseri* Forel, 1900.

Remarks. The description of *L. confucii* by Forel (1912) is based on the ergatoid female, not worker (The type is preserved in DEI).

Key to species of *Leptogenys*

1a. Larger species, total length ca. 8-9 mm.

b. Petiolar node thick, almost as long as wide, and half-circular in dorsal view.

..... *Leptogenys kitteli* Mayr, 1870

1aa. Smaller species, total length less than 7 mm.

bb. Petiolar node thin and long in dorsal view.

..... 2

2a. 3rd antennal segment long, more than twice as long as 4th segment.

b. Body black with a bluish metallic reflection.

..... *Leptogenys chinensis* (Mayr, 1970)

2aa. 3rd antennal segment subequal in length of 4th.

bb. Body black or brown, without bluish metallic reflection.

..... 3

3a. Frons and occiput of head smooth, without distinct striae.

b. Body brown to dark brown.

..... *Leptogenys confuchii* Forel, 1912

3aa. Frons and occiput of head striate.

bb. Body black.

..... *Leptogenys diminuta* (F. Smith, 1857)

Genus *Odontomachus* Latreille, 1804

Taxonomy and Morphology. Large ants. Mandible characteristically long and linear; its tip abruptly curved inward. The shafts of mandibles inserted in the middle of anterior margin of head. Antenna long. Eye developed, situated anteriorly and relatively dorsally on the head. Nuchal carinae converging in a V at midline and connected to the median longitudinal line. Anterior margin of 2nd gastral tergum without constriction.

Biology. In *O. monticola,* a single foraging individual is often found on the forest floor and even around houses. The mandibles open at an angle of 180 degrees. Nests are found in rotten wood, under stones, and in the soil.

Distribution. This genus comprises about 65 species, and distributed in the tropical and subtropical areas around the worlds. One species, *O. monticola,* has been known from Taiwan.

Taiwanese species: *Odontomachus monticola* Emery, 1892 (= *O. monticola* var. *formosae* Forel, 1912; = *O. monticola* var. *major* Forel, 1913).

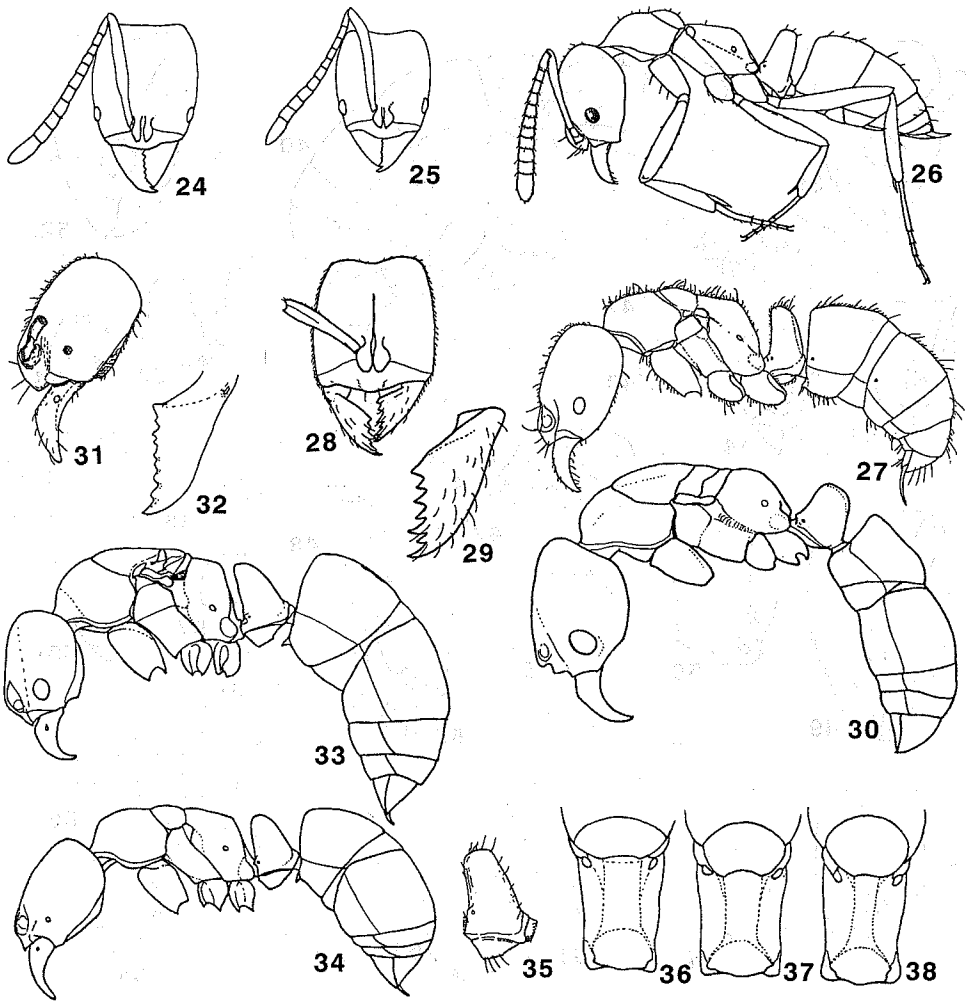
Genus *Anochetus* Mayr, 1861

Taxonomy and morphology. Small to moderate-sized species. General shape of mandible as in *Odontomachus*; long and liniar, and the tip abruptly curved inward. The shafts of mandibles inserted in the middle of anterior margin of head. Eye present, small to moderate-sized. The genus is distinguished from *Odontomachus* by the nuchal carinae which do not converge in a V at midline and the absence of median longitudinal line on head. Anterior margin of 2nd gastral tergum not constricted.

Biology. Nests are found in soil or under stones of the forests. Some species found in the forest margins and grass areas.

Distribution. It comprises 95 described species in the tropical and subtropical areas around the world. In Taiwan 2 described species have been known to occur. In addition to the species, Lin & Wu (2003) reported 2 undescribed species from Taiwan.

Taiwanese species: *Anochetus subcoecus* Forel, 1921; *A. taiwaniensis* Terayama, 1989; *A.* sp. 1; *A.* sp. 2.



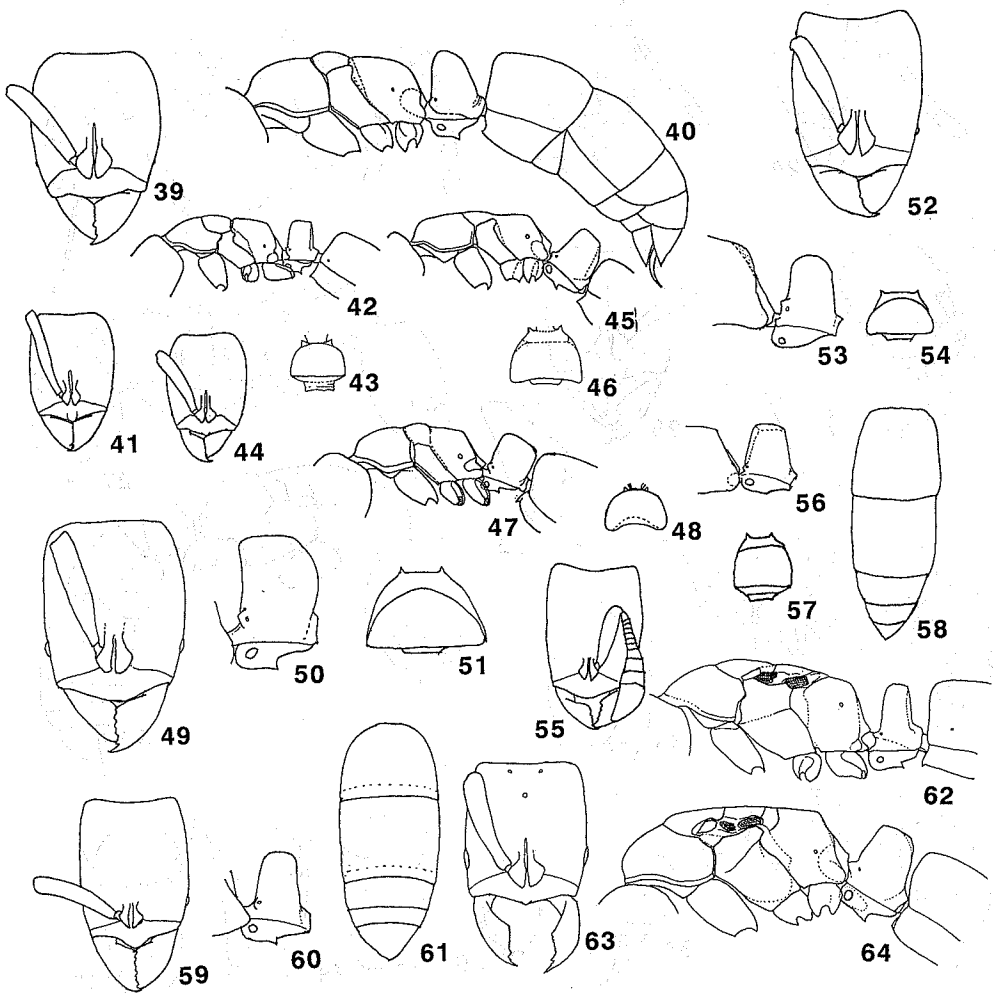
Figs. 24-38, Subfamily Ponerinae, 1.

24, *Pachycondyla luteipes* (Mayr, 1862); 25, 26, *Pachycondyla chinensis* (Emery, 1895); 27, *Pachycondyla horni* Forel, 1913; 28-30, *Pachycondyla darwinii* (Forel, 1893), 29, mandible, 30, female; 31-35, 38, *Pachycondyla tianzun* **sp. nov.**, 32, mandible, 33, female, 35, petiole, 38, dorsum of propodeum; 36, *Pachycondyla pilosior* (Wheeler, 1928), dorsum of propodeum; 37, *Pachycondyla sakishimensis* Terayama, 1999, dorsum of propodeum.

Key to species of *Anochetus*

1a. Antennal scape long, exceeding posterior lobe of head.

b. Eye large, ca. 0.25 mm in diameter.

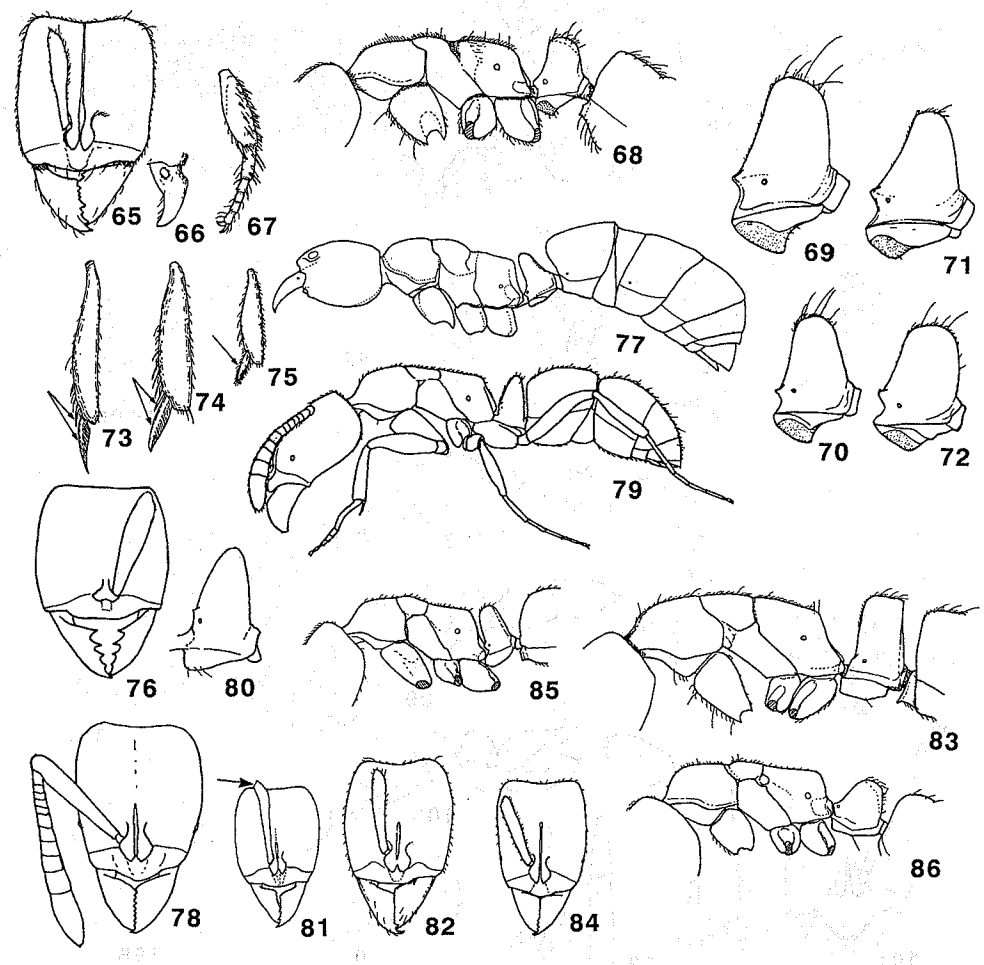


Figs. 39-64, Subfamily Ponerinae, 2.

39, 40, *Ponera tamon* Terayama, 1996; 41-43, 62, *Ponera alisana* Terayama, 1986, 43, petiolar node, dorsal view, 62, female; 44-46, 63, 64, *Ponera chiponensis* Terayama, 1986; 46, petiolar node, dorsal view; 63, 64, female; 47, 48, *Ponera takaminei* Terayama, 1996; 49-51, *Ponera rishen* **sp. nov.**, 51, petiolar node, dorsal view; 52-54, *Ponera yuhnang* **sp. nov.**, 54, petiolar node, dorsal view; 55-58, *Ponera shennong* **sp. nov.**, 57, petiolar node, dorsal view, 58, gaster, dorsal view; 59-61, *Ponera taiyangshen* **sp. nov.**, 61, gaster, dorsal view.

c. Large species; body length ca. 7 mm.
..... *Anochetus taiwaniensis* Terayama, 1989

1aa. Antennal scape short, not reaching posterior lobe of head.



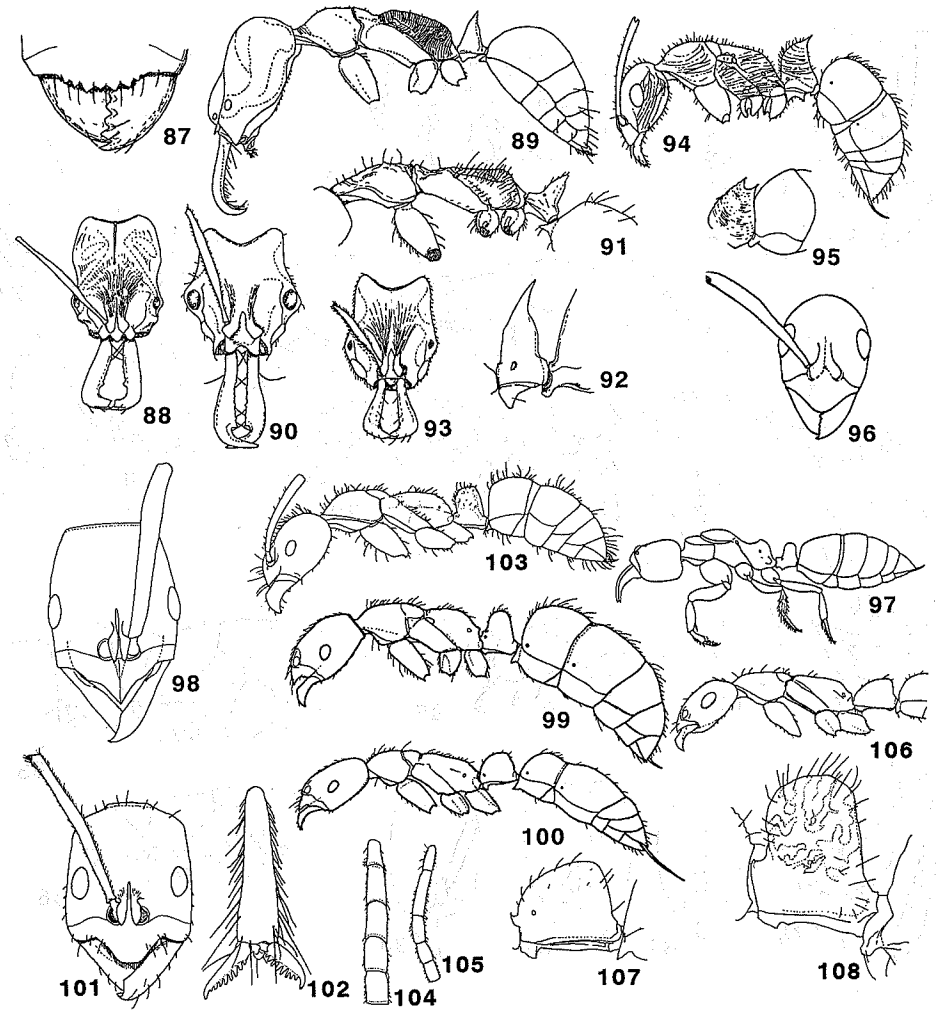
Figs. 65-86, Subfamily Ponerinae, 3.

65-70, 74, *Cryptopone taivanae* (Forel, 1913), 67, middle tibia, 69, female, petiole, 74, hind tibia with tibial spures; 71, 72, *Cryptopone sauteri* (Wheeler, 1906), 71, female, petiole; 73, genus *Pachycondyla*, tibial spures; 75, genus *Ponera*, tibial spure; 76, 77, *Cryptopone butteli* Forel, 1913; 78-80, *Hypoponera beppin* Terayama, 1999; 81, *Hypoponera nippona* (Santschi, 1937); 82, 83, *Hypoponera opaciceps* (Mayr, 1887); 84, 85, *Hypoponera sauteri* Onoyama, 1989; 86, *Hypoponera zwaluwenburgi* (Wheeler, 1933).

bb. Eye small, consist of 7-10 facets only.

cc. Smaller specis; body length ca. 4 mm.

..... *Anochetus subcoecus* Forel, 1921



Figs. 87-108, Subfamily Ponerinae, 4.

87, *Odontoponera transversa* (F. Smith, 1857); 88, 89, 92, *Odontomachus monticola* Emery, 1892, 92, petiole; 90, 91, *Anochetus taiwaniensis* Terayama, 1989; 93, *Anochetus subcoecus* Forel, 1912; 94-96, *Diacamma* sp.; 97, *Centromyrmex feae* (Emery, 1889); 98-100, 107, *Leptogenys confucii* Forel, 1912; 99, ergatoid female, 107, petiole; 101-104, 108, *Leptogenys kitteli* Mayr, 1870, 102, tarsal craw, 108, petiole; 105, 106, *Leptogenys chinensis* Mayr, 1870.

Subfamily Cerapachyinae

Taxonomy and morphology. They are slender ants, and are distinguished from the other subfamilies by the possession of pygidium with a row of spines or denticles, and the presence of a

process in the lateral portion of anterior clypeal margin. Pedicel 1-segmented or 2- segmented.

Biology. These are carnivorous ants, and feed on other ants or termites.

Distribution. This subfamily comprises about 200 described species in 5 genera, most being distributed in the tropical and subtropical areas. Two genera, *Cerapachys* and *Simopone*, have been known in Taiwan.

Key to genera in Cerapachynae

1a. Middle tibia with an apical spur.

.....*Cerapachys*

1aa. Middle tibia without apical spur.

..... *Simopone*

Genus *Cerapachys* F. Smith, 1857

Taxonomy and morphology. Moderate-sized species. Head longer than wide. Eye varies from developed to absent (*Cerapachys biroi* is eyeless in workers, but have compound eyes in ergatoid queens). Alitrunk with flat dorsal margin. Pedicel large, 1-segmented or 2-segmented. Middle tibia with an apical spur.

Biology. Many species are taken in broad-leaved forests and forest edges, and nests in soil or under stones of forest floor. It is sometimes found also in relatively shiny areas such as red pine woods. A nest of *C. biroi* containes hundreds of workers. Some species are arboreal and nests in a hollow tree twig.

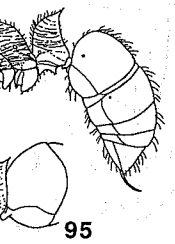
Distribution. This is the largest genus in this subfamily, consists of 144 species, and mainly distributed in the tropics and subtropics. Five species have been known in Taiwan of which *C. reticulatus* is known by winged queen only from Zhuqixiang, Chiai Pref., and one undetermined species (Ling & Wu, 2003).

Taiwanese species: *Cerapachys biroi* Forel, 1907; *C. longitarsus* (Mayr, 1878); *C. reticulatus* Emery, 1923; *C. sauteri* Forel, 1913; *C.* sp. 1.

Key to species of *Cerapachys* (Worker of *C. reticulatus* is not known.)

1a. Petiole with distinct dorsolateral margins.

b. Antenna 12-segmented.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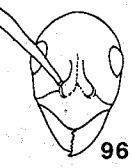
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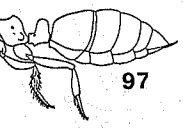
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106


108

nonticola Emery, 1892,
bcoecus Forel, 1912; 94-
ptogenys confucii Forel,
; 1870, 102, tarsal craw,

guished from the other
s, and the presence of a

..... *Cerapachys longitarsus* (Mayr, 1878)

1aa. Petiole with dorsum rounding into sides, without dorsolateral margins.

bb. Antenna 12- or 9-segmented.

..... 2

2a. Antenna 12-segmented.

b. Sculpture of head, alitrunk and petiole strongly costate predominantly.

..... *Cerapachys sauteri* Forel, 1913

2aa. Antenna 9-segmented.

bb. Sculputure predominantly punctate.

..... *Cerapachys biroi* Forel, 1907

Genus *Simopone* Forel, 1891

Taxonomy and morphology. Small to moderate-sized ants. Head longer than wide, with widely separated frontal carinae forming partial scrobes for the antennal scapes (with a few exceptions). Eye large. Antenna 11- or 12-segmented (usually 11-segmented). Alitrunk with flat dorsal margin. Petiole low, longer than wide in profile. Postpetiole large. 1st gastric segment much lager than those following gastric segments. Middle tibia without apical spur.

Resembles *Cerapachys* species, but is separated by the middle tibia without apical spur.

Biology. This genus is uncommon in collection and few ecological information is available. Probably they are arboreal.

Distribution. Sixteen species are known from the Ethiopian, the Oriental and the Australian regions.

Taiwanese species: *Simopone huode* **sp. nov.**

Remarks. This genus was firstly recorded from Taiwan by Terayama (1992), and a new species is described herein.

Simopone huode sp. nov.

(Figs. 121, 122)

Diagnosis. This species has elongate head, 11-segmented antennae, concave and carinate anterior margin of petiolar node, and rectangular subpetiolar process.

Description. Holotype alate female. Head long, 1.17 times as long as wide, with straight posterior margin and convex sides in full face view, posterolateral corner forming a dull angle; frons and vertex moderately punctate. Antenna with 11 segments; scape short, SI = 42; 10th

segment as long as wide, terminal segment twice as long as wide. Mandible broad triangular. Eye large and prominent, 0.23 mm in maximum diameter.

Alitrunk with almost straight dorsum. Petiole longer than high, with broadly convex dorsal outline in profile; in dorsal view, dorsal disk slightly wider than long, with concave anterior margin, convex posterior margin, and weakly convex lateral margins; anterior margin carinate. Subpetiolar process rectangular, with round anteoventral and angulate posteroventral corners.

First gastral tergum 0.95 times as long as wide, 0.50 mm in maximum width in dorsal view. Fore wing 2.3 mm in length.

Measurements (mm). HL 0.71, HW 0.60, SL 0.26, WL 1.00, PL 0.38, PH, 0.36, DPW 0.38, TL 3.4.

Color. Body brown; mandible, antenna, and legs yellowish brown.

Holotype. Alate female, Hungtou, Lan Hsu is., Taitung Pref., 11. vii. 1971, K. Mizusawa leg.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Huode (火德), which is the name of a Taiwanese goddess.

Subfamily Aenictinae

Taxonomy and morphology. The subfamily is separated from the other subfamilies by the following characteristics: pedicel 2-segmented; frontal carina forming a thin wall so that antennal insertion is opened; promesonotal suture absent on the dorsum. Workers have a 2-segmented pedicel, while males and queens have a 1-segmented pedicel.

Biology. The ants of this subfamily are known as "army ants" along with Ecitoninae and Dorylinae. Aenictine ants are vagrant in habits; they do not construct a permanent nest, and attack the other ant nests and feed on larvae and pupae. Males are often taken at light.

Distribution. It is distributed mostly in the Oriental region and a few in the Ethiopian and Australian regions.

Remarks. This subfamily comprises a single genus, *Aenictus*.

Genus *Aenictus* Shuckard, 1840

Distribution. Approximately 150 species have been known from the tropical and subtropical zones of the Ethiopian, Oriental and Australian regions. In Taiwan, 6 species have been known to

occur of which 3 are known by male only.

Taiwanese species: *Aenictus ceylonicus* (Mayr, 1866) (= *A. ceylonicus* var. *formosensis* Forel, 1913); *A. latiscapus sauteri* Forel, 1912; *A. lifuiae* Terayama, 1984; *A. longi taivanae* Forel, 1913; *A. punctiventris* Emery, 1901; *A.* sp. 1.

Quadrinominal infrasubspecific unavailable name: *Aenictus latiscapus sauteri* var. *satoi* Santschi, 1937.

Remarks. A male of *A. lifuiae* is shown in Figs. 133-136. A cotype of *A. latiscapus sauteri* Forel is preserved in TARI (Labeled Ako, XII. 1922[!], [Col. T. Shiraki], and the types of *A. lifuiae* Terayama, 1984, are in TARI, NMNC, NIAES, NSMT and MNHA. Hung et al. (1972) recorded *Aenictus* sp. (nr. *camposi* Wheeler & Chapman) from Fenchihu (1800m asl), central Taiwan.

Key to species of *Aenictus* (*A. latiscapus, A. longi*, and *A. punctiventris* are known by male only.)

1a. Lateral face of propodeum with irregular rugae.

b. Mandible linear to narrow triangular, with 3 to 6 teeth.

..... *Aenictus ceylonicus* (Mayr, 1866)

1aa. Lateral face of propodeum without rugae.

bb. Mandible broad triangular, with 7 teeth.

..... *Aenictus lifuiae* Terayama, 1984

Subfamily Leptanillinae

Taxonomy and morphology. It is distinguished from the other subfamilies by the 2-segmented pedicel, the absence of frontal carinae and eyes, and the presence of promesonotal suture on the dorsum of alitrunk. Among the 5 genera, *Phaulomyrma* and *Yavenella* have been known from males only.

Biology. Only a few detailed ecological observations have been made up to now. *Leptanilla* species have specialized habits to predate on the geophilomorph centipedes.

Distribution. This subfamily comprises about 40 species in 5 genera, and is distributed from tropical to temperate areas in the Old World. In Taiwan, 2 species in 2 genera are recorded. Rare species in Taiwan.

Key to genera of Leptanillinae

1a. Antennal scape short, reaching or very slightly exceeding the level of midlength of head.
b. Mandible short, not strongly produced in profile.
c. Clypeus short, longer than wide, broadly rounded, and with an obscure posterior margin.
d. Smaller species; total body length less than 2 mm.
..... *Leptanilla*

1aa. Antennal scape long, exceeding the posterior margin of head in frontal view.
bb. Mandible long and slender in profile.
cc. Clypeus large, trapezoidal, and with a distinct posterior margin
dd. Larger species, total body length more than 3 mm.
..... *Protanilla*

Genus *Leptanilla* Emery, 1870

Taxonomy and morphology. Small ants; total length of worker around 1 mm in most species. Body flat dorsoventrally and slender. Eye absent. Frontal carina absent so that antennal insertion opened. Pedicel 2-segmented in workers, and 1-segmented in queens and males. This genus belongs to the tribe Leptanillini.

Biology. Most species lives in soil, and they have specialized habits to predate on the geophilomorph centipedes. Workers walk with antennae tapping.

Distribution. About 40 species are distributed in the Old World tropics and subtropics. A single species, *L. taiwanensis*, is known in Taiwan (Wushe, Nantou Pref.).

Taiwanese species: *Leptanilla taiwanensis* Ogata, Terayama et Masuko, 1995.

Remarks. The first finding nest of the *L. taiwanensis* found in soil about 15 cm in depth. Many larvae were found feeding a geophilomorph centiped, which has ca. 4 cm in total length in the nest. This is the first field observation on the food habit about leptanilline species (Ogata et al., 1995).

Genus *Protanilla* Taylor, in Bolton, 1990

Taxonomy and morphology. Total body length 2.5-4 mm. It is separated from *Leptanilla* by the moniliform antennal flagellum, the long antennal scape which exceeds the posterior margin of head, the long and slender mandible in profile, and the trapezoidal cypeus which has distinct

posterior margin. The body length is larger than in *Leptanilla*, usually more than 3 mm. Pedicel is 2-segmented in the worker and queen. This genus belongs to the tribe Anomalomyrmini.

Biology. The developed mandibles can be opend at 180 degrees. Workers forage on the ground with the mandible opened.

Distribution. This genus contains 5 species in the Oriental region; *P. rafflesi* Taylor in Bolton, 1990 from Singapore and East Malaysia, *P. bicolor, P. concolor* and *P. furcomandibular* form China (Xu, 2002; Xu & Zhang, 2002), and *P. schoedli* from Sri Lanka (Baroni-Urbani & Andrade, 2006). *Protanilla wallacei* in Hölldobler & Wilson (1990) is an unavailable name. Classiffication has not been completed. The genus is known by a single species, *P. lini* sp. nov., in Taiwan.

Taiwanese species: ***Protanilla lini* sp. nov.**

Protanilla lini sp. nov.

(Figs.113-118)

Diagnosis. Easily separated from the Chinese species: from *L. bicolor* by the round petiole and postpetiole in dorsal view (petiole and postpetiole oval, and longer than wide, respectively, in *bicolor*), and the concolorous body (bicolored in *bicolor*), from *P. concolor* by the reverse U-shaped petiolar node in profile (subtriangular in *concolor*), and round postpetiolar node in dorsal view (postpetiole short, wider than long in *concolor*), and from *P. furcomandibular* by the thinner mandible (broader in *furcomandibular*), and the absence of lateroventral tooth of mandible (two lateroventral teeth present in *furcomandibular*).

Description. Holotype worker. Head long, smooth and shining, 1.26 times as long as wide, with almost straight posterior margin and convex sides in full face view. Mandible elongate-triangular, with about 10 peg-like denticles in ventral portion. In profile, apical 1/3 of mandible curved ventrally. Anterior margin of clypeus concave at middle. Antenna with 12 segments; scape long, microreticulate, exceeding posterior margin of head, SI = 74; 2nd segment (pedicel) longer than wide, 3rd to 11th segments each almost as long as wide; terminal segment 2.3 times as long as wide. Eye lacking.

Alitrunk long and slender; pronotum smooth and shining; mesonotum thin, 0.5 times of width of pronotum in dorsal view; propodeum smooth and shining, with convex dorsal margin and convex posterodorsal corner in profile. Petiolar node higher than long, smooth and shining, with convex dorsal margin and almost straight anterior and posterior margins; in dorsal view, dorsal disc round, as long as wide; subpetiolar process low, bearing lobe-like. Postpetiole higher than long, and lower than petiole, with well convex dorsal and ventral margins; in dorsal view, dorsal disc round, as long as wide.

Gaster largely smooth; in dorsal view, 1st gastral tergum with straight anterior margin and dully angulate anterolateral corners, 0.50 mm in maximum width.

Measurements (mm). HL 0.60, HW 0.48, SL 0.50, WL 0.93, PL 0.23, PH 0.33, DPW 0.23, PPL 0.23, PPH 0.33, PPW 0.24, TL 2.9.

Color. Body yellowish brown; antenna and legs somewhat yellowish.

Holotype. Worker, Fusan, Taipei Pref., 18. iii. 1995, C.-C. Lin leg.

Paratypes. 2 workers, same data as the holotype.

Type depository. Holotype in NIAES, and paratypes in the collection of the Social Insect Laboratory of NCUE.

Etymology. This species is named after the collector of this species, Dr. C.-C. Lin, who is a leading entomologist.

Subfamily Pseudomyrmicinae

Taxonomy and morphology. This subfamily is distinguished from the other subfamilies by the pectinated tarsal craws, the large eyes, and the posterior margin of clypeus which is straight, not concave medially. Many of the Asian species are easily recognized by the slender petiole and postpetiole. The phylogenetical position of this subfamily is not clear, and several hypotheses are presented.

Biology. Many species are arboreal, and nests are found in hollows of plants. Some species engage in mutualism with specific plant species.

Distribution. This subfamily comprises about 200 species in 3 genera, *Tetraponera*, *Pseudomyrmex* and *Myrcidris*, and distributed in the tropical and subtropical areas. In Taiwan, 3 species in the genus *Tetraponera* have been collected.

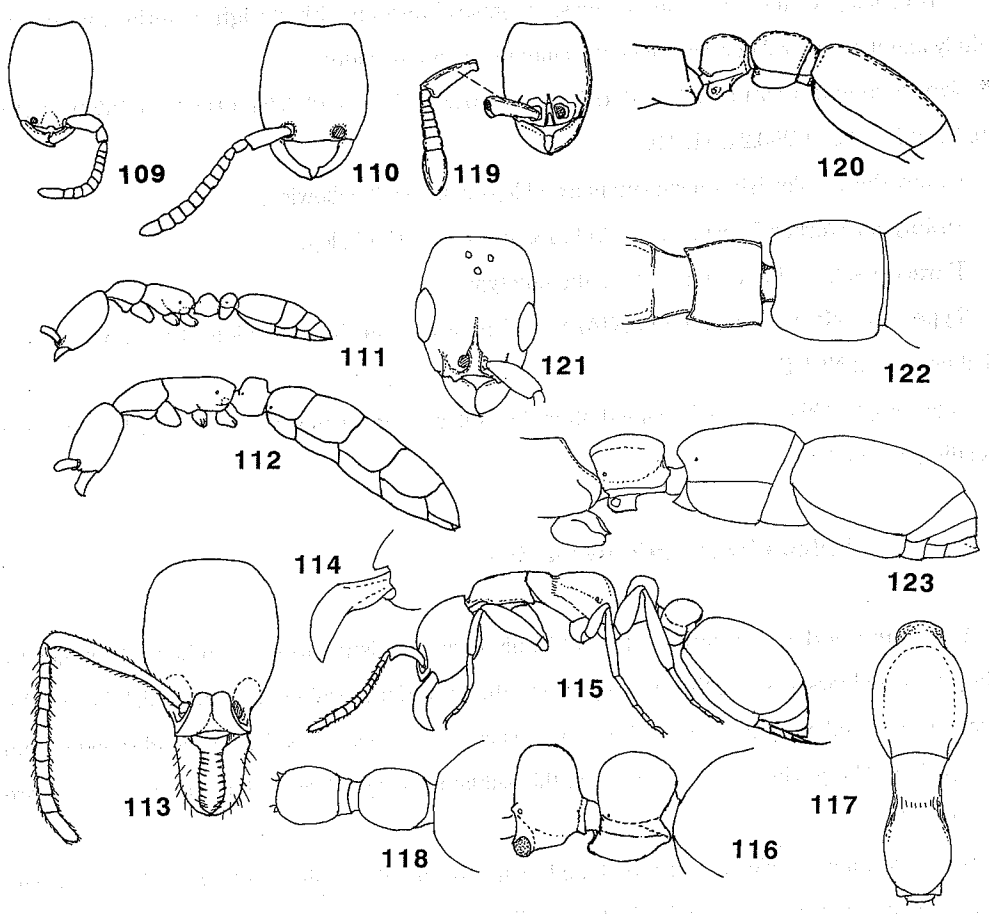
Genus *Tetraponera* F. Smith, 1852

Taxonomy and Morphology. Slender ants. The genus is easily separated from the other ant genera by the developed eyes, 2-segmented pedicel, and slender body proportion.

Biology. *T. allaborans* is commonly found in Taiwan, and often seen on branches or leaves of trees or grasses. They are easily collected by sweeping or beating.

Distribution. One hundred eighteen species are described from the tropical and subtropical zones of the Old World.

Taiwanese species: *Tetraponera allaborans* Walker, 1859; *T. attenuata* F. Smith, 1877 (= *T.*



Figs. 109-118, Subfamily Liptanillinae. Figs. 119-123, Subfamily Cerapachyinae, 1. 109-112, *Leptanilla taiwanensis* Ogata, Terayama & Masuko, 1995, (redrawn from Ogata et al., 1995), 110, 112, female; 113-118, *Protanilla lini* **sp. nov.**, 114, mandible, lateral view, 117, alitrunk, dorsal view, 118, pedicel, dorsal view; 119, 120, *Cerapachys biroi* Forel, 1907; 121-123, *Simopone huode* **sp. nov.**, 122, petiole and 1st gastral tergum, dorsal view.

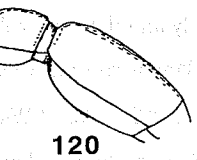
thagatensis (Forel, 1907)); *Tetraponera modesta* (F. Smith, 1860).

Key to species of *Tetraponera*

1a. Body yellowish brown or orange-brown, gaster dark brown.

b. Smallest among the Taiwanese species; HW 0.5-0.6 mm.

..... *Tetraponera modesta* (F. Smith, 1860)



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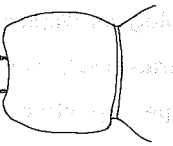

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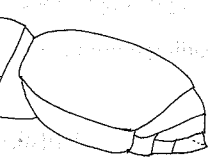

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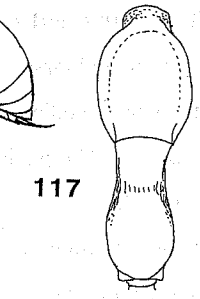


117

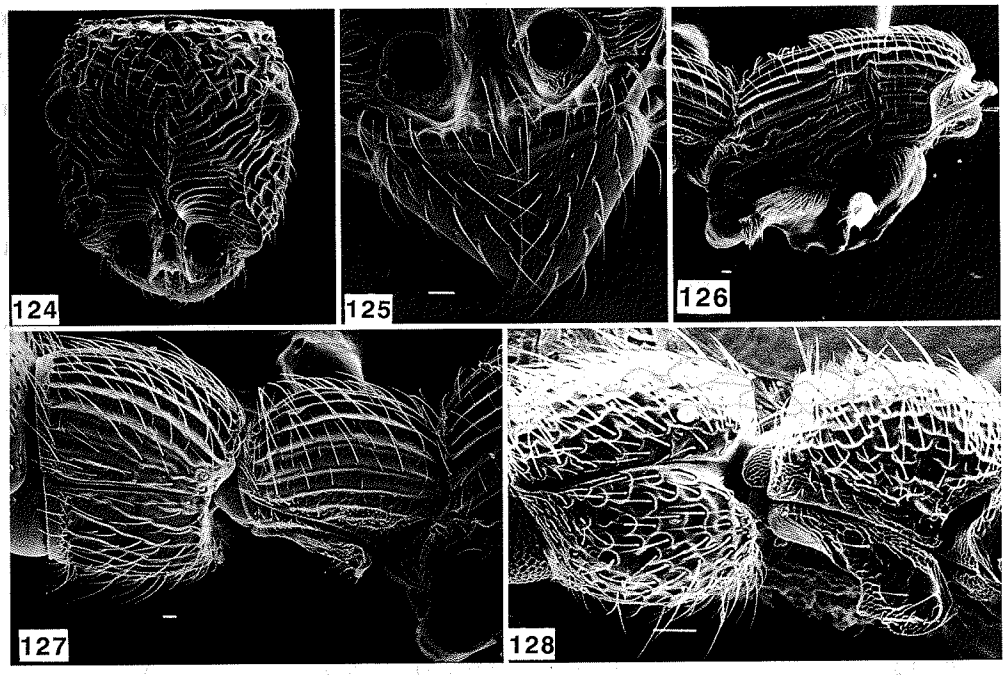
erapachyinae, 1.

wn from Ogata et al.,

ral view, 117, alitrunk,

07; 121-123, *Simopone*

desta (F. Smith, 1860)



Figs. 124-128, Subfamily Cerapachyinae, 2.

124-127, *Cerapachys sauteri* Forel, 1913, 125, mandible, 127, pedicel; 128, *Cerapachys biroi* Forel, 1907, pedicel. (SEM photos).

1aa. Body black.

bb. Larger species; HW more than 0.6 mm.

..... 2

2a. Mandible slender, with 3 teeth on the masticatory margin.

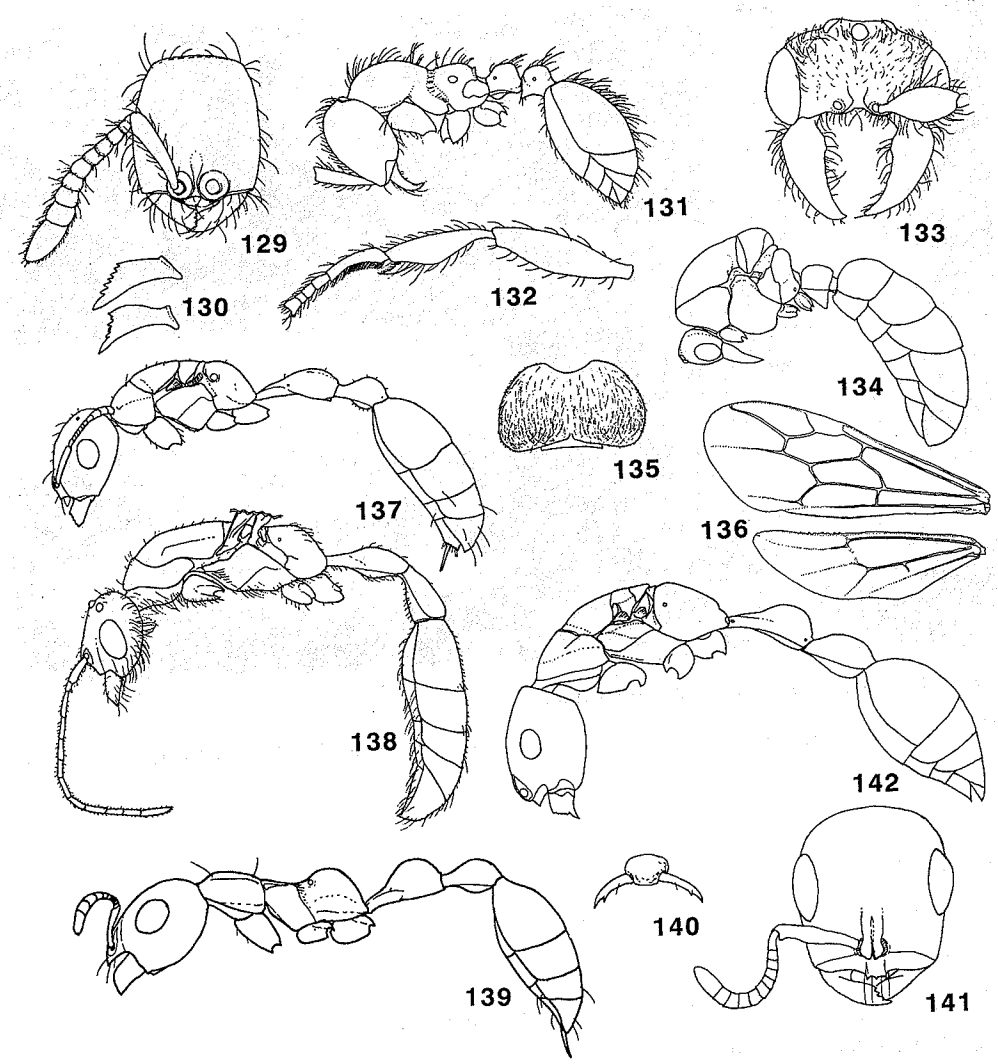
b. Smaller species; head width 0.6-0.9 mm.

..... *Tetraponera allaborans* Walker, 1859

2aa. Mandible more robust, with 4 teeth on the masticatory margin.

bb. Larger species; head width 1.0-1.5 mm.

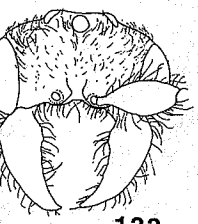
..... *Tetraponera attenuata* F. Smith, 1877



Figs. 129-136, Subfamily Aenictiinae. 137-142, Subfamily Pseudomyrmecinae. Figs 129-136, *Aenictus lifuiae* Terayama, 1984; 130, mandibles, lateral view, 132, fore leg, 133-136, male, 135, petiole, dorsal view; 137-141, *Tetraponera allaborans* Walker, 1859; 137, female, 138, male, 140, tarsal craw; 142, *Tetraponera attenuata* F. Smith, 1877, female.

Subfamily Myrmicinae

Taxonomy and morphology. This subfamily has following characteristics: Compound eyes sometimes extremely reduced, but present except in a few genera; frontal lobe generally covering antennal insertion; antenna consisting of 4 to 12 segments, and variable also in shape; pedicel



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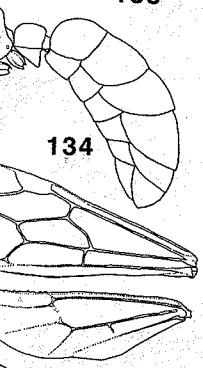

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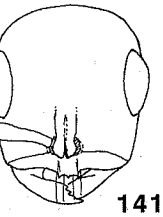


141

nyrmecinae.

132, fore leg, 133-136,

359; 137, female, 138,

stics: Compound eyes

obe generally covering

also in shape; pedicel

consisting of 2 segments (petiole and postpetiole); abdomen with a sting, or not.

It has the largest number of genera (139 genera up to 2005). Bolton (2003) divided this subfamily into 6 tribal groups and 24 tribes.

Biology. It is most diverse in biology and morphology in the Formicidae.

Distribution. About 5,000 species are recorded around the world. In Taiwan 128 species in 29 genera are recorded. Those belong to 14 tribes in 3 tribal groups (Table 2).

Table 2. Taiwanese genera in the subfamily Myrmicinae.

Tribal group	Tribe	Genus
Dacetine t.g.	Basicerotini	*Eurhopalothrix*
	Dacetini	*Pyramica, Strumigenys*
Solenopsidine t.g.	Myrmecini	*Myrmica*
	Tetramoriini	*Rhoptromyrmex, Tetramorium*
	Pheidolini	*Aphaenogaster, Lophomyrmex, Messor, Pheidole*
	Paratopulini	*Paratopula*
	Solenopsidini	*Anillomyrma, Carebara, Monomorium, Pheidologeton, Solenopsis, Formosimyrma* **gen. nov.**
	Stenammini	*Lordomyrma, Vollenhovia*
Formicoxenine t.g.	Crematogastrini	*Crematogaster, Recurvidris*
	Meranoplini	*Meranoplus*
	Formicoxenini	*Cardiocondyla, Temnothorax*
	Myrmecinini	*Acanthomyrmex, Myrmecina, Pristomyrmex*
	Metaponini	*Metapone*
	Melissotarsini	*Rhopalomastix*

Key to genera of Myrmicinae

1a. Postpetiole attached to dorsum of 1st gastral segment.

b. Propodeal spiracle at least partly included in posterior face of propodeum.

..... *Crematogaster* (antenna with 10 or 11 segments)

1aa. Postpetiole attached to anterior face of 1st gastral segment.

bb. Propodeal spiracle situated on lateral face of propodeum.

..... 2

2a. Antenna with 4 to 7 segments.

b. Antennal club consisting of 2 segments.

..... 3

2aa. Antenna with 8 or 10 segments.

bb. Antennal club consisting of 2 segments.
..... 5

2aaa. Antenna with 11 or 12 segments.

bbb. Antennal club consisting of 2 or more segments, or distinct club absent.
..... 9

3a. Antenna with 7 segments.

b. Antennal scrobe present which run below the eye.
..... *Europalothrix*

3aa. Antenna with 4 or 6 segments.

bb. Antennal scrobe present which above the eye.
..... 4

4a. Mandibles inserted in the middle of the anterior margin of head.

b. Mandible elongate, almost straight or weakly curved.

c. Masticatory margin of mandible without a series of teeth.
..... *Strumigenys*

4aa. Mandibles inserted at anterolateral corners of head.

bb. Mandible more or less triangular, or elongate in a few species.

cc. Masticatory margin of mandible with a series of teeth (without a series of teeth in a few species).
..... *Pyramica*

5a. Antennal club extremely large and flat.

b. Frontal lobes very close to each other.

c. Postpetiole attached to gaster by the whole posterior face.
..... *Rhopalomastix*

5aa. Antennal club unmodified, more or less cylindrical.

bb. Frontal lobes more widely separated from each other.

cc. Postpetiole attached to gaster by lower portion only.
..... 6

6a. Petiole sessile, without peduncle.

b. Promesonotum sharply marginate laterally and with spines posteriorly.

c. Antenna with 9 segments.
..... *Melanoplus*

6aa. Petiole with peduncle.

bb. Promesonotum not marginate, and without spines posteriorly.

cc. Antenna with 8-10 segments.

..... 7

7a. Antenna with 8 segments (club consisting of 2 segments).

b. Elongate antennal scrobe present which above the eye.

c. Median portion of clypeus strongly produced.

..... *Formosimyrma* **gen. nov.**

7aa. Antenna with 8-10 segments.

bb. Antennal scrobe shorter, or absent.

cc. Median portion of clypeus longitudinally bicarinate, not produced medially.

..... 8

8a. Worker caste monomorphic, weakly dimorphic or serially polymorphic.

b. Anterior margin of clypeus with a single median seta.

c. Posterodorsal corner round, without spine nor distinct angle in profile.

..... *Solenopsis*

8aa. Worker caste strongly dimorphic.

bb. Anterior margin of clypeus with pairs of hairs, without a single median seta.

cc. Propodeum with spine, or sharply angulate in profile.

..... *Carebara*

9a. Propodeal spine strongly curved upward and pointing anteriorly.

b. Petiolar shaft more or less curved.

..... *Recurvidris*

9aa. Propodeal spine straight or weakly curved, but not curved forward.

bb. Petiolar shaft straight.

..... 10

10a. Petiole barrel-shaped, without an anterior peduncle.

b. Anterior portion of dorsolateral margin of propodeum with a small tooth.

c. Ventrolateral margin of head delineated by a shape longitudinal carina on each side.

..... *Myrmecina*

10aa. Petiole with an anterior peduncle.

bb. Anterior portion of dorsolateral margin of propodeum without tooth.

cc. Ventrolateral margin of head without longitudinal carinae.

..... 11

11a. Propodeal spiracle close to the maergine of the declivity.

b. Antenna short, shorter than the length of head; 11-segmented.

..... *Metapone*

11aa. Propodeal spiracle well in front of the margin of the declivity.

bb. Antenna longer than the head length; 11- or 12-segmented.

..... 12

12a. Antennal club consisting of 2 segments.

b. Antenna with 11 segments.

c. Strongly polymorphic species.

d. Eye present.

..... *Pheidologeton*

12aa. Antennal club consisting of 3 segments.

bb. Antenna with 11 segments (with 10 segments in foreign species).

cc. Small monomorphic species.

dd. Eye absent.

..... *Anillomyrma*

12aaa. Antennal club consisting of more than 3 segments, or not forming a distinct club.

bbb. Antenna with 11 or 12 segments (when the species or genera with 11-segmented antenna, then the club consisting of 3 segments).

ccc. Monomorphic species (excepting *Acanthomyrmex* and *Pheidole* which are strongly dimorphic).

ddd. Eye present.

..... 13

13a. Antenna with 11 segments.

..... 14

13aa. Antenna with 12 segments.

..... 16

14a. Anterior margin of clypeus with a series of small teeth.

b. Frontal lobe not developed laterally, so that antennal insertion is exposed.

..... *Pristomyrmex*

14aa. Anterior margin of clypeus without a series of small teeth.

bb. Frontal lobe developed laterally, so that antennal insertion is covered by it.

..... 15

15a. Antennal scrobe absent.

b. Pronotal dorsum a flat plateau which is sharply marginate laterally.

c. Tooth-like or triangular processes with near humeli of pronotum.

..... *Lophomyrmex*

15aa. Antennal scrobe present.

bb. Pronotal dorsum convex, without distinct lateral margination.

cc. Pronotum without tooth-like or triangular processes.

..... *Tetramorium* (part)

16a. Antenna with a 3-segmented club.

..... 17

16aa. Antenna with a 4-segmented club or club indistinct.

..... 25

17a. Dorsa of head and alitrunk without distinct hairs.

b. Seen from above postpetiole more than twice as wide as long.

..... *Cardiocondyla*

17aa. Dorsa of head and alitrunk with hairs.

bb. Seen from above postpetiole less than 1.5 times as wide as long.

..... 18

18a. Posterior margin of petiole convex in profile.

b. Posterodorsal margin of petiolar node produced as a rim.

..... *Vollenhovia*

18aa. Posterior margin of petiole straight in profile.

bb. Posterodorsal margin of petiolar node not produced as a rim.

..... 19

19a. Propodeum without spines or teeth, at most carinate posterodorsally.

b. Anterior clypeal margin with a distinct median seta.

..... *Monomorium*

19aa. Propodeum armed with spines or teeth.

bb. Anterior clypeal margin with pairs of setae, but without a median single seta.

..... 20

20a. Alitrunk with strong spines at pronotal humeli and propodeal angle.

b. Strongly dimorphic species.

..... *Acanthomyrmex*

20aa. Alitrunk without spines at pronotal humeli.

bb. Monomorphic species.

..... 21

21a. Promesonotal dorsum convex in profile.

b. Worker caste strongly dimorphic.
..... *Pheidole*

21aa. Promesonotal dorsum flat in profile.
bb. Worker caste monomorphic with a few exceptions.
..... 22

22a. Dorsum of promesonotum flat, forming very shallow convex curve from front to back in profile.
..... *Paratopula*

22aa. Dorsum of promesonotum forming a high, dome-like or markedly convex arc in profile.
..... 23

23a. Head heart-shaped in full face view.
b. Anterior clypeal margin strongly arcuate and prominent.
..... *Rhoptromyrmex*

23aa. Head not heart-sharped in full face view.
bb. Anterior clypeal margin not strongly arcuate.
..... 24

24a. Each lateral portion of clypeus with its posterior margin raised into a ridge in front of the antennal insertion.
b. Propodeal spiracle situated behind the line which connects the apex and base of propodeal spine and extended ventrally.
c. Mandible with 7 teeth (with a few exceptions) of which apical 3 large.
..... *Tetramorium*

24aa. Each lateral portion of clypeus not raised into a ridge in front of the antennal insertion.
bb. Propodeal spiracle situated in front of the line which connects the apex and base of propodeal spine and extended ventrally.
cc. Mandible with 5-6 teeth which gradually become smaller toward the base.
..... *Temnothorax*

25a. Antenal scape long, far exceeding posterior margin of head.
..... *Aphaenogaster*

25aa. Anternnal scape short, at most slightly exceeding posteior margin of head.
..... 26

26a. Propodeal spine absent.
b. Venter of head with long, strong subdecumbent hairs.
..... *Messor*

26aa. Propodeal spine present.

bb. Venter of head without long hairs.

.....*Myrmica*

Tribe Basicerotini

Genus *Eurhopalothrix* Brown & Kempf, 1961

Taxonomy and morphology. Small ants. Head pentagonal, widest at about mid point to posterior 2/5 of head; lateral margin forming an angle, anterolateral margin angulate in full face view. Anterior margin of clypeus straight to concave. Mandible triangular, serially dentate; apical margin engaging directly at full closure. Antenna with 7 segments. Antennal scrobe present which run below the eye. Alitrunk compact. Petiole and postpetiole without foliaceous or membranous outgrowths.

Biology. Clyptic foreagers in forest. *Eurhopalothrix biroi* is known to be predaceous on small softbodied arthropods, especially Collembola (Brown & Kempf, 1960).

Distribution. Thirty-six species are known from the tropical or subtropical areas in the New World, Oriental, and Australian regions. A single species, *Eurhopalothrix procera*, has been known from Lanyu island in Taiwan.

Remarks. *Rhopalothrix* sp. in Brown (1949) is conspecific with *Eurhopalothrix procera*. It is recorded form Botel Tobako island (= Koto Sho, = Lanyu) in Taiwan. This species is distributed from Australia, New Guinea, Borneo, the Philippines, Solomon Islands, and Taiwan.

Taiwanese species: *Eurhopalothrix procera* (Emery, 1897).

Tribe Dacetini

Genus *Pyramica* Roger, 1862

Taxonomy and morphology. Small ants; total length 1-3 mm. Head triangular, with strongly concave posterior margin in full face view. Mandible subtriangular or elongate, inserted at anterolateral corners of head, and masticatory margin of with a series of teeth (without a series of teeth in a few species). Antenna with 4 or 6 segments; club consisting of 2-segments. Petiole and postpetiole each with spongiform appendages. *Trichoscapa, Pentastruma, Kyidris, Epitritus* and *Smithistruma* were synonymized with this genus by Bolton (1999).

Biology. Many species live in leaf litter or soil, and hunt collembolans, mites, diplurans, small centipedes, and other soft-bodied arthropods. Temporary social parasitic species are present.

Distribution. This is large genus comprises 330 species, and distributed from the tropics to temperate zones of the world excluding the Australian region. In Taiwan, 14 species have been known.

Taiwanese species: *Pyramica sauteri* (Forel, 1912) (= *Pentastruma sauteri* Forel, 1912); *P. formosa* (Terayama, Lin & Wu, 1995) (= *Epitritus formosus* Terayama, Lin & Wu, 1995); *P. hexamera* (Brown, 1958); (= *Epitritus hexamerus* Brown, 1958); *P. hirashimai* (Ogata, 1990) (= *Epitritus hirashimai* Ogata, 1990); *P. mutica* (Brown, 1949) (= *Kyidris mutica* Brown, 1949; = *Kyidris nuda* Brown, 1949); *P. takasago* (Terayama, Lin & Wu, 1995) (= *Kyidris takasago* Terayama, Lin & Wu, 1995); *P. elegantula* (Terayama & Kubota, 1989) (= *Smithistruma elegantula* Terayama & Kubota, 1989); *P. leptothrix* (Wheeler, 1929) (= *Strumigenys leptothrix* Wheeler, 1929; = *S. leptothrix* (Wheeler, 1929); *P. benten* (Terayama, Lin & Wu, 1995) (= *Smithistruma benten* Terayama, Lin & Wu, 1995); *P. formosimonticola* (Terayama, Lin & Wu, 1995) (= *Smithistruma formosimonticola* Terayama, Lin & Wu, 1995); *P. kichijo* (Terayama, Lin & Wu, 1995) (= *Smithistruma kichijo* Terayama, Lin & Wu, 1995); *P. mazu* (Terayama, Lin & Wu, 1995) (= *Smithistruma mazu* Terayama, Lin & Wu, 1995); *P. membranifera* (Emery, 1869) (= *Trichoscapa membranifera* (Emery, 1869)); *P. japonica* (Ito, 1914).

Species excluded from the Taiwanese fauna: *Pyramica incerta* (Brown, 1949).

Remarks. Although Ogata and Onoyama (1998) suggested that *P. formosimonticola* (= *Smithistruma formosimonticola*) is an extreme of *P. benten* (= *S. benten*), Bolton (2000) regarded both are independent good species. *Pyramica incerta* was recorded from Taiwan by Tang and Li (1992). However, it is excluded from the Taiwanese fauna, since the no reliable record is available. As only two queen individuals are known of *Pyramica formosa*, it is most resembles to *P. dyschima* Bolton, 2000, from Malaysia and Indonesia by its diagnostic characters. *P. formosa* is easily separable from the *P. hexamera* and *P. hirashimai* by the absence of large flattend hairs on vertex and mesonotal dorsum in female.

Key to species of *Pyramica* (*P. formosa* is known by female (queen) only.)

1a. Mandible elongate.

b. Labrum elongated below, visible between mandibles in full face view. 2

1aa. Mandible more or less triangular.

bb. Labrum short, not visible in full face view.

..... 3

2a. Mandibular shaft with 2 spine-like teeth.

b. Mesonotal dorsum higher than porpodeal dorsum in profile.

c. Propodeal spines developed.

d. Larger species; total length about 2 mm.

..... *Pyramica hexamera* (Brown, 1958)

2aa. Mandibular shaft without tooth.

bb. Mesonotal dorsum continuous to propodeal dorsum in profile.

cc. Propodeal spines obscure.

dd. Smaller species; total body length about 1 mm.

..... *Pyramica hirashimai* (Ogata, 1970)

3a. Dorsal alitrunk with 2 distinct convexities.

b. Postpetiole laterally with small spongiform appendages.

c. A space formed near the base of mandibles when they are closed.

..... 4

3aa. Dorsal alitrunk not raised into 2 separate convexities.

bb. Postpetiole laterally with large spongiform appendages.

cc. No distinct space formed when the mandibles are closed.

..... 5

4a. First to 3rd gastral terga with standing spoon-shaped hairs.

b. Propodeal spine acute and produced.

..... *Pyramica takasago* (Terayama, Lin & Wu, 1995)

4aa. First to 3rd gastral terga without standing spoon-shaped hairs.

bb. Propodeal spine dull and small.

..... *Pyramica mutica* (Brown, 1949)

5a. Fully closed mandibles with a strongly defined, transverse basal border, which is separated from the anterior clypeal margin by a conspicuous impression or gap.

b. Pronotum carinate laterally, with pronounced humeral angles.

c. Head with a single pair of erect clavate hairs on vertex.

..... *Pyramica membranifera* (Emery, 1869)

5aa. Fully closed mandibles without a strongly defined, transverse basal border.

bb. Pronotum without pronounced humeral angles.

cc. Clavate hairs absent on vertex.

..... 6

6a. Dorsal margin of head flat in profile.

b. Dorsum of head and alitrunk without hairs.

..... *Pyramica sauteri* (Forel, 1912)

6aa. Dorsal margin of head convex in profile.

bb. Dorsum of head and alitrunk with hairs.

..... 7

7a. Pronotum smooth and shining.

b. Dorsal outline of alitrunk convex in profile.

c. Anterior margin of clypeus transverse.

..... *P. mazu* (Terayama, Lin & Wu, 1996)

7aa. Pronotum more or less sculptured.

bb. Dorsal outline of alitrunk not convex in profile.

cc. Anterior margin of clypeus convex.

..... 8

8a. Head and dorsum of alitrunk with abundant long flagellate hairs.

b. Upper corner of propodeal lamellae bluntly angulate.

..... *Pyramica kichijo* (Terayama, Lin & Wu, 1996)

8aa. Head and dorsum of alitrunk without long flagellate hairs.

bb. Upper corner of propodeal lamellae forming an acute tooth.

..... 9

9a. Posterolateral corner of head bluntly angulate in full face view.

b. Frons and vertex with abundant decumbent spatulate hairs.

..... *Pyramica japonica* (Ito, 1914)

9aa. Posterolateral corner of head rounded, not forming an angle in full face view.

bb. Frons and vertex with straight erect or suberect hairs.

..... 10

10a. Dorsa of head and pronotum without long erect hairs.

..... 11

10aa. Dorsa of head and pronotum abundant with long erect hairs.

..... 12

11a. Propodeal spine developed, longer than basal width.

b. Posterolateral corner of head distinctly angulate in full face view.

c. Propodeal lamella well developed.

..... *Pyramica elegantula* (Terayama & Kubota, 1989)

11aa. Propodeal spine smaller, as long as basal width.

b. Posterolateral corner of head rounded, not forming a distinct angle in full face view.

c. Propodeal lamella weakly developed.

..... *Pyramica benten* (Terayama, Lin & Wu, 1995)

12a. Anterior half of cephalic dorsum with long erect hairs.

b. Anterior margin of antennal scape with 3 long erect hairs.

c. Tibiae and tarsi with long erect hairs.

..... *Pyramica leptothrix* (Wheeler, 1929)

12aa. Anterior half of cephalic dorsum without long erect hairs.

bb. Anterior margin of antennal scape without long erect hairs.

cc. Tibiae and tarsi without long erect hairs.

..... *Pyramica formosimonticola* (Terayama, Lin &Wu, 1995)

Genus *Strumigenys* F. Smith, 1860

Taxonomy and morphology. Small ants; total length less than 4 mm. Mandible very long, shaft-shaped. Apical portion of mandible forked; usually intercalary teeth present. Subapical portion of mandible with 1-2 teeth in many species. Eye located under antennal scrobe. Antenna consisting of 4 or 6 segments. Petiole and postpetiole with spongiform appendages. The genus *Quadristruma* was synonymized with the present genus by Bolton (1999).

Biology. Ants of this genus inhabit forest floor, and hunt and feed on collembolans.

Distribution. This genus is large, comprises 474 described species in the world, especially abundant in species number in the tropical and subtropical areas. Fourteen species have been known in Taiwan.

Taiwanese species: *Strumigenys chuchihensis* Lin & Wu, 2001; *S. emmae* (Emery, 1890) (= *Quadristruma emmae* (Emery, 1890)); *S. formosensis* Forel, 1912 (= *S. feae* var. *formosensis* Forel, 1912); *S. hispida* Lin & Wu, 1996; *S. konteiensis* Lin & Wu, 2001; *S. lacunosa* Lin & Wu, 1996; *S. lewisi* Cmeron, 1886 (= *S. godeffroyi* Mayr, 1866, in Lin & Wu, 1996); *S. lichiaensis* Lin & Wu, 1996; *S. liukueiensis* Terayama & Kubota, 1989; *S. minutula* Terayama & Kubota, 1989; *S. nanzanensis* Lin & Wu, 1996; *S. orchidensis* Lin & Wu, 2001; *S. solifontis* Brown, 1949; *S. trada* Lin & Wu, 1996.

Remarks. *Strumigenys lewisi* is taxonomically problematic species. There are morphologically very similar in workers, but different in queens in several populations in Japan and Taiwan. Although it is widely recorded from Southeast Asia and Hawaii, the identification should be

reconfirmed because there occur several very similar species. Molecular analysis is needed for determine the range of species.

Key to species of *Strumigenys*

1a. Antenna consisting of 4 segments.
..... *Strumigenys emmae* (Emery, 1890)

1aa. Antenna consisting of 6 segments.
..... 2

2a. Head and mesosoma with numerous spoon-shaped hairs.
b. Apical fork of mandible with 2 spiniform teeth, and 4 intercalary denticles.
..... *Strumigenys konteiensis* Lin & Wu, 2001

2aa. Head and mesosoma without numerous spoon-shaped hair.
bb. Apical fork of mandible with 2 spiniform teeth, and 1 or 2 intercalary denticles.
..... 3

3a. Preapical tooth of mandible absent, or minute.
b. Anterior clypeal margin deeply concave medially.
..... *Strumigenys formosensis* Forel, 1912

3aa. Preapical tooth of mandible absent, or minute.
bb. Anterior clypeal margin transverse.
..... *Strumygenys lacunosus* Lin & Wu, 1996

3aaa. Preapical tooth of mandible present.
bbb. Anterior clypeal margin deeply concave medially.
..... *Strumigenys orchidensis* Lin & Wu, 2001

3aaaa. Preapical tooth of mandible present.
bbbb. Anterior clypeal margin transverse.
..... 4

4a. Dorsolateral margin of head behind level of eye with 1-3 laterally projecting flagellate hairs.
..... 5

4aa. Dorsolateral margin of head behind level of eye without laterally projecting flagellate hair.
..... 8

5a. First gastral tergum with numerous simple erect hairs; long flagellate hairs present 5 pairs at most.
b. Dorsolateral margin of head posteriorly without erect hairs.

..... 6

5aa. First gastral tergum with numerous long flagellate hairs.

bb. Dorsolateral margin of head posteriorly with at least 3 erect hairs.

..... 7

6a. Medium-sized species; TL 2.2-2.4 mm.

b. Propodeum largely smooth and shining.

c. Eye consist of 6 facets.

..... *Strumigenys trada* Lin & Wu, 1996

6a. Small species; TL 1.7-2.0 mm.

b. Propodeum microreticulate.

c. Eye consist of 9-11 facets.

..... *Strumygenys minutula* Terayama & Kubota, 1989

7a. Dorsum of promesonotum with numerous short curved hairs.

b. Eye large, consisting of about 30 facets.

..... *Strumigenys nanzanensis* Lin & Wu, 1996

7aa. Dorsum of promesonotum with few short curved hairs.

bb. Eye smaller, consisting of about 10 facets.

..... *Strumygenys chuchihensis* Lin & Wu, 2001

8a. First gastral tergum with numerous simple erect hairs,.

..... 9

8aa. First gastral tergum with long flagellate hairs, without simple erect hair.

..... 10

9a. Head with numerous long erect hairs.

b. Dorsal margin of antennal scrobe with long erect hairs.

c. Larger species; total body length 2.5-2.7 mm.

..... *Strumigenys liukueiensis* Terayama & Kubota, 1989

9aa. Head with long erect hairs in posterolateral area only.

bb. Dorsal margin of antennal scrobe with short narrowly spatulate hairs.

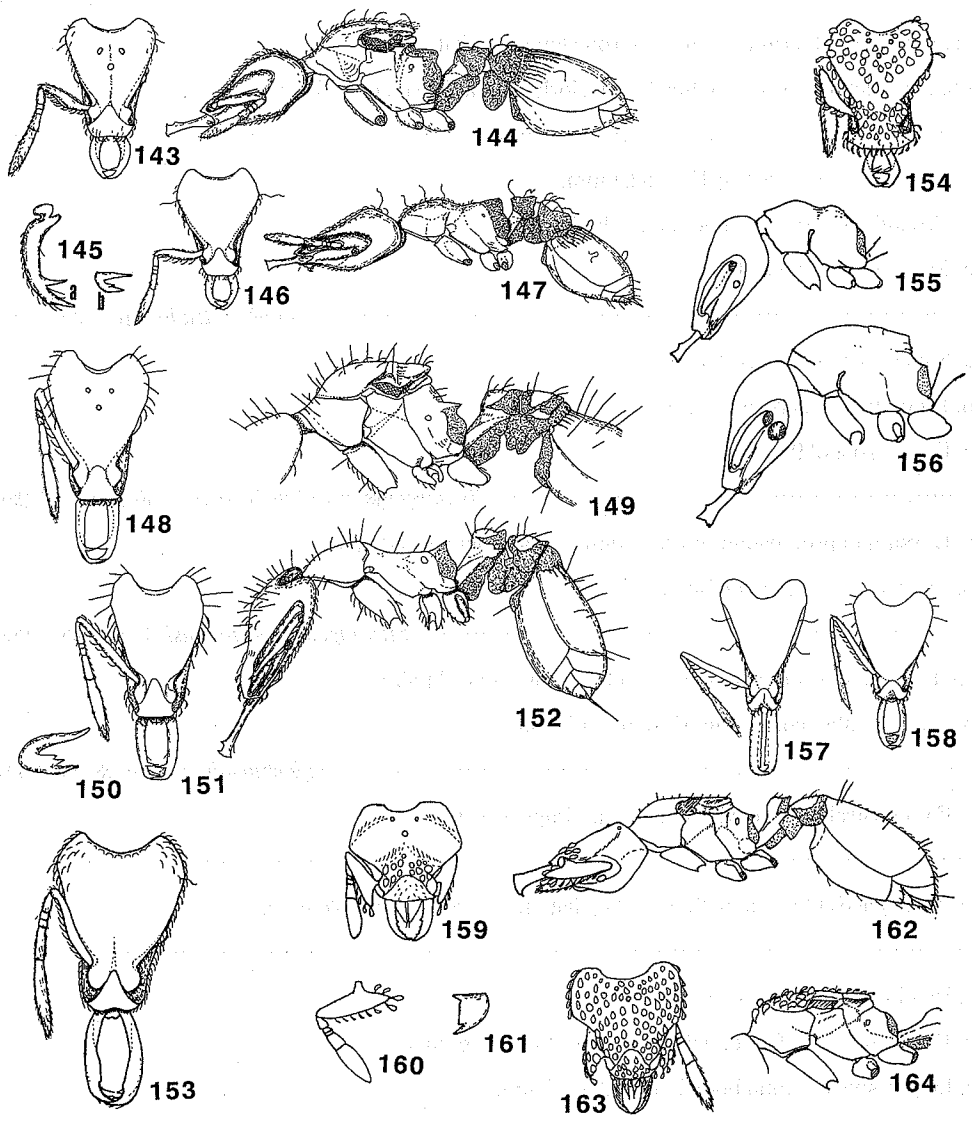
cc. Smaller species; total body length 2.1-2.2 mm.

..... *Strumigenys lichiaensis* Lin & Wu, 1996

10a. First gastral tergum with erect hairs restricted to 2 transverse rows.

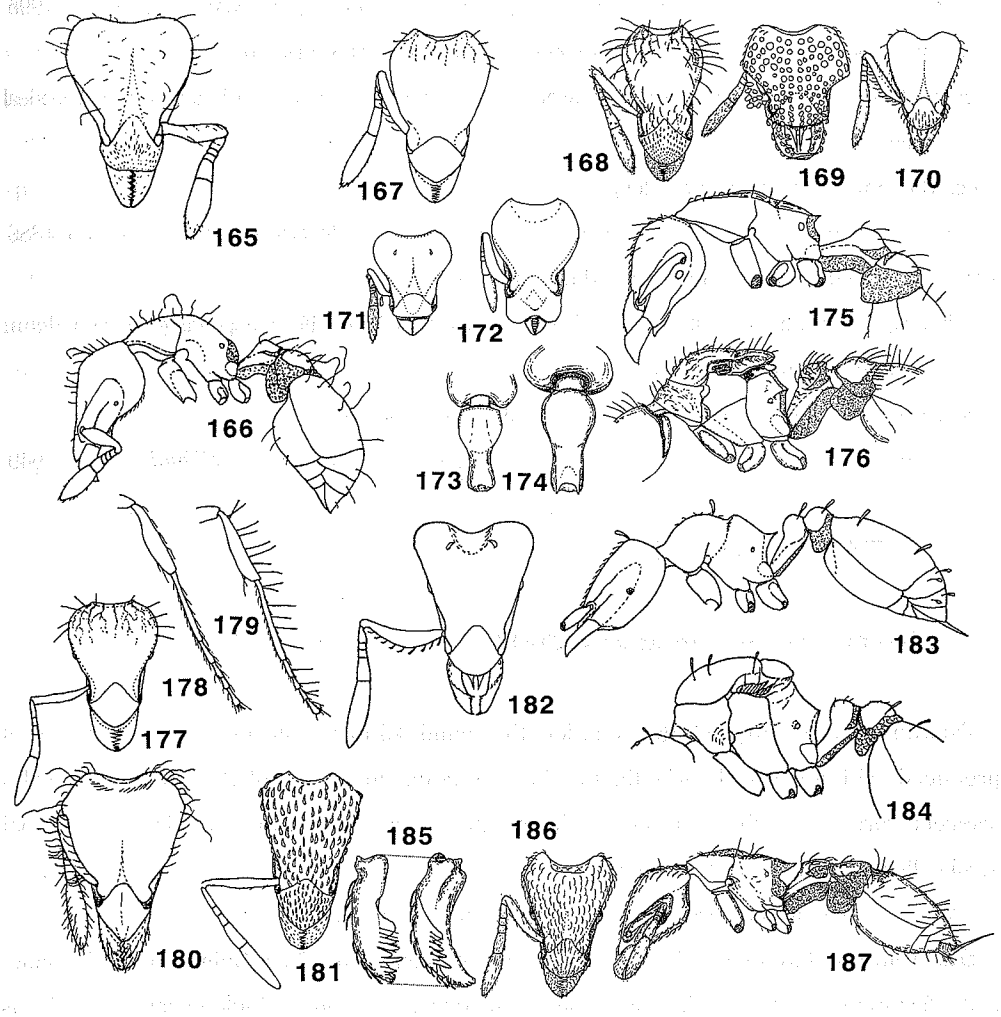
b. Posterior margin of spongeform appendage of propodeum almost straight, without distinct propodeal spine.

c. Mandible shorter than head length.



Figs. 143-164, Subfamily Myrmicinae, 1.

143-147, *Strumigenys minutula* Terayama & Kubota, 1989, 143, 144, female, 145, mandible; 148-152, *Strumigenys liukueiensis* Terayama & Kubota, 1989, 148, 149, female, 150, mandible, end-on view; 153, *Strumigenys lacunosa* Lin & Wu, 1996; 154-156, *Strumigenys emmae* (Emery, 1890), 156, female; 157, *Strumigenys formosensis* Forel, 1912; 158, *Strumigenys solifontis* Brown, 1949; 159-162, *Pyramica formosus* (Terayama, Lin & Wu, 1995), female, 161, mandible, end-on view; 163, 164, *Pyramica hirashimai* (Ogata, 1990), female.



Figs. 165-187, Subfamily Myrmicinae, 2.

165, 166, *Pyramica mazu* (Terayama, Lin & Wu, 1995); 167, 175, *Pyramica benten* (Terayama, Lin & Wu, 1995); 168, 176, 179, *Pyramica leptothrix* (Wheeler, 1929), 176, female, 179, middle leg; 169, *Pyramica hexamera* (Brown, 1958); 170, *Pyramica mutica* (Brown, 1949); 171, 173, *Pyramica membranifera* (Emery, 1869); 172, 174, *Pyramica sauteri* (Forel, 1912); 177, 178, *Pyramica formosimonticola* (Terayama, Lin & Wu, 1995), 178, middle leg; 180, *Pyramica kichijo* (Terayama, Lin & Wu, 1995); 181, *Pyramica japonica* (Ito, 1914); 182-184, *Pyramica takasago* (Terayama, Lin & Wu, 1995), 184, female; 185-187, *Pyramica elegantula* (Terayama & Kubota, 1989), 185, mandible.

..... *Strumigenys hispida* Lin & Wu, 1996

10aa. First gastral tergum with erect hairs not restricted to 2 transverse rows.

bb. Posterior margin of spongeform appendage of propodeum almost straight, without distinct propodeal spine.

cc. Mandible shorter than head length.

..... *Strumigenys lewisi* Cameron, 1886

10aaa. First gastral tergum not restricted to 2 transverse rows.

bbb. Propodeum with an acute propodeal spine; upper 2/3 of spongiform appendage of propodeum strongly narrowed just below.

ccc. Mandible slightly more than or almost half the head length.

..... *Strumigenys solifontis* Brown, 1949

Tribe Stenammini

Genus *Lordomyrma* Emery, 1897

Taxonomy and morphology. Total length around 3-5 mm. Anterior clypeal margin well produced, with a pair of longitudinal carinae. Antenna consisting of 12 segments; apical 3 segments forming a club. Promesonotal dorsum produced; metanotal groove distinct. Antennal scrobe distinct in the Taiwanese species.

Biology. Found in rotten wood or soil on the moist forest floor.

Distribution. Twenty species have been known mainly from New Guinea, and Fiji island, and a few from New Caledonia, northeastern Australia and Japan. A single unnamed species is recorded from Taiwan by Lin & Wu (2003).

Taiwanese species. *Lordomyrma* sp.

Remarks. In Japan a single species, *L. azumai* (Santschi, 1941), occurs only, and this genus is not found around Taiwan: the Ryukyu Islands, China, and the Phillippines.

Genus *Vollenhovia* Mayr, 1865

Taxonomy and morphology. Small to medium-sized ants; total length 2-6 mm. Head longer than wide. Clypeus with a pair of longitudinal carinae. Forntal lobe relatively small; frontal carina obscure; antennal scrobe absent. Mandible triangular, with 4-7 teeth. Antenna consisting of 12 segments (11 in a few species); apical 3 segments forming a club (club obscure in a few species).

Antennal scape short, not reaching posterior margin of head in full face view. Maxillary palpi with 1-3 segments, usually with 2 segments. Eye large. Petiole larger than postpetiole, without peduncle, or peduncle very short if any. Legs short; middle and hind legs lack tibial spur.

Biology. Many species are found in rotten wood or dead twigs on the forest floor. Not a few species are alboreal. In some species ergatoid queens are found in nests. Workerless and social parasitic species are present.

Distribution. This genus comprises seventy-two species, and mainly distributed in Southeast Asia, India, and New Guinea, with a few from Australia, Oceania and northeastern Asia. Five species have been known to occur in Taiwan.

Taiwanese species: *Vollenhovia satoi* Santschi, 1937; *V. acanthina* (Karavaiev, 1935); *V. shunfenger* **sp. nov.**; *V. menshen* **sp. nov.**; *V. xingjun* **sp. nov.**

Species excluded from the Taiwanese fauna: *Vollenhovia emeryi* Wheeler, 1906.

Remarks. Although Forel (1912) recorded *V. emeryi* from Pilam (= Taitung Pref.), no reliable additional record is known. This species is distributed in the mainland of Japan, from Hokkaido to Kyushu alone. *V. acanthina* is recorded from Taiwan by Lin & Wu (2003).

Key to species of *Vollenhovia*

1a. Propodeum with acute propodeal spines; tip of the spine turned upward.

b. Dorsum of petiole with an acute tooth at midlength in profile.

..... *Vollenhovia acanthina* (Karavaiev, 1935)

1aa. Propodeum without distinct spine, posterolateral margin angulate at most.

bb. Dorsum of petiole without tooth.

..... 2

2a. Posterolateral margin of propodeum convex, and not forming an angle in profile.

b. Anteroventral corner of postpetiole acutely angulate and produced anteroventrally.

c. Larger species, HL > 0.75 mm, total body length ca. 3.5 mm.

..... 3

2aa. Posterolateral margin of propodeum angulate or forming a small tooth.

bb. Anteroventral corner of postpetiole obtusely angulate.

cc. Smaller species, HL < 0.65 mm, total body length ca. 2.5 mm.

..... 4

3a. Posterior margin of propodeum steeply sloping.

..... *Vollenhovia satoi* Santsch, 1937

3aa. Posterior margin of propodeum gently sloping.

..... *Vollenhovia shunfenger* **sp. nov.**

4a. Subpetiolar process developed; its thin lamellar wall higher than long.

b. Frons with a large brown spot.

..... *Vollenhovia menshen* **sp. nov.**

4aa. Subpetiolar process low; its thin lamellar wall longer than high.

bb. Frons without a large brown spot.

..... *Vollenhovia xingjun* **sp. nov.**

Vollenhovia menshen sp. nov.

(Fig. 204)

Diagnosis. This species resembles *V. emeryi* Wheeler, 1906, distributed from Hokkaido to Yakushima island in Japan, but is separable from the latter by the much developed lamellar wall of subpetiolar process and the absence of distinct propodeal spines.

Description. Head microreticulate, 1.19 times as long as wide, with concave posterior margin. CI = 84, SI = 71, eye 0.13 mm in diameter. Promesonotum densely punctate, promesnonotal dorsum almost straight, metanotum very weakly concave in profile; prosterodorsal corner of propodeum with an angle. Petiolar node higher than long, with convex dorsal margin, posterolateral corner not forming an angle, Subpetiolar process developed, its thin lamellar wall higher than long. Postpetiole higher than long, dorsal outline convex in prifile. Gaster smooth and shining.

Measurements (mm). HL 0.63, HW 0.53, SL 0.38, WL 0.78, PL 0.20, PH 0.33, DPW 0.20, PPL 0.20, PPH 0.23, PPW 0.20, TL 2.5.

Color. Reddish brown; frons with a large brown spot; alitrunk and pedicel reddish brown; gaster blackish brown.

Holotype. Worker, Nanshanxi, Nanfen-Cun, Nantou Pref., 30. vii. 1986, M. Terayama leg.

Paratypes. 2w, same data as the holotype; 2w, 1 ergatoid female, same locality, 28. vii.- 3. viii. 1988; 1w, Wushe, Nantou Pref., 23. viii. 1987, M. Terayama leg.

Type depository. Types are preserved in NIAES.

Etymology. The specific epithet is the Chinese noun Menshen (門神), which is the name of a Taiwanese god.

Remarks. Females (queens) of *V. emeryi* are all alate, while this species produces ergatoid females.

Vollenhovia shunfenger sp. nov.

(Fig. 203)

Diagnosis. Large species. Resembling *V. satoi* Santsch, 1937, but is separated from the latter by the gently sloping posterior margin of propodeum (steeply sloping, almost vertically at near the mid length, in *V. satoi*).

Description. Head punctate, 1.18 times as long as wide, with concave posterior margin. CI = 87, SI= 70, eye relatively large, 0.15 mm in diameter. Mandible with 7 teeth. Promesonotum punctate, dorsal margin gently convex in profile, metanotal groove distinctly incised dorsally; popodeum with convex dorsal outline, posterodorsal corner convex, not forming an angle. Propodeum longer than high, with straight anterior margin and convex posterior margin; subpetiolar process developed, its thin lamellar wall slightly longer than high. Postpetiole slightly longer than high and longer than petiole, with convex dorsal margin; anteroventral corner acutely produced. Gaster smooth and shining.

Measurements (mm). Worker: HL 0.78, HW 0.68, SL 0.48, WL 1.30, PL 0.26, PH 0.41, DPW 0.28, PPL 0.33, PPH 0.30, PPW 0.32, TL 3.5. Female: HL 0.80, HW 0.78, SL 0.55, WL 1.39, PL 0.30, PH 0.43, DPW 0.27, PPL 0.35, PPH 0.33, PPW 0.32, TL 4.6.

Color. Body reddish brown excepting blackish brown gaster; antenna and legs yellowish brown.

Holotype. Worker, Fenqihu, Chaiyi Pref., 22. x. 1977, K. Yamauchi leg.

Paratypes. 1w 1f, same data as the holotype; 1 ergatoid female, Nanshanxi, Nanfen-Cun, Nantou Pref., 18. v. 1981, M. Isono leg.

Type depository. The holotype in NIAES and paratypes in NSMT.

Etymology. The specific epithet is the Chinese noun Shunfenger (順風耳), which is the name of a Taiwanese god.

Remarks. This species produces both alate and ergatoid females.

Vollenhovia xingjun sp. nov.

(Fig. 205)

Diagnosis. This species is most resembles *V. benzai* Terayama & Kinomura, 1998, recorded in southern part of Japan by the low subpetiolar process and the densely punctate promesonotal dorsum without a longitudinal smooth band. However, it is separated from the latter by the much larger thin lamellar wall of subpetiolar process.

Description. Head punctate, 1.16 times as long as wide, with shallowly concave posterior margin. CI = 86, SI = 63, eye 0.13 mm in diameter. Promesonotum densely punctate, with almost

straight dorsal margin in profile; metanotal groove indistinct; posterodorsal corner of propodeum forming an angle. Petiole higher than long, with weakly convex dorsal margin; subpetiolar process low, its thin lamellar wall longer than high. Postpetiole as long as high, with convex dorsal and ventral margins. Gaster smooth and shining.

Measurements (mm). HL 0.55, HW 0.48, SL 0.30, WL 0.68, PL 0.20, PH 0.30, DPW 0.18, PPL 0.20, PPH 0.20, PPW 0.20, TL 2.4.

Color. Body yellowish brown, frons without a large brown spot, antenna and legs yellow.

Holotype. Worker, Nanshanxi, Nanfen-Cun, Nantou Pref., 21.viii. 1987, S. Kubota leg.

Paratypes. 4w, same data as the holotype; 28w, 1 ergatoid female, Hueisenlinchan, Shinsheng-Cun, Nantou Pref., 28. vii.- 2. viii. 1988; 1w, Meizilin, Huchu-Cun, Nantou Pref., 28. vii.- 2. vii. 1988; 1w, Wushe, Nantou Pref., 5. viii. 1982, M. Terayama leg.; 11w, 1 ergatoid female, Puli, Nantou Pref., 20. viii. 1987, M. Terayama leg.

Type depository. The holotype is deposited in the collection of NIAES, and paratypes are in NSMT and TARI.

Etymology. The specific epithet is the Chinese noun Xingjun (星君), which is the name of a Taiwanese goddess.

Remarks. This species produces ergatoid females and commonly found in this genus in Taiwan. Some specimens have very weak triangular propodeal teeth.

Tribe Solenopsidini

Genus *Anillomyrma* Emery, 1913

Taxonomy and morphology. Small ants; total length around 1-3 mm. Head rectangular, longer than wide. Mandible with 3 or 4 teeth, mandibular blades crossing over at full closure. Antenna with 10 segments (11 segments in the Taiwanese species), with a 3-segmented club. Eyes completely lacking. Petiolar peduncle lacking an anteroventral process. Postptiole in dorsal view broadly attached to anterodorsal part of gaster.

In the tribe Solenopsidini, the genus *Parvimyrma* Eguchi & Bui, 2007, recorded from Viet Nam, is also eye completely absent. However, it is separated from the latter by the 3-segmented club (11-segmented antenna with a 2-segmented club in *Parvimyrma*) and the postpetiole whichi is broadly attached to anterodorsal part of gaster (narrowly attached to the anterior most of gaster in *Parvimyrma*).

Biology. It is suggested that this genus is a subterranean nester and forager.

Distribution. This genus is very small, comprises 3 species only, and known from the Oriental region: *A. continentis* from Viet Nam and Gunadong in China, *A. decamera* from Sri Lanka and *A. tridens* from Borneo (Wheeler, 1928; Bolton, 1995; Fellowes, 2006). In Taiwan a single unnamed species is recorded by Lin & Wu (2003).

Taiwanese species: *Anillomyrma* sp.

Genus *Carebara* Westwood, 1840

Taxonomy and morphology. Small ants; total length around 1-5 mm. Workers are dimorphic, with the major and minor quite different. Antenna consisting of 8-11 segments; apical 2 segments forming a club. Eye small. Metanotal groove distinct. Head of the major developed, and often with a pair of cornicles on vertex. Head of the major developed, and often with a pair of cornicles on vertex. Minor usually measuring less than 2 mm. Head without cornicles on vertex.

The genera *Oligomyrmex, Afroxyidris* and *Paedalgus,* were synonymized with the genus *Carebara* by Fernandez (2004).

Biology. *Carebara* species inhabits the floor of broad-leaved forests, and nests in the soil, rotten wood, and under stones.

Distribution. This genus comprises 175 species, and mainly in the tropical and subtropical areas. In Taiwan 4 species have been known.

Taiwanese species: *Carebara sauteri* (Forel, 1912) (= *Oligomyrmex sauteri* Forel, 1912); *C. amia* (Forel, 1913) (= *Oligomyrmex amia* (Forel, 1913); = *Aneleus amius* (Forel, 1913)); *C. oni* (Terayama, 1996) (= *Oligomyrmex oni* Terayama, 1996); *C. qianliyan* **sp. nov.**

Species excluded from the Taiwanese fauna: *Carebara yamatonis* (Terayama, 1996).

Key to species of *Carebara* (*C. amia* is excluded in this key, since it is known from female only and taxonomically ambiguous.)

1a. Major worker large; total length > 3.5 mm.
b. Eye large in the major; its diameter larger than the maximum width of antennal scape.
c. Mesopleuron with a transverse groove at about midlength in the major.
d. Major without transverse rugae on vertex.
e. Pronotum of minor worker smooth and shining.
..... 2

1aa. Major worker smaller; total length ca. 2 mm.

bb. Eye small in the major; its diameter smaller than the maximum width of antennal scape.

cc. Mesopleuron without a groove at midlength in the major.

dd. Five or six distinct transverse rugae present on vertex in the major.

ee. Pronotum of minor worker microreticulate.

..... *Carebara sauteri* (Forel, 1912)

2a. Major worker smaller; HL 0.80 mm, HW 0.75 mm.

b. First gastral tergum in the major without longitudinal striae.

c. Subpetiolar process long, bearing an anteroventral tooth.

d. Minor worker with acute propodeal teeth.

..... *Carebara oni* (Terayama, 1996)

2a. Major worker larger; HL 1.15 mm, HW 1.08 mm.

b. First gastral tergum in the major with many longitudinal striae.

c. Subpetiolar process short, bearing a blunt angle.

d. Minor worker without propodeal teeth.

..... *Carebara qianliyan* **sp. nov.**

Carebara qianliyan sp. nov.

(Figs. 230, 231)

Diagnosis. This species is easily separated from the other Asian congeners by the large body size and the many longitudinal striae on the 1st gastric tergum in the major worker.

Description. Holotype major worker. Head broad, almost as long as wide, and widest at near posterolateral corners; posterior corner strongly cocave; ocelli present; occiput with a pair of small cornicles at near posterior ocelli; frons and vertex coarsely punctate and with longitudinal striae. Antenna 9-segmented; SI = 47. Compound eye consist of about 10 facets, ca. 0.10 mm in diameter.

Alitrunk robust, dorsal margin of promesonotum almost straight; metanotum incised in dorsum; dorsum of propodeum convex, without spine. Petiolar node higher than long, with narrow reversed U-shaped; in dorsal view, dorsal disc short, 0.44 times as long as wide; subpetiolar process low and short, bearing a blunt anteroventral angle. Postpetiole higher than long, with convex dorsal margin; in dorsal view, dorsal disc trapezoidal, widest at anteriorend, 0.61 times as long as maximum width.

Gaster microreticulate and opaque, strongly punctate, with many longitudinal striae at posterior 1/3.

Paratype worker. Head rectangular, 1.18 times as long as wide, with almost straight posterior

margin and parallel sides. Antenna consist of 9 segments. Pronotum smooth and shining, with weakly convex dorsal margin; metanotal groove slightly incised in dorsum; propodeum microreticulate, with convex dorsal margin, posterodorsal margin round, not forming an angle. Petiole smooth and shining, subptiolar process very low, bearing anteroventral angle. Postpetiole smooth and shining. Gaster including 1st gastral tergum, smooth and shining.

Measurements (mm). Major worker: HL 1.15, HW 1.08, SL 0.50, WL 1.00, PL 0.50, PH 0.40, DPW 0.41, PPL 0.28, PPH 0.38, PPW 0.45, TL 3.8. Minor worker: HL 0.40, HW 0.34, SL 0.21, WL 0.38, PL 0.20, PH 0.13, DPW 0.08, PPL 0.10, PPH 0.06, PPW 0.09, TL 1.2. Female: HL 1.17, HW 1.15, SL 0.63, WL 1.86, PL 0.49, PH 0.40, DPW 0.48, PPL 0.35, PPH 0.35, PPW 0.53, TL 5.3.

Color. Reddish brown.

Holotype. Major worker, Liukuei, Kaohsiung Pref., 17. viii. 1987, M. Terayama leg.

Paratypes. 4 major workers, 7 minor workers, 1f, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun qianliyan (千里眼), which is the name of a Taiwanese god.

Remarks. A nest was found in the soil of the floor of broad-leaved forest.

Genus *Monomorium* Mayr, 1855

Taxonomy and morphology. Small and slender ants; total length less than 4 mm. Mandible with 3-5 teeth. Clypeus with a more or less produced anterior margin, and a distinct median seta. Antenna consisting usually of 12 segments (11, or 10 segments in a few foreign species); apical 3 segments forming a club. Propodeum without posterodorsal teeth. Subpetiolar process small or obscure.

Biology. These species inhabit from dry areas such as grasslands and forest edges to forests, and nest in the soil, under stones, under the bark or in the dead twigs of trees, and a few species inhabit in forests. *Monomorium pharaonis* is polygenous, and the colony reproduces by budding. It is world wide species and well known as a house pest.

Distribution. This genus comprises 399 described species in the world and 9 species have been known from Taiwan.

Taiwanese species: *Monomorium chinense* Santschi, 1925; *M. destructor* (Jerdon, 1851); *M. floricola* (Jerdon, 1851); *M. hiten* Terayama, 1997; *M. sechellense* Emery, 1894 (= *M. fossulatum* Emery, 1894); *M. intrudens* F. Smith, 1874 (= *M. nipponense* Wheeler, 1906); *M. latinode* Mayr, 1872; *M. pharaonis* (Linnaeus, 1758); *M. zhinu* **sp. nov.**

Key to species of *Monomorium*

1a. Eye small, consisting of 1-2 facets.

b. Posterodorsal corner of propodeum in profile angulate.

..... *Monomorium sechellense* Emery, 1894

1aa. Eye larger, consisting of more than 4 facets.

bb. Posterodorsal corner of propodeum in profile rounded, not forming an angle (weakly angulate in *M. pharaonis*).

..... 2

2a. Head and alitrunk coarsely microreticulate and opaque.

..... *Monomorium pharaonis* (Linnaeus, 1758)

2aa. Head and alitrunk smooth and shining.

..... 3

3a. Propodeum with longitudinal rugae.

..... 4

3aa. Propodeum without rugae.

..... 5

4a. Mandible with 4 teeth.

b. Metanotal groove deeply incised dorsally.

..... *Monomorium destructor* (Jerdon, 1851)

4aa. Mandible with 5 teeth.

bb. Metanotal groove weakly incised dorsally.

..... *Monomorium latinode* Mayr, 1872

5a. Body uniformly blackish brown to black.

..... *Monomorium chinense* Santschi, 1925

5aa. Bicolored species; head and gaster brown to blackish brown, alitrunk light brown.

..... *Monomorium floricola* (Jerdon, 1851)

5aaa. Head and alitrunk yellow, gaster black to blackish brown.

..... 6

6a. Metanotal groove deeply incised.

b. Dorsal margin of propodeum acutely convex in profile.

..... *Monomorium intrudens* F. Smith, 1874

6aa. Metanotal groove shallowly incised.

bb. Dorsal margin of propodeum moderately convex in profile.

Monomorium zhinu sp. nov.

(Fig. 213)

Diagnosis. Resembles *M. triviale* Wheeler, 1906, in Japan, but distinguished by the shape of petiole and postpetiole, and blackish color in gaster.

Description. Head smooth and shining, 1.22 times as long as wide, with convex posterior margin. CI = 82, SI= 74, Eye 0.06 mm in diameter. Alitrunk smooth and shining, with weakly convex promesonotal dorsum; metanotal groove shallowly incised; propodeal dorsum convex, posterodorsal corner not forming an angle. Petiolar node triangular, with obtusely angulate dorsal margin and convex dorsal margin. Postpetiole higher than long. Gaster smooth and shining.

Measurements (mm). HL 0.35, HW 0.29, SL 0.22, WL 0.43, PL 0.11, PH 0.15, DPW 0.10, PPL 0.08, PPH 0.10, PPW 0.10, TL 1.2.

Color. Head, alitrunk and pedicel yellow; gaster blackish brown; antenna and legs yellow.

Holotype. Worker, Riyuetan, Nantou Pref., 28. vii.- 2. viii. 1988.

Paratype. 1w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Zhinu (織女), which is the name of a Taiwanese goddess.

Remarks. The specimens examined were taken from the leaf litter samples by Berlese funnels.

Genus *Pheidologeton* Mayr, 1862

Taxonomy and morphology. Total length 2-15 mm. Worker caste strongly polymorphic. Antenna 11-segmented; apical 2 segments forming a club. Mandible with 5 or 6 teeth (obscure in the major worker). Eye relatively small. Pro- and mesonotal dorsa of minors convex; metanotal groove distinct; propodeum with spines. Subpetiolar process absent. Largest majors with ocelli, axilla, and metanotum.

Biology. *Pheidologeton diversus* forms large colonies, often found in the soil or under stones. The colony has long foraging trails.

There are many intermediate forms between the smallest and largest workers. In the case of *P. diversus*, the head of the largest major may be nearly 10 times as large as that of the smallest minor, and in dry weight more than a 500-time difference is said to exist.

Distribution. *Pheidologeton* comprises around 49 described species, and is distributed in the

tropics from Africa to South East Asia and Australia. Three species are recorded in Taiwan. *P. dentiviris* is known from male caste only, and Lin & Wu (2003) regarded it as a synonymy with *P. yanoi*, provisionally.

Taiwanese species: *Pheidologeton affinis* (Jerdon, 1851); *P. diversus* (Jerdon, 1851) (= *P. diversus ficta* Forel, 1911, provisionally); *P. yanoi* Forel, 1911 (= *P. dentiviris* (Forel, 1913), provisionally; = *Idrisella dentiviris* (Forel, 1913), provisionally).

Key to species of *Pheidologeton*

1a. In minor worker, propodeal spine long, gradually tapering apically and directed backward.

b. In major worker, propodeal spine longer than its basal width.

..... 2

1aa. In minor and media workers, propodeal spine short and recurved upward direted.

bb. In major worker, propodeal spine short and basally thick, recurved upward.

..... *Pheidologeton yanoi* Forel, 1911

2a. In minor worker, maximum diameter of eye as long as 2nd antennal segment.

b. In major worker, gastral terga with very sparse standing hairs.

..... *Pheidologeton diversus* (Jerdon, 1851)

2aa. In minor worker, eye smaller, maximum diameter of eye shorter than half length of 2nd antennal segment.

bb. In major worker, gastral terga with abundant standing hairs.

..... *Pheidologeton affinis* (Jerdon, 1851)

Genus *Solenopsis* Westwood, 1841

Taxonomy and morphology. *Solenopsis* species are monomorphic or polymorphic, body size varying from 1 to 10 mm. Antenna consisting of 10 segments; apical 2 segments forming a club. Clypeus with a pair of longitudinal carina, and a long median seta. Metanotal groove distinct. Propodeum without posterodorsal teeth.

Biology. Some species including *S. invicta* and *S. geminata* are called "fire ants", and are serious agricultural and nuisance pests on the American continents. Both species nest in the soil in bare lands, grasslands, etc.

Small *solenopsis* species nests in the soil or under stones. The nests are connected to those of other ant species by narrow tunnels which the Japanese species *S. japonica* and European *S.*

fugax workers use to steal food from them. *S. japonica* is also suggested that this species could be a predator of soil insects.

Distribution. Two hundred eighty-five species are recorded in the world. Although 4 species are known in Taiwan, reexamination of *tipuna* and *indagatrix* is needed taxonomically.

Taiwanese species: *Solenopsis geminata* (Fabricius, 1804); *S. invicta* Buren, 1972; *S. tipuna* Forel, 1912; *S. indagatrix* Wheeler, 1928.

Remarks. Red imported fire ant, *S. invicta*, was firstly recorded in 2003 in Taiwan, and quickly spread their distribution. Two social forms, monoginous and polygynous colonies, are known in the Taiwanese population.

Tropical fire ant, *S. geminata*, has been known from the tropical and subtropical countries all over the world, including the Philippines, continental China, Japan, and Taiwan. It might have been originated from Central America or the southern United States, and then extended its range with the help of human activities.

Workers and nests of both species are shown in the Figs. 219-224.

Key to species of *Solenopsis*

1a. Eye large, consisting of more than 20 facets.
b. Larger species; total length more than 3 mm.
c. Strongly polymorphic.
..... 2

1aa. Eye small, consisting of less than 6 facets.
bb. Smaller; total length about 1.5-2 mm.
cc. Very weakly dimorphic.
..... 3

2a. Head of major worker without longitudinal carina.
b. Anterior margin of clypeus with 3 teeth in major.
c. Antennal scape long, easily exceeding the level of eye.
d. Propodeum of minor worker carinate dorsolaterally.
..... *Solenopsis invicta* Buren, 1972

2aa. Head of major worker with longitudinal carina.
bb. Anterior margin of clypeus with 2 small teeth in major.
cc. Antennal scape shorter, slightly exceeding the level of eye.
dd. Propodeum of minor worker not carinate dorsolaterally.

..... *Solenopsis geminata* (Fabricius, 1804)

3a. Head length ca. 0.40 mm.

b. Eye small, consisting of 1-3 facets.

c. Propodeum longer, more than half as long as the promesonotum.

..... *Solenopsis tipuna* Forel, 1912

3aa. Head longer, more than 0.45 mm.

bb. Eye larger, consisting of 4 or 5 facets.

cc. Propodeum shorter, less than half as long as the promesonotum.

..... *Solenopsis indagatrix* Wheeler, 1928

Formosimyrma gen. nov.

Type species: *Formosimyrma lanyuensis* **sp. nov.**

Gender: feminine.

Diagnosis of worker. Monomorphic terrestrial myrmicine ants with the following combination of characters.

1. Mandible broad triangle, with 7 teeth.
2. Median portion of clypeus with a thin and high longitudinal wall; the wall well produced anteriorly in full face view.
3. Frontal lobes narrow, connected each other, and produced and covered to the level of anterior margin of clypeus.
4. Frontal carinae and antennal scrobes developed.
5. Eye small and oval, positioned in front of the midlength of the sides of the head.
6. Antenna 8-segmented; scape short, apical 2 segments froming a distinct club.
7. Alitrunk short and stout; promesonotal dorsum convex in profile.
8. Metanotal groove present.
9. Propodeum with a pair of acute teeth.
10. Petiole with long peduncle and reversed U-shape node.
11. Postpetiole higher than long.
12. Middle and hind tibiae without tibial spur.

Remarks. *Formosimyrma* is belonging to the tribe Solenopsidini in the Sufbamily Myrmicinae. Within the genera of tribe Solenopsidini, this genus most resembles the genus *Mayriella* Forel, 1902, distributed from Nepal through Southeast Asia into Papua New Guinea and Australia to New Zealand. However, it is distinguished from the latter by the median portion of clypeus with

a thin and high longitudinal wall (anterior margin of clypeus armed with a pair of sharp teeth just above the mandibles in *Mayriella*), 8-segmented antennae (10-segmented in *Mayriella*), and oval eyes (eyes elongate and lower section narrows into a point in *Mayriella*).

Etymology: Formosi, old name of Taiwan, 'Formosa' + myrma, Gr., ant.

Formosimyrma lanyuensis sp. nov.

(Figs. 225-229)

Descripton. Head densely punctate, 1.14 times as long as wide, with slightly concave posterior margin and subparallel sides in full face view. Mandible smooth and triangular, with 7 teeth; apical to basal 2nd teeth acutely triangular, and basal tooth rectangular. Anterior margin of clypeus convex, median portion with a thin longitudinal wall; the wall well produced anteriorlly in full face view. Antenna with 8 segments; scape short, not reaching posterior margin of head, SI = 77; 3rd to 5th segment each wider than long; 6th segment twice as long as length of 5th segment; 7th segment 1.6 times as long as wide; terminal segment 2.5 times as long as wide. Eye oval, 0.05 mm in maximum diameter.

Alitrunk densely punctate, promesonotal dorsum convex, anterior and lateral corners of dorsal disc round, not carinate; propodeal tooth acute, longer than its basal width. Petiole densely punctate, with relatively long peduncle, node with convex dorsal margin and straight anterior and posterior margins; in dorsal view, dorsal disc 0.63 times as long as wide, with convex anterior and posterior margins. Postpetiole densely punctate, higher than long, with convex dorsal margin; in dorsal view, dorsal disc 0.75 times as long as wide.

Gaster smooth and shining, with many subdecumbent hairs.

Measurements (mm). HL 0.63, HW 0.55, SL 0.42, WL 0.70, PL 0.27, PH 0.20, DPW 0.20, PPL 0.15, PPH 0.20, PPW 0.20, TL 2.0.

Color. Head and alitrunk yellowish brown, dorsum of propodeum darker; petiole and postpetiole brown, dorsal surfaces dark brown; gaster brown; antenna and legs yellowish brown.

Holotype. Worker, Lanyu is. (Orchid is.), Taidong Pref., 1. x. 1993, M. Terayama leg.

Type depository. NIAES.

Etymology. The specific epithet is based on the name of type locality, Lanyu island.

Ecological note. The specimen was collected on the floor of evergreen forest.

Tribe Myrmicini

Genus *Myrmica* Latreille, 1804

Taxonomy and morphology. Moderate-sized and monomorphic ants, usually 4-6 mm in body length. Antenna with 12 segments; scape relatively short, at most slightly exceeding posterior margin of head; apical 3 or 4 segments forming a club (4-segmented club in the Taiwanese species). Eye moderate in size. Antennal scrobe absent. Frontal carina short. Propodeum with developed spines. Petiole with peduncle and node. Subpetiolar process present but small, and situated in the anterior portion of petiole.

Biology. *Myrmica* species nests in the soil and rotten wood, and under stones. Some species are social parasitic and parasitic to other *Myrmica* species.

Distribution. One hundred ninety-six species have been known from the Palearctic and Nearctic regions. Four species have been known from Taiwan; they are commonly found in the mountainous regions. In the central part of the Chongyang Mountains, these species are confined to the altitudes higher than 1,700 m.

Elmes and Radchenko (1998) revised the Taiwanese species of this genus, and Masuko and Terayama (2002) commented on *M. mirabile*.

Taiwanese species: *Myrmica formosae* Wheeler, 1929 (= *M. margaritae* var. *formosae* Wheeler, 1929; = *M. margaritae* var. *pulchella* Santschi, 1937; = *M. ritae formosae* Wheeler, 1929); *M. serica* Wheeler, 1928; *M. arisana* Wheeler, 1930 (= *M. kurokii* st. *tipuna* Santschi, 1937); *M. mirabile* Elmes & Radchenko, 1998.

Key to species of *Myrmica*

1a. Head and alitrunk very coarsely rugose.

b. Propodeal spine very long; far exceeding the level of posterior margin of propodeal lobe in profile. 2

1aa. Head and alitrunk much more finely rugulose or reticulate.

bb. Propodeal spine distinctly shorter; slightly far exceeding the level of posterior margin of propodeal lobe in profile. 4

2a. Frons between frontal carinae level with the eyes with 4 coarse rugae. ..... *Myrmica formosae* Wheeler, 1929

2aa. Frons between frontal carinae level with the eyes more than 5 rugae.
..... *Myrmica serica* Wheeler, 1928

3a. Large species; head width more than 1.65 mm.
b. Antennal scape strongly curved at base but without an angle.
..... *Myrmica mirabile* Elmes & Radchenko, 1998

3aa. Smaller species; head width less than 1.20 mm.
bb. Antennal scape weakly curved at base.
..... *Myrmica arisana* Wheeler, 1930

Tribe Tetramoriini

Genus *Rhoptromyrmex* Mayr, 1901

Taxonomy and morphology. Small ants. Head heart-shaped in full face view. Antennal margin of clypeus strongly arcuate and prominent. Antenna with 12 segments, with a 3-segmented club. Eye behind midlength of sides of head. Palpal formula 3 : 2. Alitrunk with flat dorsum and propodeal spines. Ventral margin of petiole convex.

Biology. *Rhoptromyrmex* species inhabits the forests and forest edges, and nest in the soil, rotting wood, and under stones. They are general feeders, and they collect living and dead arthropods, tend to homopterous insects both above and below ground, and feed at plant nectaries.

Distribution. This genus consists of 10 species, and distributed in the Old World tropics, and a few species in the Palaearctic region. A singlse species has been known in Taiwan.

Taiwanese species: *Rhoptromyrmex wroughtonii* Forel, 1902 (= *R. rothneyi* var. *taiwanensis* Wheeler, 1930).

Genus *Tetramorium* Mayr, 1855

Taxonomy and morphology. Small to medium-sized ants; total length 2-4 mm. Antenna consist of 11 or 12 segments and usually 12 segments; apical 3 segments forming a club. Mandible triangular; apical 3 teeth larger than the rest. Eye moderately large. Anterior portion of antennal scrobe carinate. Promesonotal dorsum flat in profile. Propodeal spine usually developed (absent in a few foreign species). Propodeal spiracle positioned anterior to propodeal spine.

Biology. *Tetramorium* species inhabits in widely environments from the forests to open sites

such as grasslands, bare areas or crop fields. They nest in the soil, rotting wood, and under stones. In *T. nipponense*, this species prefers wetter areas, and nests in rotten wood, under barks and stones in the forest or at forest edge. Multiple queens are found in a nest in some species. It is one of the commonest genus in Taiwan.

Distribution. This is a large genus, comprising 459 species around the world. In Taiwan 9 species have been known. Besides, Lin & Wu (2003) reported several undescribed or undetermined species from Taiwan.

Taiwanese species: *Tetramorium kraepelini* Forel, 1905 (= *T. amium* Forel, 1912, provisionally); *T. bicarinatum* (Nylander, 1846) (= *T. guineense* Fabricius, 1793); *T. indicum* Forel, 1913; *T. lanuginosum* (Mayr, 1870) (= *Triglyphothrix stratidens* Emery, 1889); *T. nipponense* Wheeler, 1928; *T. pacificum* Mayr, 1870 (= *T. pacificum* var. *subscabrum* Emery, 1893); *T. parvispinum* (Emery, 1893) (= *Triglyphothrix parvispinum* var. *formosae* Forel, 1922); *T. simillimum* (F. Smith, 1851); *T. smithi* Mayr, 1878, **new record.**

Remarks. *T. amium* described from Pilam by Forel (1912) is provisionally synonymized with *T. kraepelini* in this volume. *T. smithi* which is 11-segmented antennal species is recorded for the first time from Taiwan (collection data: 3w, Chipen, Taidong City, 10. viii. 1987, M. Terayama leg.; 2 workers, Liukuei, Kaohsiung Pref., 17. viii. 1987, M. Terayama leg.).

Key to species of *Tetramorium*

1a. Propodeum armed with short spines, not reaching the level of posterior margin of metapleural lobe in profile.

..... *Tetramorium simillimum* (F. Smith, 1851)

1aa. Propodeum armed with long spines, exceeding the level of posterior margin of metapleural lobe in profile.

..... 2

2a. Posterodorsal corner of petiolar node rounded, not forming a distinct angle in profile.

b. Head, alitrunk, petiole and postpetiole with abundant hairs including branched ones.

..... 3

2aa. Posterodorsal corner of petiolar node forming a distinct angle in profile.

bb. Hairs on head to postpetiole simple.

..... 4

3a. First gastral tergum with many simple hairs, and a few bifid or trifid hairs.

..... *Tetramorium lanuginosum* (Mayr, 1970)

3aa. Hairs on 1st gastral tergum universally trifid, simple or bifid hairs completely absent from the tergum.

..... *Tetramorium parvispina* (Emery, 1891)

4a. Antenna with 11 segments.

b. Dorsal disc of postpetiole rectangular, with parallel sides in dorsal view.

..... *Tetramorium smithi* Mayr, 1878

4aa. Antenna with 12 segments.

bb. Dorsal disc of postpetiole round; lateral margins convex in dorsal view.

..... 5

5a. Anterior margin of clypeus without median notch.

b. Anterolateral corner of 1st gastral tergum forming a distinct angle in dorsal view.

c. Small species, total body length about 2 mm.

..... *Tetramorium kraepelini* Forel, 1905

5aa. Anterior margin of clypeus with a medim notch.

bb. Anterolateral corner of 1st gastral tergum rounded or bluntly angular at mast.

cc. Larger species, total body length about 3 mm.

..... 6

6a. Body dark brown to blackish brown.

b. Petiolar node large, with anterolateral corner without angle.

..... *Tetramorium pacificum* Mayr, 1879

6aa. Body yellow to yellowish brown, sometimes with the gaster dark brown.

bb. Anterodorsal corner of petiolar node forming an angle.

..... 7

7a. Erect hairs on frontal carina short, shorter than the diameter of eye.

b. Petiolar node with flat dorsal outline.

c. Head and alitrunk yellowish brown; gaster blackish brown to almost black.

..... *Tetramorium bicarinatum* (Nylander, 1846)

7aa. Erect hairs on frontal carina long, some being longer than the diameter of eye.

bb. Petiolar node with posterior corner higher than anterior corner in profile.

cc. Head and alitunk yellowish brown; gaster yellowish brown to brown.

..... 8

8a. Propodeal spine long, abruptly upcurved apically.

b. Dorsum of head with reticular cross-meshes to the level of the posterior margins of eyes.

..... *Tetramorium nipponense* Wheeler, 1928

8aa. Propodeal spine short, more or less straight.

bb. Dorsum of head with longitudinally regular sculpture to the level of the posterior margins of eyes.

..... *Tetramorium indicum* Forel, 1913

Tribe Pheidolini

Genus *Aphaenogaster* Mayr, 1853

Taxonomy and morphology. Moderate to large sized ants. Body usually slender, antenna and legs also long and slender. Antenna consist of 12 segments, with apical 4 segments forming a club. Eye moderately large. Promesonotal dorsum convex in profile. Mestanotal groove incised dorsally. Propodeum with a pair of teeth (absent in a few species). Petiole with long peduncle.

Biology. Many species inhabits the forests and nest in the soil, rotting wood, and under stones in forests and at forest edges. Some species are found in dry rocky seasides or sunny areas, and nests in the soil or under stones.

Distribution. This genus comprises 227 described species, and is distributed around the world excluding the Ethiopian region. Eight species are known from Taiwan, of which 5 are new to science.

Taiwanese species: *Aphaenogaster lepida* Wheeler, 1930 (= *A. silvestrii* Wheeler, 1929; = *A. funkikoensis* Creighton, 1950); *A. tipuna* Forel, 1913; *A. takahashii* Wheeler, 1930; *A. baogong* **sp. nov.**; *A. fengbo* **sp. nov.**; *A. wangtian* **sp. nov.**; *A. wangye* **sp. nov.**; *A. xuantian* **sp. nov.**

Remarks. A cotype of *A. takahashii* Wheeler, 1929, is available in TARI (collection data; Botel Tobago, 1926, No.49, Takahashi [Type No. 612]). Botel Tobago written in the data label means Lanyu island.

Key to species of *Aphaenogaster*

1a. Posterior portion of head behind eyes elongated.

b. Prothorax elongated anteriorly in profile.

..... 2

1aa. Posterior portion of head not remarkably elongated.

bb. Prothorax of normal shape.

..... 4

2a. Occiput not constricted in profile.

..... *Aphaenogaster baogong* **sp. nov.**

2aa. Occiput forming a distinct neck in profile.

..... 3

3a. Anterior clypeal margin with a median notch.

b. Propodeal spine directed upward.

c. Postpetiole as high as petiole.

..... *Aphaenogaster takahashii* Wheeler, 1930

3a. Anterior clypeal margin convex, without median notch.

b. Propodeal spine directed posterior portion.

c. Postpetiole large, higher than petiole.

..... *Aphaenogaster wangtian* **sp. nov.**

4a. Body bicolored; head and alitrunk reddish brown, and gaster dark brown.

..... 5

4aa. Body reddish brown to blackish brown and concolorous.

..... 7

5a. Head largely smooth, scattered small punctures, and without longitudinal rugae.

b. Propodeal spine thin.

..... 6

5aa. Head with longitudinal rugae.

bb. Propodeal spine thick and triangular.

..... *Aphaenogaster lepida* Wheeler, 1930

6a. Propodeal spine shorter, less than twice as long as its basal width.

..... *Aphaenogaster tipuna* Forel, 1913

6aa. Propodeal spine thin and long, ca. 3 times as long as its basal width.

..... *Aphaenogaster fengbo* **sp. nov.**

7a. Mesopleuron microreticulate, without longitudinal rugae.

b. Body black.

..... *Aphaenogaster xuantian* **sp. nov.**

7aa. Mesopleuron with longitudinal rugae.

bb. Body yellowish brown.

..... *Aphaenogaster wangye* **sp. nov.**

Aphaenogaster baogong sp. nov.

(Fig. 208)

Diagnosis. This species has an elongate head and prothorax. It is resembles *A. wangtian* sp. nov. and *A. takahashii* Wheeler, 1930, but is easily distinguished from the latters by the shape of occipit of head (not constricted).

Description. Head microreticulate, 1.50 times as long as wide; posterior portion of head behind eyes elongated; CI = 74, CI-II = 67; posterior margin strongly convex in full face view. Clypeus with several longitudinal rugae. Antenna long; scape longer than head length; SI = 185, SI-II = 205, scape scattered with short subdecumbent hairs, without long erect or suberect haris. Eye 0.25 mm in maximum diameter.

Pronotum weakly microreticulate, elongated anteriorly in profile; mesonotum smooth and shining, mesopleuron microreticulate; propodeal spine long and acute, twice as long as its basal width, directed to posterior portion.

Petiole with a long peduncle; node triangular, with dully angulate dorsum. Postpetiole with convex dorsal margin in profile.

Measurements (mm). HL 1.45, HW 1.00, HW-II 0.90, SL 1.85, WL 1.95, PL 0.55, PH 0.31, DPW 0.22, PPL 0.34, PPH 0.30, PPW 0.33, TL 5.5.

Color. Body brown, gaster dark brown.

Holotype. Worker, Nanshanxi, Nanfen-Cun, Nantou Pref., 12. viii. 1984, M. Terayama leg.

Paratypes. 11w, same data as the holotype; 3w, same locality, 3. viii. 1981, M. Terayama leg.: 9w, Liukuei, Kaohsiung Pref., 23. viii. 1987, H. Sakai leg.; 7w, Wushe, Nantou Pref., 23. viii. 1987, S. Kubota leg.

Type depository. Holotype in NIAES, paratypes in NIAES, NSMT and TARI.

Etymology. The specific epithet is the Chinese noun baogong (包公) which is the name of a Taiwanese god.

Remarks. This species inhabits forests, and nests in under stones or rotten woods.

Aphaenogaster fengbo sp. nov.

(Fig. 207)

Diagnosis. This species has a smooth and shining head and pronotum. It is resembles *A. tipuna*, but is separable from the latter by the long and thin propodeal spines.

Description. Head smooth and shining, with scattered small punctures, 1.26 times as long as wide; posterior margin moderately convex in full face view; CI = 83, CI-II = 79. Clypeus with several longitudinal rugae. SI = 150, SI-II = 143, eye 0.26 mm in maximum diameter.

Pronotum smooth and shining; mesonotum smooth and shining, mesopleuron microreticulate; propodeal spine thin and very long, 3.0 times as long as its basal width.

Petiole with a long peduncle; node reverse U-shaped. Postpetiole relatively large, longer than high, with convex dorsal margin in profile.

Measurements (mm). HL 1.33, HW 1.10, HW-II 1.05, SL 1.50, WL 1.85, PL 0.60, PH 0.41, DPW 0.26, PPL 0.50, PPH 0.43, PPW 0.34, TL 5.1.

Color. Head dark brown, alitrunk reddish brown, gaster blackish brown, legs brown.

Holotype. Worker, Hungtou, Lanhsu island, Taidong Pref., 8. viii. 1981, K. Wada leg.

Paratypes. 2w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Fengbo (風伯) which is the name of a Taiwanese god.

Aphaenogaster wangtian sp. nov.

(Fig. 206)

Diagnosis. This species has an elongate head and prothorax. The species resembles *A. takahashii* by the elongate head with a remarkable neck at posterior portion. However, it is separated from the latter by the convex anterior margin of clypeus (anterior margin of clypeus with a median notch in *takahashii*), the large postpetiole (postpetiole as high as petiole in *takahashii*), and posterior directed propodeal spines (propodeal spines directed upward in *takahashii*).

Description. Head smooth and shining, with long erect hairs; posterior portion of head behind eyes elongated and occipit form a distinct neck; 1.53 times as long as wide; CI = 66, CI-II = 62. Clypeus smooth, with several transverse rugae; anterior margin convex. Antenna long; scape longer than head length; SI = 208, SI-II = 219, scape with long suberect hairs. Eye 0.25 mm in maximum diameter.

Pronotum smooth and shining, with long erect hairs, and elongated anteriorly in profile; mesonotum smooth and shining, upper half of mesopleuron with longitudinal rugae, under half smooth and shining; propodeal spine short and triangular, 0.8 times as long as its basal width; tip directed to posterior portion.

Petiole with a long peduncle; node convex dorsal margin in profile. Postpetiole large, higher than petiole, with convex dorsal margin in profile.

Measurements (mm). HL 1.45, HW 0.95, HW-II 0.90, SL 1.98, WL 1.90, PL 0.55, PH 0.30, DPW 0.20, PPL 0.46, PPH 0.51, PPW 0.30, TL 5.3.

Color. Yellowish brown.

Holotype. Worker, Nanshanxi, Nanfen-Cun, Nantou Pref., 5. viii. 1985, M. Terayama leg.

Paratypes. 44w, same data as the holotype; 1w, Riyuetan, Nantou Pref., 28. vii.- 2. viii. 1988; 1w, Pinlin, Taipei Pref., 28. vii.- 2. viii. 1988; 3w, Liukuei, Kaohsiung Pref., 17. viii. 1987, H. Sakai leg.

Type depository. Holotype in NIAES, paratypes in NIAES, NSMT and TARI.

Etymology. The specific epithet is the Chinese noun Wangtian (王天) which is the name of a Taiwanese god.

Aphaenogaster wangye sp. nov.

(Figs. 211, 212)

Diagnosis. Small species. Head moderately long, ca. 1.4 times as long as wide, eye well produced; pronotum and mesopleura with longitudinal rugae; propodeal teeth small.

Description. Head microreticulate, 1.42 times as long as wide; with convex posterior margin in full face view; CI = 85, CI-II = 70. Clypeus with several longitudinal rugae; anterior margin weakly concave at midlength. Antenna moderately long; scape slightly longer than head length; SI = 135, SI-II = 164. Eye strongly produced, 0.20 mm in maximum diameter.

Pronotal dorsum weakly microreticulate and subopaque, with weak transverse rugae; mesonotum with rugae, mesopleuron with rugae; propodeal spine short, and triangular, tip directed to posterior portion.

Petiole with a long peduncle; node reverse U-shaped. Postpetiole with convex dorsal margin in profile.

Measurements (mm). HL 1.02, HW 85, HW-II 72, SL 1.15, WL 1.51, PL 0.40, PH 0.26, DPW 0.31, PPL 042, PPH 0.26, PPW 0.45, TL 3.9.

Color. Yellowish brown, head somewhat darker.

Holotype. Worker, Nanshanxi (600-700 m asl), Nanfen-Cun, Nantou Pref., 14. viii. 1985, M, Terayama leg.

Paratypes. 52 workers, same data as the holotype; 1f, 11w, Wushe, Nantou Pref., 12. viii. 1985, M. Terayama leg.

Type depository. Holotype in NIAES, paratypes in NIAES, NSMT and TARI.

Etymology. The specific epithet is the Chinese noun Wangye (王爺) which is the name of a Taiwanese god.

Aphaenogaster xuantian sp. nov.

(Figs. 210, 211)

Diagnosis. Blackish species. This species has a microreticulate head, pronotum and mesopleura, and large postpetiole.

Description. Head microreticulate, 1.33 times as long as wide, with weakly convex posterior margin in full face view; CI = 84, CI-II = 75. Clypeus with several longitudinal rugae; anterior margin concave at midlength. Antenna moderately long; scape slightly longer than head length; SI = 132, SI-II = 148, Eye 0.20 mm in maximum diameter.

Pronotum microreticulate; mesonotum and mesopleuron microreticulate; propodeum microreticulate; propodeal spine small and triangular, tip directed to posterior portion.

Petiole with a long peduncle; node subtriangular, with almost straight anterior margin and convex dorsal margin, posterodorsal corner not forming an angle. Postpetiole large, with convex dorsal margin in profile.

Measurements (mm). HL 1.42, HW 1.18, HW-II 1.05, SL 1.85, WL 2.12, PL 0.55, PH 0.41, DPW 0.24, PPL 0.48, PPH 0.42, PPW 0.40, TL 5.2.

Color. Body black, antenna and legs brown.

Holotype. Worker, Hehuanshan (3,000 m asl), Nantou Pref., 24. viii. 1988, M. Terayama leg.

Paratypes. 4w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Xuantian (玄天) which is the name of a Taiwanese god.

Remarks. It was collected in the mountain area at about 3,000 m in altitude.

Genus *Lophomyrmex* Emery, 1892

Taxonomy and morphology. Small and relatively slender ants. Head without antennal scrobe. Apical (masticatory) margin of mandible with 8 or more teeth, denticles, or crenulations in total (fewer in a few species). Antenna with 11 segments, with a 3-segmented club. Pronotal dorsum flat, shaply marginate laterally; tooth-like or triangular processes with near humeli. Propodeum with a pair of spines. Propodeal spiracle with in front of the margin of the declivity.

Biology. Some *Lophomyrmex* species are found on the ground in secondary forests, and surface scavengers. Nests are usually located near the base of trees and seem moderately populous.

Distribution. Small genus contains 4 species from the Oriental and Australian regions. A single species has been known from Taiwan.

Taiwanese species: *Lophomyrmex taivanae* Forel, 1912.

Genus *Messor* Forel, 1890

Taxonomy and morphology. Total length 4-5 mm. Body almost entirely black. Antenna with 12 segments, and with a 4-segmented club or club indistinct; antennal scape short, slightly exceeding posterior margin of head in full face view. Eye moderately developed. Ventral face of head with long hairs. Metenotal groove distinct, deeply incised dorsally. Propodeal spine absent.

Biology. *Messor* species are well known as harvester ants which carry seeds into nests as food. The nests are dug in the soil of open grasslands or bare areas.

Distribution. The genus contains about 110 species, mostly distributed in Eurasia, with a few in North America, tropical Africa and Madagascar. In Taiwan a single species has been known from Lanyu island.

Taiwanese species: *Messor aciculatus* (Wheeler, 1874), **new record**.

Remarks. An alate female specimen was examined from Lanyu (collection data: Hungtou, Lan Hsu Is., Taiwan, 11. vii. 1971, K. Mizusawa leg.; Figs. 200-202, 281). It has not significant differences from the Japanese *aciculatus* females in external morphology. So I tentatively identified as *M. aciculatus* in the Taiwanese specimen, although the nuptial flight season is differ from Japan (April to early June in Japan). Lin & Wu (2003) reported *Messor* sp. from Taiwan also.

Genus *Pheidole* Westwood, 1841

Taxonomy and morphology. Workers are dimorphic, with minor worker, and major workers or soldiers. Antenna with 12 segments, and with a 3-5 segmented club. Antennal scape moderate to long. Eye moderately developed. Promesonotal dorsum usually convex. Metanotal groove distinct. Propodeum with spines. Petiole without distinct subpetiolar process.

Biology. These ants often form distinct trails from the nest to foraging sites, and often come into houses. Judging form its wide geographical distribution, abundant species number, and big biomass, it is one of the most thriving ant genera such as *Camponotus* and *Crematogaster*.

Distribution. This is one of the largest genus, comprises 1,121 described species, with largest species numbers in tropics and subtropics. However, the actual number of species in the world would be twice the number of described species. Ten species (11 forms) have been known from Taiwan, taxonomic study is not advanced yet.

Taiwanese species: *Pheidole fervens* F. Smith, 1858 (= *P. amia* Forel, 1912; = *P. javana* var. *dolenda* Forel, 1912; = *P. javana soror* Santschi, 1937); *P. funkikoensis* Wheeler, 1929; *P. indica* Mayr, 1878; *P. megacephala* (Fabricius, 1793); *P. ernesti* Forel, 1912; *P. noda* F. Smith, 1874 (= *P.*

noda var. *flebilis* Santschi, 1937, provisionally); *P. noda formosensis* Forel, 1913 (= *P. rhombinoda* var. *formosensis* Forel, 1913); *P. pieli* Santschi, 1925; *P. parva* Mayr, 1865 (= *P. rinae tipuna* Forel, 1912; = *P. sauteri* Wheeler, 1909); *P. ryukyuensis* Ogata, 1982; *P. taivanensis* Forel, 1912.

Quadrinominal infrasubspecific unavailable name: *Pheidole javana* r. *jubilans* var. *formosae* Forel, 1912 (= *P. indica* Mayr, 1878, see Eguchi, 2004).

Key to species of *Pheidole* (Taxonomically ambiguous species are excluded.)

1a. Smaller species; head length less than 1.2 mm in major worker and 0.6 mm in minor worker.
b. Anteroventral margin of head with 3 distinct processes in the marjor worker.
c. Posterior margin of minor worker head flat in full face view.
..... 2

1aa. Larger species; head length more than 1.2 mm in major worker and 0.8 mm in minor worker.
bb. Anteroventral margin of head without processes or at most with blunt weak processes.
cc. Posterior margin of minor worker head convex in full face view.
..... 5

2a. Head of major worker long, 1.2 times as long as wide, and with strongly impressed vertex.
b. Clypeus of minor worker with a median longtudinal carina.
..... *Pheidole ryukyuensis* Ogata, 1982

2aa. Head of major worker, as long as wide or slightly longer than wide, not so strongly impressed.
bb. Clypeus of minor worker without a longitudinal carina.
..... 3

2aaa. Head of major worker, wider than long (HL 1.15 mm; HW 1.25 mm).
..... *Pheidole taivanensis* Forel, 1912 (known soldier only.)

3a. Vertex of minor worker head sculptured.
..... 4

3aa. Vertex of minor worker head smooth.
..... *Pheidole funkikoensis* Wheeler, 1929

4a. Dorsum of promesonotum smooth and often with several transverse rugulae in major worker.
b. Lateral surface of pronotum smooth and shining in minor worker.
c. Propodeal spine very short in minor.
..... *Pheidole pieli* Santschi, 1925

4aa. Dorsum of promesonotum longitudinally rugose or rugoso-reticulate in major worker.
bb. Lateral surface of pronotum microreticulate in minor worker.

cc. Propodeal spine medium-sized, and needle-shaped.

..... *Pheidole parva* Mayr, 1865

5a. Postopetiole distinctly larger than petiole in both the major and minor workers.

..... *Pheidole noda* F. Smith, 1874

5aa. Postopetiole smaller than petiole in both the major and minor workers.

..... 6

6a. Vertex smooth and shining in the major worker.

b. Mesonotal dorsum not produced dorsally in the minor worker.

c. Propodeal dorsum anteriorly not produced in the minor worker.

..... *P. megacephala* (Fabricius, 1793)

6aa. Vertex sculptured in the major worker.

bb. Mesonotal dorsum produced anteriorly in the minor worker.

cc. Propodeal dorsum anteriorly produced in the minor worker.

..... 7

7a. Eye small in both majors and minors; its diameter smaller than the length of 10th antennal segment.

b. Propodeal spine thin, weakly curved posteriorly in the major worker, but the condition not stable.

..... *P. fervens* F. Smith 1858

7aa. Eye larger; its diameter larger than the length of 10th antennal segment.

bb. Propodeal spine usually thick, pointing upward in the major worker, but the condition not stable.

..... *Pheidole indica* Mayr, 1878

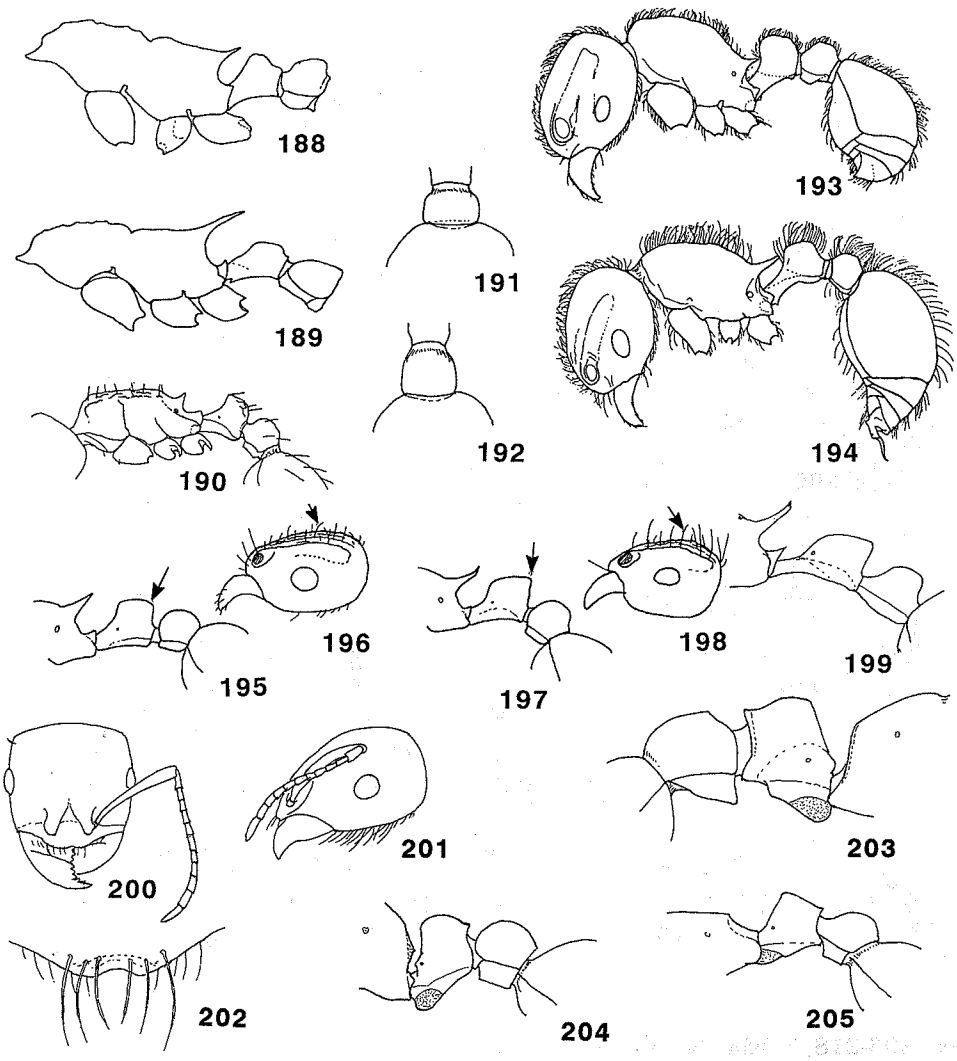
Tribe Paratopulini

Genus *Palatopula* Wheeler, 1919

Taxonomy and morphology. Moderate-sized ants. Head longer than wide. Mandible triangular with 7 or more teeth or denticles. Median portion of clypeus broad, not longitudinally bicarinate. Frontal lobes relatively far apart so that posteromedian portion of the clypeus is usually very much broader than one of the lobes. Antenna with 12 segments, scape relatively short. Dorsum of promesonotum flat or forming a single, very shallowly convex curve from front to back. Dorsal surface of propodeum the same level as the promesonotum. Petiolar node large, rectangular or rounded-rectangular.

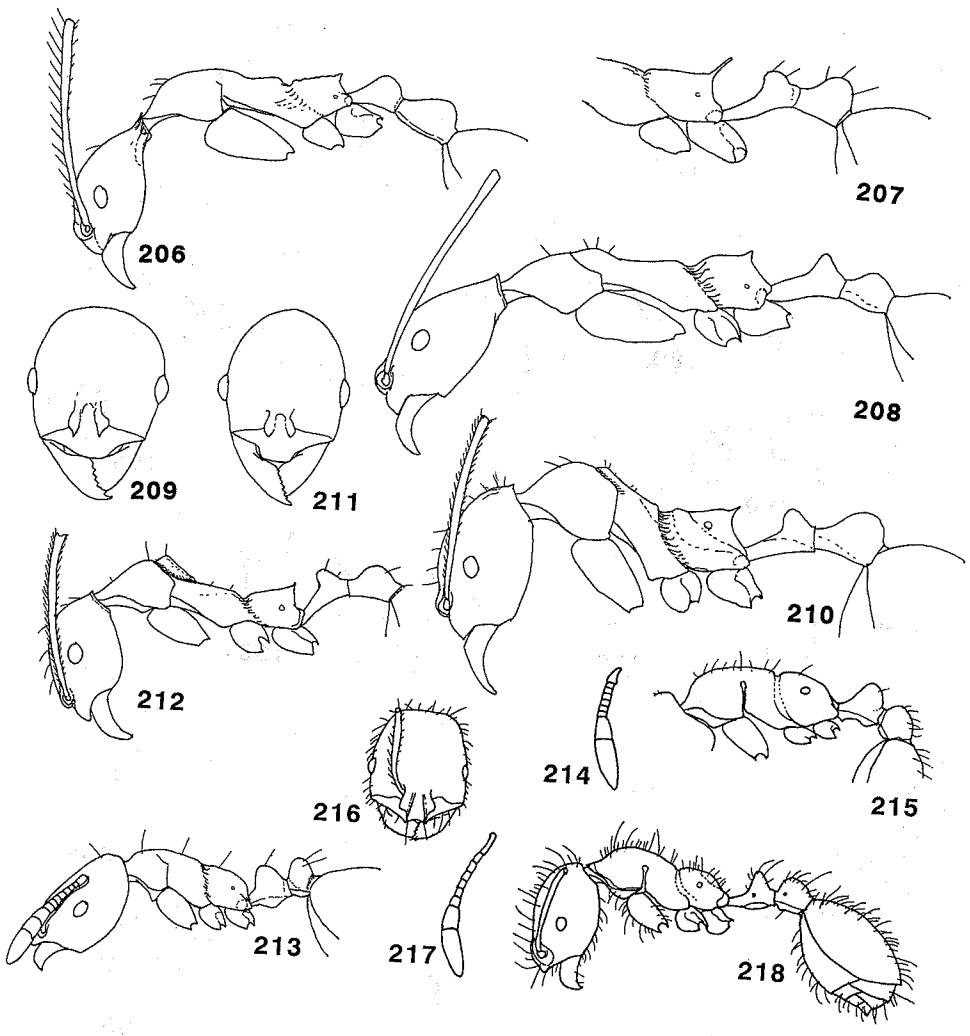
Biology. *Paratopula* species are uncommon in collection. They are arboreal habitat.

Distribution. This is a small genus, contains 10 species from the Oriental and Australian



Figs. 188-205, Subfamily Myrmicinae, 3.

188, *Myrmica arisana* Wheeler, 1930; 189, *Myrmica formosae* Wheeler, 1929; 190, *Tetramorium simillimum* (F. Smith, 1851); 191, *Tetramorium smitii* Mayr, 1878, dorsum of postpetiole; 192, 195, 196, *Tetramorium bicarinatum* (Nylander, 1846), 192, dorsum of postpetiole; 193, *Tetramorium parvispinum* (Emery, 1893); 194, *Tetramorium lanuginosum* (Mayr, 1870); 197, 198, *Tetramorium nipponense* Wheeler, 1928; 199, *Tetramorium pacificum* Mayr, 1870; 200-202, *Messor aciculatus* (F. Smith, 1874), 202, anterior margin of clypeus; 203, *Vollenhovia shunfenger* **sp. nov.**; 204, *Vollenhovia menshen* **sp. nov.**; 205, *Vollenhovia xingjun* **sp. nov.**

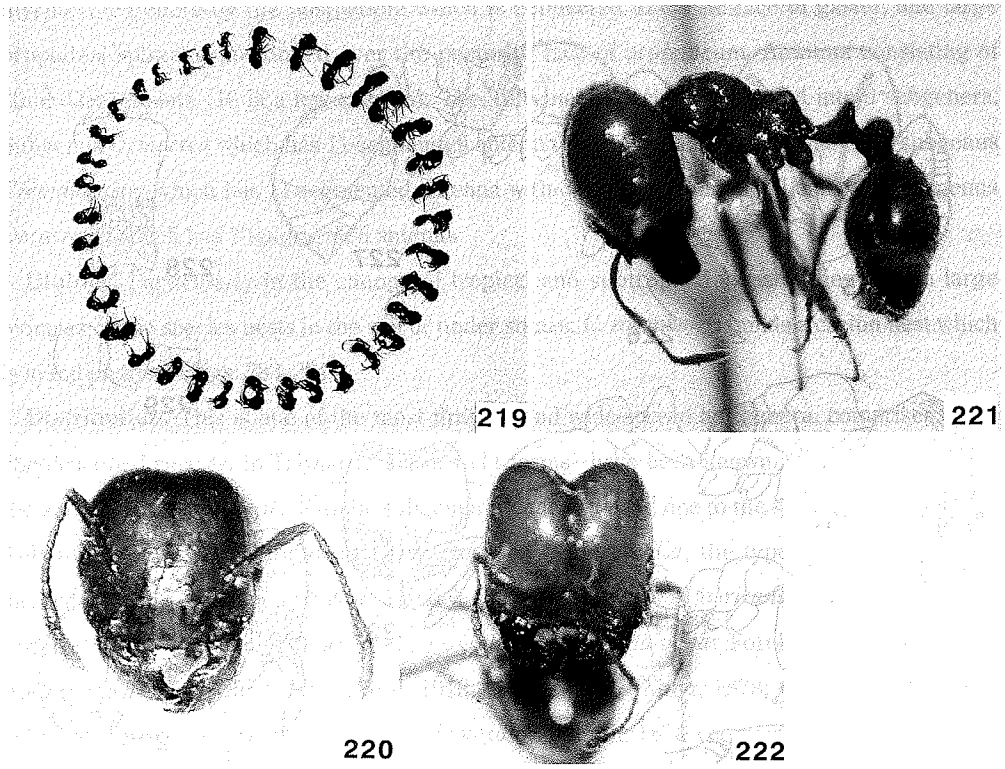


Figs. 206-218, Subfamily Myrmicinae, 4.

206, *Aphaenogaster wangtian* **sp. nov.**; 207, *Aphaenogaster fenbo* **sp. nov.**; 208, *Aphaenogaster baogong* **sp. nov.**; 209, 210, *Aphaenogaster xuantian* **sp. nov.**; 211, 212, *Aphaenogaster wangye* **sp. nov.**; 213, *Monomorium zhinu* **sp. nov.**; 214, 215, *Solenopsis tipuna* Forel, 1912; 216-218, *Solenopsis geminata* (Fabricius, 1840).

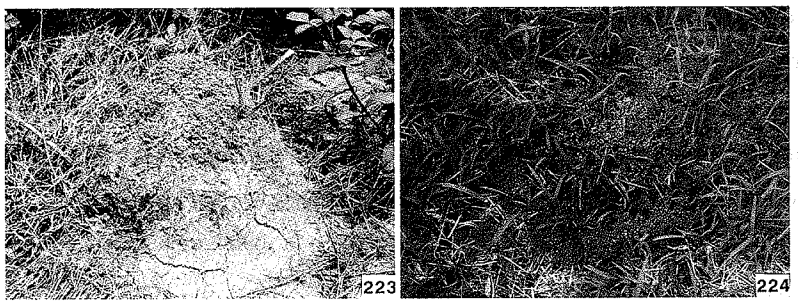
regions only.

Taiwanese species: *Palatopula ceylonica* (Emery, 1901) (= *Atopomyrmex celyonicus* Emery, 1901; = *Atopula ceylonica* (Emery, 1901)).



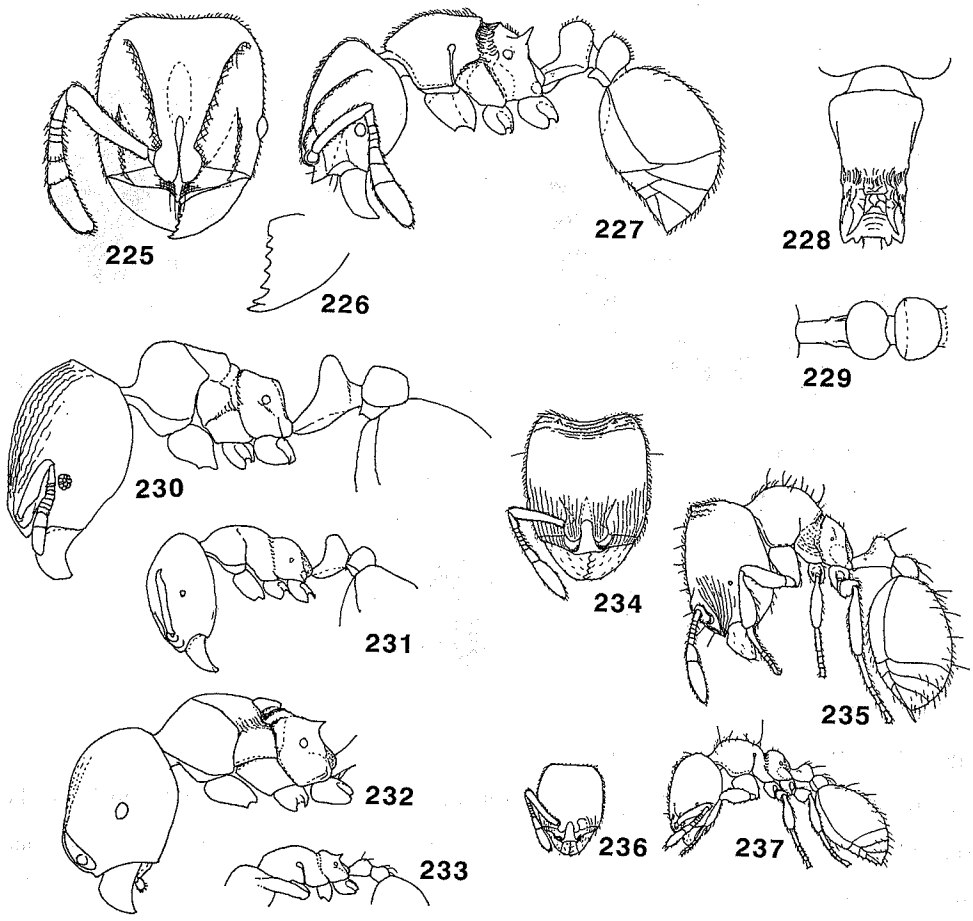
Figs. 219-222, Subfamily Myrmicinae, 5.

219-220, *Solenopsis invicta* Buren, 1972; 219, workers, showing polymorphism; 221, major worker, profile; 220, major worker, head, full face view; 222, *Solenopsis geminata* (Fabricius, 1840), major worker, full face view.



Figs. 223, 224, Subfamily Myrmicinae, 6.

223, Nest of *Solenopsis invicta* Buren, 1972; 224, nest of *Solenopsis geminata* (Fabricius, 1840).



Figs. 225-237, Subfamily Myrmicinae, 7.

225-229, *Formosimyrma lanyuensis* **gen. et sp. nov.**, 226, mandible, 228, alitrunk, dorsal view, 229, pedicel, dorsal view; 230, 231, *Carebara qianliyan* **sp. nov.**, 230, major worker, 231, minor worker; 232, 233, *Carebara oni* (Terayama, 1996), 232, major worker, 233, minor worker; 234-237, *Carebara sauteri* (Forel, 1912), 234, 235, major worker, 236, 237, minor worker.

Tribe Crematogasterini

Genus *Crematogaster* Lund, 1831

Taxonomy and morphology. Small to moderate-sized ants. It is separated from the other

myrmecine genera by the postpetiole which is connected to dorsal face of gaster, and large propodeal spiracles positioned over the posterior face of propodeum. Antenna consisting of 10 or 11 segments (10 in a few species). The Taiwanese species are divided into 3 subgenera; Subgenus *Orthocrea* which has 11-segmented antenna with 2-segmented antennal club, subgenus *Crematogaster* which has 11-segmented antenna with 3-segmented antennal club, and subgenus *Decacrema* which has 10-segmented antenna.

Biology. Particularly in the canopy of tropical and subtropical forests, they have a large biomass. Some species nests in the soil or under stones. *C. rogenhoferi* builds a carton nest which is found on trees (Figs. 283, 284).

Distribution. This is one of the most thriving and wide-spread ant genera, comprises about 780 described species. In Taiwan 10 species (11 forms) have been known, of which 7 belong to the subgenus *Crematogaster,* 2 to the subgenus *Orthocrema*, and one to the subgenus *Decacrema.*

Taiwanese species: Subgenus *Crematogster* (= *Acrocoelia*, the type species of the two subgenera are synonymous (Bolton, 1995)): *Crematogaster dohrni fabricans* Forel, 1911; *C. bison* Forel, 1913; *C. pia taivanae* Forel, 1913 (= *C. tamidula* var. *taivanae* Forel, 1913); *C. popohana* Forel, 1912; *C. popohana amia* Forel, 1913; *C. rogenhoferi* Mayr, 1878; *C. subnuda formosae* Wheeler, 1909; *C. nawai* Ito, 1914 (= *C. laboriosa* F. Smith, 1874 (preoccupied *laboriosa* by *C. laboriosus* F. Smith, 1860)).

Subgenus *Orthocrema*: *Crematogaster biroi* Mayr, 1897; *C. treubi apilis* Forel, 1913.

Subgenus *Decacrema*: *Crematogaster schimmeri* Forel, 1912.

Remarks. Although Lin & Wu (2003) regarded *C. bison* as a synonym of *C. dohrni fabricans*, and *C. popohana amia* as an independent species to *C. popohana*, I followed taxonomic treatment of Bolton et al. (2005) in this article. *C. p. amia* has been known from female (queen) and male only. Taxonomy has not been advanced yet in Taiwan in this genus.

Key to species of *Crematogaster* (Taxonomically ambiguous species are excluded.)

1a. Antenna 11-segmented.
..... 2

1aa. Antenna 10-segmented.
..... *Crematogaster schimmeri* Forel, 1912

2a. Antenna with 2-segmented club.

b. Body yellow.
..... 3

2aa. Antenna with 3-segmented club.

bb. Body brown to black.

..... 4

3a. Larger species; TL ca. 2.7 mm.

..... *Crematogaster treubi apilis* Forel, 1913

3aa. Smaller species; TL 1.8-2.3 mm.

..... *Crematogaster biroi* Mayr, 1897

4a. Mesonotal dorsum convex, not carinate laterally.

..... *Crematogaster nawai* Ito, 1914

4aa. Mesonotal dorsum flat or concave, carinate laterally.

..... 5

5a. Head strongly sculputured.

..... 6

5aa. Head largely smooth and shining.

..... *Crematogaster subnuda formosae* Wheeler, 1909

6a. Head with numerous longitudinal small striae.

..... *Crematogaster rogenhoferi* Mayr, 1878

6aa. Head largely covered with punctures.

..... *Crematogaster dohrni fabricans* Forel, 1911 or *C. bison* Forel, 1913

Genus *Recurvidris* Bolton, 1992

Taxonomy and morphology. Small ants; total length 2-3 mm. Antenna consisting of 11 segments; apical 3 segments forming a club. Propodeal spine thin; its tip strongly recurved, pointing forward. Subpetiolar process developed. Posterior portion of postpetiole flattened dorsoventrally; its posterior face relatively widely connected to gaster.

Biology. No detailed ecological information is available. Nests in the soil or under stones in forests or at forest edges. Foreagers of *R. recrvispinosa* are found on the leaves of trees and on the ground.

Distribution. This genus comprises 9 species and is restricted to the Oriental region. A single species has been known to occur in Taiwan.

Taiwanese species: *Recurvidris recurvispinosa* (Forel, 1890).

Remarks. The genus *Recurvidris* was firstly recorded from Taiwan by Terayama et al. in 1994, and *R. recurvispinosa* was recorded from Taiwan by Wu & Wang in 1995.

Tribe Formicoxenini

Genus *Cardiocondyla* Emery, 1869

Taxonomy and morphology. Small and slender ants; total length less than 3.5 mm in the worker. Eye relatively developed. Antenna consisting of 12 segmens (11 segments in a few foreign species); apical 3 segments forming a club. Dorsa of head and alitrunk without hairs. Petiole with subpetiolar process; petiolar peduncle usually long. Postpetiole flat, wider than long in dorsal view.

Biology. Many species inhabit open sites such as grasslands and bare areas. Workers forage on the ground and on tree trunk or leaves.

Distribution. This genus comprises about 69 species, and is distributed in the Old World tropics and subtropics. All the records from New World are based upon human introductions. Four species have been known from Taiwan.

Taiwanese species: *Cardiocondyla kagutsuchi* Terayama, 1998; *C. minutior* Forel, 1899; *C. obscurior* Wheeler, 1929 (= *C. wroughtonii* var. *obscurior* Wheeler, 1929); *C. wroughtonii* (Forel, 1890) (= *C. wroughtonii* var. *bimaculata* Wheeler, 1929).

Species excluded from the Taiwanese fauna: *Cardiocondyla nuda* (Mayr, 1866); *C. parvinoda* Forel, 1902.

Remarks. The records of *C. nuda* from East Asia are misidentification. True *nuda* is restricted in Australia, New Guinea and Polynesia. Although Seifert (2003) regarded Indomalayan-West Pacific *nuda* as *C. kagutsuchi*, molecular phylogenetic study suggested that *kagutsuchi* consists of several sibling species, that are morphologically simillar (Yamauchi et al., 2005). At least, two male morphologically different species are present in Japan: one produce exclusively ergatoid males and other produce regularly both ergatoid and winged males. The record of *C. parvinoda* Forel, 1902, from Taiwan should be misidentification, and it is presumably *C. minutior*.

Key to species of *Cardiocondyla*

1a. Propodeal spine thin and long, needle-shaped.

b. Body yellow to yellowish brown.

..... 2

1aa. Propodeal spine short and thick, triangular.

bb. Body dark brown to black.

..... 3

2a. Head and alitrunk yellow; gaster brown.

b. Gaster without large spots.

..... *Cardiocondyla obscurior* (Wheeler, 1929)

2aa. Body concolorous yellow.

bb. Gaster with a pair of large yellowish brown spots.

..... *Cardiocondyla wroughtonii* (Forel, 1890)

3a. Peduncle of petiole shorter.

b. Propodeal spine long, with an acute tip.

..... *Cardiocondyla minutior* Forel, 1899

3aa. Peduncle of petiole longer.

bb. Propodeal spine small, with a bluntly angulate tip.

.....*Cardiocondyla kagutsuchi* Terayama, 1999 (*Cardiocondyla kagutsuchi*-complex)

Genus *Temnothorax* Mayr, 1861

Taxonomy and morphology. Moderate to small-sized ants. The genus resembles the genus *Tetramorium*, but is distinguished from the latter by the absence of a carina or wall in front of antennal insertion, 5-toothed (rarely 6-toothed) mandible, and the anteriorly placed propodeal spiracle.

In 2003, Bolton diveided the genus *Leptothorax* into two genera, *Leptothorax* and *Temnothorax*, and all the Taiwanese species belong to the genus *Temnothorax*.

Biology. Nest sites vary from underground to arboreal. Some species are slavery or temporary social parasites.

Distribution. This genus comprises 367 species in the world, but most are distributed in the Palaearctic and Nearctic regions. In Taiwan 8 species are known, of which 6 are described as new to science herein.

Taiwanese species: *Temnothorax confucii* (Forel, 1912) (= *Tetramorium confuchii* Forel, 1912; = *Leptothorax confuchii* (Forel, 1912)); *T. taivanensis* (Wheeler, 1929) (= *Leptothorax taivanensis* Wheeler, 1929); *T. huatuo* **sp. nov.**; *T. kuixing* **sp. nov.**; *T. leigong* **sp. nov.**; *T. leimu* **sp. nov.**; *T. tianpeng* **sp. nov.**; *T. yanwan* **sp. nov.**

Key to species of *Temnothorax*

1a. Propodeal spine absent; posterodorsal corner of propodeum round in profile.
..... *Temnothorax leimu* **sp. nov.**

1aa. Propodeal spine short and triangular, ca. 1.2 times as long as its basal width.
..... *Leptothorax huatuo* **sp. nov.**

1aaa. Propodeal spine long and needle-shaped, more than tweice as long as its basal width.
..... 2

2a. Head and alitrunk brown to black.
..... 3

2aa. Head and alitrunk yellow.
..... 5

3a. Promesonotal dorsum strongly convex, highest at mesonotum.

b. Petiole with a long peduncle.
..... *Temnothorax taivanensis* (Wheeler, 1929)

3aa. Promesonotal dorsum weakly convex, or almost straight.

bb. Petiole without a distinct peduncle, or with a short peduncle.
..... 4

4a. Antennal scape short, not reaching posterior margin of head in full face view.
..... *Temnothorax yanwan* **sp. nov.**

4aa. Antennal scape long, reaching posterior margin of head in full face view.
..... 5

5a. Petiolar peduncle indistinct; anterior margin of node almost straigt in profile.

b. Posterodorsal margin of postpetiole concave in profile.

c. Concolorous blackish brown to black.
..... *Temnothorax tianpeng* **sp. nov.**

5aa. Petiolar peduncle shorter; anterior margin concave in profile.

bb. Posterodorsal margin of postpetiole straight in profile.

cc. Bicolored; head and gaster black, alitrunk brown.
..... *Temnothorax kuixing* **sp. nov.**

6a. Head with many distinct longitudinal rugae.

b. Larger species; HL ca. 2.5-3.0 mm.
..... *Leptotohrax confuchii* (Forel, 1912)

6aa. Head miocroreticulate, without longitudinal rugae.

bb. Smaller species; HL 1.4 mm.

..... *Leptothorax leigong* **sp. nov.**

Temnothorax kuixing sp. nov.

(Fig. 241)

Diagnosis. Blackish brown species. Antennal scape long, exceeding posterior margin of head. Propodeal spine long and needle-shaped. Petiole with short peduncle, with concave anterior margin, convex dorsal margin and straight posterodorsal margin in profile.

Description. Holotype worker. Head excluding eyes long, 1.33 times as long as wide, with convex posterior margin in full face view. Scape exceeding posterior margin of head. Eye 0.15 mm in diameter. Promesonotum with very weakly convex dorsum in profile; matanotal groove shallowely incised dorsally. Propodeum with straight dorsal margin; propodeal spine long and needle-shaped. Petiole short, with short peduncle; anterior margin concave, anterodorsal corner forming an angle, dorsal to posterior margin convex; subpetiolar process distinct, bearing anteroventral tooth. Postpetiole higher than long, with convex anterodorsal margin and straight posterodorsal margin.

Measurements (mm). HL 0.70, HW 0.60, HW-II 0.53, SL 0.53, WL 0.80, PL 0.30, PH 0.23, DPW 0.14, PPL 0.18, PPH 0.20, PPW 0.22, TL 2.6 mm.

Color. Head, alitrunk, pedicel blackish brown; gaster black.

Holotype. Worker, Songgang (2,200 m asl), Nantou Pref. 27. viii. 1987, M. Terayama leg.

Paratypes. 2w, same data as the holotype; 1f, 1m, 3w, same data as the holotype; 2f, 4w, same data as the holotype; 3w, Hehuanshan (3,000 m asl), Nantou Pref., 10. viii. 1982, M. Terayama leg.

Type depository. Holotype in NIAES, paratypes in NIAES, NSMT and TARI.

Etymology. The specific epithet is the Chinese noun Kuixing (魁星) which is a Taiwanese god.

Remarks. It is collected in the mountain area at about 2,200-3,000 m in altitude.

Temnothorax leimu sp. nov.

(Fig. 238)

Diagnosis. This species is easily separated from the other East Asian congeners by the absence of propodeal teeth.

Description. Holotype worker. Head excluding eyes 1.26 times as long as wide, with straight posterior margin in full face view; frons and vertex with thin longitudinal striae. Antennal scape short, not reaching posterior margin of head. Eye 0.15 mm in doameter. Alitrunk long, with almost straight dorsal margin; propodeal spine absent, posterodorsal corner of propodeum

forming a dull angle. Petiole long, with long peduncle; node reversed broad U-shaped in profile; subpetiolar process distinct, bearing anteroventral tooth. Postpetiole as long as high, with convex dorsal margin.

Measurements (mm). HL 0.85, HW 0.78, HW-II 0.68, SL 0.55, WL 1.05, PL 0.40, PH 0.26, DPW 0.18, PPL 0.28, PPH 0.28, PPW 0.30, TL 3.2.

Color. Head, alitrunk, and pedicel dark brown; gaster blackish brown; antenna and legs dark brown.

Holotype. Worker, Cuifeng, Nantou Pref., 6. viii. 1981, S. Kubota leg.

Paratypes. 2w, Febgqihu, Chiayi Pref., 1. v. 1981, M. Isono leg.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Leimu (雷母) which is the name of a Taiwanese goddess.

Temnothorax huatuo sp. nov.

(Fig. 242)

Diagnosis. Blackish species. Head wide, as long as wide; scape short, not reaching posterior margin of head; propodeal spine short, acute triangular; petiole with short peduncle and triangular node. Resembling *T. congruus* (F. Smith, 1874) in Japan, but separated from the latter by the acute subpetiolar process and the higher postpetiole.

Description. Holotype worker. Head wide, as long as wide excluding eyes, with almost straight posterior marigin in full face view. Antennal scape short, not reaching posterior margin of head. Eye 0.16 mm in maximum diameter. Mesonotal dorsum straight; propodeum with straight dorsal margin; propodeal spine short and acute triangular, 1.2 times as long as its basal width. Petiole with short peduncle and triangular node, dorsum of node dully angulate; subpetiolar process distinct, bearing anteroventral tooth. Postpetiole higher than long, with almost straight dorsal margin.

Measurements (mm). HL 0.58, HW 0.63, HW-II 0.58, SL 0.48, WL 0.60, PL 0.28, PH 0.23, DPW 0.16, PPL 0.16, PPH 0.20, PPW 0.23, TL 2.8.

Color. Blackish brown to black.

Holotype. Worker, Liu kuei, Kaohsiung Pref., 22. viii. 1987, M. Terayama leg.

Paratypes. 17w, same data as the holotype.

Type depository. Holotype in NIAES, paratypes in NIAES, NSMT, and TARI.

Etymology. The specific epithet is the Chinese noun Huatuo (火德) which is the name of a Taiwanese god.

Temnothorax tianpeng sp. nov.

(Fig. 240)

Diagnosis. Resembles *T. kuixing* sp. nov., but separated the shape of pedicel segments and body color indicated in the taxonomic key.

Description. Holotype worker. Head 1.33 times as long as wide excluding eyes, with convex posterior margin in full face view; frons and vertex with longitudinal rugae. Antennal scape long, exceeding posterior margin of head. Eye 0.16 mm in maximum diameter. Promesonotal dorsum weakly convex; metanotal groove very shallowly incised dorsally; propodeum with weakly convex dorsal margin; propodeal spine long, 3.0 times as long as its basal width; posterior half slightly downcurved. Petiole short, peduncle indistinct; anterior margin straight, dorsal margin convex, posterior margin weakly convex. Postperiole with convex anterodorsal margin and concave posterodorsal margin.

Measurements (mm). HL 0.85, HW 0.75, HW-II 0.71, SL 0.85, WL 1.00, PL 0.40, PH 0.26, DPW 0.20, PPL .25, PPH 0.23, PPW 0.23, TL 3.0 mm.

Color. Head black; alitrunk, petiole and postpetiole brown; gaster black; mandible, antenna dark brown; coxae and femur dark brown, trochanters, tibiae and tarsi brown.

Holotype. Worker, Tianchi (2,200 m asl), Gaoxiong Pref., 26. viii. 1980, M. Terayama leg.

Paratypes. 1w, 1f, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Tianpeng (天蓬, =猪八戒) which is the name of a Taiwanese god.

Remarks. It is collected in the mountain area at about 2,200 m in altitude.

Temnothorax leigong sp. nov.

Diagnosis. Small yellowish species. Easily separated from the other Taiwanese yellowish species, *T. confuchii* (Forel, 1912), by the microreticulate head and metasternum, and small body size. Rather it is resembles *T. basara* Terayama & Onoyama, 1999, from the Ryukyu Islands, southwestern Japan. However, it is separated from the latter by the incised metanotal groove, black gaster, and weakly concave anterior margin of petiolar node.

Description. Head 1.21 times as long as wide excluding eyes, with convex posterior margin; frons and vertex microreticulate, without distinct longitudinal rugae. Antennal scape exceeding posterior margin of head. Eye 0.11 mm in maximum diameter. Promesonotum with gently convex dorsum; pronotal disc and mesonotum with reticulate rugae; metanotal groove incised dorsally;

metapleuron microreticulate, without longitudinal rugae; propodeum with straight dorsal margin; propodeal spine long and thin, needle-shaped. Petiole with a long peduncle, node reversed U-shaped; subpetiolar process distinct, bearing acute triangular. Postpetiole as long as high, with convex anterodorsal and straight posterodorsal margins.

Measurements (mm). HL 0.58, HW 0.53, HW-II 0.48, SL 0.48, WL 0.65, PL 0.28, PH 0.18, DPW 0.13, PPL 0.18, PPH 0.18, PPW 0.14, TL 1.4.

Color. Head, alitrunk, and pedicel yellowish brown; gaster black excepting basal portion of 1st tergum brown.

Holotype. Worker, Wushe, Datong-Cun, Nantou Pref., 5. viii. 1982, M. Terayama leg.

Paratypes. 1w, same locality, 23. viii. 1987, S. Kubota leg.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Leigong (雷公) which is the name of a Taiwanese god.

Temnothorax yanwan sp. nov.

Diagnosis. Small blackish species. It is easily saparated from the Taiwanese congeners by the short antennal scape, the long propodeal teeth, and the short petiolar peduncle and triangular node.

Description. Head 1.14 times as long as wide excluding eyes, with concave posterior margin in full face view. Antennal scape short, not reaching posterior margin of head. Eye 0.14 mm in maximum diameter. Promesonatal dorsum straight excepteng anterior postion of pronotum; metanotal groove very weakly incised dorsally; propodeum with straight dorsal margin; propodeal spine long, acute and narrow. Petiole short, peduncle very short, node triangular; subpetiolar prosess very small, ventral margin with obtuse triangle. Postpetiole almost as long as high, with convex dorsal margin.

Measurements (mm). HL 0.61, HW 0.55, HW-II 0.52, SL 0.43, WL 0.70, PL 0.25, PH 0.23, DPW 0.13, PPL 0.22, PPH 0.21, PPW 0.22, TL 2.0.

Color. Body blackish brown; antenna brown except for club blackish; legs brown.

Holotype. Worker, Liukuei, Kaohsiung Pref., 23. viii. 1987, S. Kubota leg.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Yanwan (閻王) which is the name of a Taiwanese god.

Tribe Meranoplini

Genus *Melanoplus* F. Smith, 1853

Taxonomy and morphology. Small to medium-sized ants. Head wide, with long frontal carina exceeding the level of eye. Mandible small, with 4-5 teeth. Antenna with 9 segments, with 3-segmented club. Frontal lobes widely separated. Eye large, situated posterior of head in full face view. Promesonotum sharply marginate laterally, the margins expanded with spines, lobes, or foliaceous processes. Propodeum with large spines.

Biology. *Melanoplus* species form ground nests. Workers are slow moving, foraging on the ground, and occasionally on tree trunks. They are generalist scavengers, some species are specialize on seeds.

Distribution. This genus comprises 61 species, and distributed in the tropical and subtropical regions in the Old World. A single species has been known to occur in Taiwan.

Taiwanese species: *Melanoplus bicolor* (Guérin-Méneville, 1844) (= *M. bicolor* var. *fuscescens* Wheeler, 1930).

Tribe Myrmecinini

Genus *Acanthomyrmex* Emery, 1892

Taxonomy and morphology. Dimorphic species. Frontal lobe absent, so antennal base exposed in full face view. Antenna with 12 segments, with 3-segmented club. Postpetiole attached on the apparent anteroventral surface of the gaster. Major worker with disproportionately large head. Mandible robust and edentate. Propodeum with a pair of long spines. Petiole with a pair of spines or teeth on the dorsum. Minor worker with triangular mandible, with about 10 teeth. Eye developed. Pronotum and propodeum each with a pair of long spines. Petiole with a pair of spines or teeth on the dorsum.

Biology. *Acanthomyrmex* species nests in the soil in forest, and form a small colony consisting of tens of workers. The head length of major workers is more than twice as long as that of minors. The majors serve roles in nest defense, and also mill the seeds which form a large part of the diet of these omnivores. The ergatoid (permanently wingless) queens are known for some species.

Distribution. Sixteen species are distributed in the Oriental region. In Taiwan, *A. crassispinus* has been known from southern part, Pingtung and Taitung Prefectures and Lanyu island.

Taiwanese species: *Acanthomyrmex crassispinus* Wheeler, 1930.

Genus *Myrmecina* Curtis, 1892

Taxonomy and morphology. Small to medium-sized ants. Head rectangular, venteral margin of head delineated by a shape longitudinal carina. Anterior margin of clypeus produced. Antenna with 12-segmented, and with a 3-segmented club. Lateral margin of propodeum anteriorly with a small teeth. Propodeal teeth distinct. Petiole without distinct node or peduncle, barell-shaped. Subpetiolar process present.

Biology. This species nests in the soil and rotten wood, or under stones in forests, and feeds on mites. Intermediate individuals between the queen and worker have been known in several species.

Distribution. This genus comprises 37 species in the world, but high species diversity is seen in Southeast Asia and New Guinea. In Taiwan 4 species have been known.

Taiwanese species: *Myrmecina sauteri* Forel, 1912; *M. taiwana* Terayama, 1985; *M. strigis* Lin & Wu, 1998; *M. kaigong* **sp. nov.**

Remarks. A syntype of *M. sauteri* is preserved in TARI (labeled Pilam, II. 1908, [Col. T. Shiraki]), and 3 paratypes in DEI (labeled Formosa, Pilam, II. 1908, Sauter leg.). Types of *M. strigis* are preserved in NTU, and types of *M. taiwana* in NIAES, TARI, and OMNH.

Key to species of *Myrmecina*

1a. Body yellowish brown.

b. Base of antennal scape broaden.

..... *Myrmecina taiwana* Terayama, 1985

1aa. Body black in most parts.

bb. Base of antennal scape parallel, not broaden.

..... 2

2a. Anterior margin of clypeus strongly concave, with a pair of large lateral lobes and with a small median projection.

b. Larger species; head length about 0.85 mm, total body length about 3.5 mm.

..... *Myrmecina strigis* Lin & Wu, 1998

2aa. Anterior margin of clypeus largely straight.

bb. Smaller species; head length about 0.65 mm, total body length 2-2.5 mm.

..... 3

3a. Anterolateral corner of 1st gastral tergum forming an acute angle; anterior marign of 1st gastral tergum concave.

..... *Myrmecina sauteri* Forel, 1912

3aa. Anterolateral corner of 1st gastral tergum forming an obtuse angle; anterior marign of 1st gastral tergum straight.

..... *Myrmecina kaigong* **sp. nov.**

Myrmecina kaigong sp. nov.

(Figs. 252, 253)

Diagnosis. This species resembles *M. sauteri* Forel, 1912, from Taiwan and *M. ryukyuensis* Terayama, 1996, from the Ryukyu Islands, southwestern Japan. However, it is distingished from *sauteri* by the straight anterior margin and obtusely angulate anterolateral corners of 1st gastral tergum (concave anterior margin and acutely angulate anterolateral margin in *sauteri*), and from *ryukyuensis* by the rather thick and straight, oblique rugae on head, and the smooth genal area (rugae on head thinner and much irregular, and longitudinal, and genal area microreticulate in *ryukyuensis*).

Description. Holotype worker. Head rectangular, 1.05 times as long as wide, with weakly convex posterior margin and sides in full face view; posterolateral corner forming an obtuse angle; vertex with about 20 even oblique rugae; the rugae rather thick and straight; genal area smooth and shining. Anterior margin of clypeus almost straight, without median projection. Eye small, consist of 4 facets, and 0.03 mm long. Antennal scape short, SI = 82, not reaching posterior margin of head; basal portion parallel, not broaden.

Dorsum of alitrunk with about 12 longitudinal rugae; propodeal tooth triangular, tip direcded to posterior portion. Petiole slightly higher than long, with straight anterior margin in profile; a dull angle present at midlength of dorsal margin; subpetiolar process present, bearing small anteroventral lobe. Postpetiole 1.3 times as long as high, with convex dorsal margin.

Gaster smooth and shining; anterolateral corner of 1st tergum forming an obtuse angle, and anterior marign straight in dorsal view.

Measurements (mm). HL 0.58, HW 0.55, SL 0.45, WL 0.68, PL 0.18, PH 0.20, DPW 0.16, PPL 0.15, PPH 0.20, PPW 0.23, TL 2.2.

Color. Head and alitrunk black; petiole, postpetiole, and gaster dark brown; mandible blackish brown; antenna and legs yellow.

Holotype. Worker, Chihpenxi, Taitung Pref., 20. viii. 1980, M. Terayama leg.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun kaigong (開公) which is the name of a Taiwanese god.

Genus *Pristomyrmex* Mayr, 1866

Taxonomy and morphology. Relatively small to medium-sized ants; total length 2-4 mm. Antenna consisting of 11 segments; apical 3 segments forming a club. Propodeal spines present. Exceptionally in this subfamily, this genus has undeveloped frontal lobes, and antennal insertion is exposed.

Biology. Nests are found in rotten wood or under stones in forests in *P. brevispinosus* and *P. formosae*. A colony consists of small number of workers, usually less than 20, and a queen. Some species has ergatoid queens only and no usual queens.

P. punctatus is queenless. Workers produce workers (daughters) by thelytoky. Males are only rarely produced in summer. Colonies may have many ergatoid females, which have relatively large heads and ocelli. This species does not build permanent nests, but relocates its nests frequently. A large colony of this species can comprise several tens or hundreds of thousands workers.

Distribution. This genus comprises 53 species around the world, and about half are distributed in the Oriental region. Three species have been known in Taiwan.

Taiwanese species: *Pristomyrmex punctatus* (F. Smith, 1860) (= *P. pungens* Mayr, 1866); *P. formosae* Lin & Wu, 1998; *P. brevispinosus* Emery, 1887.

Quadrinominal infrasubspecific unavailable name: *Pristomyrmex brevispinosus* r. *sulcatus* var. *formosae* Forel, 1912.

Remarks. Although Wang (2003) regarded *P. yaeyamensis* Yamene & Terayama, 1999, from Iriomote is., the Ryukyus, southwestern Japan as a junior synonym of *P. brevispinosus*, I have an opposite opinion. Both are ecologically strongly different; *P. yaeyamensis* produces ergatoid queens only, whereas *P. brevispinosus* produces usual winged queens. It is suggested that the represent a good species each other (Yamane & Terayama, 1999).

Pristomyrmex formosae in Lin & Wu, 1998, is a first available use of *Pristomyrmex brevispinosus* r. *sulcatus* var. *formosae*.

Key to species of *Pristomyrmex*

1a. Anterolateral margin of pronotum without spine.

b. Propodeal spine long, exceeding the level of posterior end of propodeum in profile.

c. Head and alitrunk brown to reddish brown; gaster black.

..... *Pristomyrmex punctatus* (F. Smith, 1860)

1aa. Anterolateral margin of pronotum with a spine.

bb. Propodeal spine short, not reaching the level of posterior end of propodeum in profile.

cc. Body uniformly yellowish brown to reddish brown.

..... 2

2a. Pronotum with a pair of slender and acute spines.

b. Postpetiolar node longer than wide in dorsal view.

c. Larger species; total length more than 4.2 mm in major workers.

..... *Pristomyrmex brivispnosus* Emery, 1887

2aa. Pronotum with a pair of short and blunt tooth.

bb. Postpetiolar node broader than long in dorsal view.

cc. Smaller species; total length less than 4.0 mm in majors.

..... *Pristomyrmex formosae* Lin & Wu, 1998

Tribe Metaponini

Genus *Metapone* Forel, 1911

Taxonomy and morphology. Medium-sized ants. Head rectangular, longer than wide. Apical (maticatory) margin of mandible with 4-6 denticles. Narrow but deep antennal scrobes present which are bordered above by very broad, horizontal, laterally directed or downcurved frontal carinae. Eyes situated below posterior end of the scrobal impression. Alitrunk long, dorsal outline flat in profile. Legs short.

Biology. This genus forms a nest in rotten fallen wood in forests.

Distribution. This genus consists of 17 species distributed in the Oriental, Indo-Australian and Malagasy regions. A single species has been known in Taiwan.

Taiwanese species: *Metapone sauteri* Forel, 1912.

Tribe Melissotarsini

Genus *Rhopalomastix* Forel, 1900

Taxonomy and morphology. Small ants; total length 1.5-3 mm. Antenna consisting of 10 segments; scape and funiculus short and extremely flat. Propodeal spines absent. Postpetiole connected to gaster by the whole posterior face.

Biology. The ants of this genus are found under the bark of living tree near ground.

Distribution. This is a small genus, comprising 7 species only, and restricted to the Oriental region. *R. omotoensis* was described from Ishigaki is., the Ryukyus, in Japan, and later recorded from Taiwan by Lin & Wu (2003). Other species is collected in Taiwan and described herein as a new to science.

Taiwanese species: *Rhopalomastix omotoensis* Terayama, 1996; *R. mazu* **sp. nov.**

Rhopalomastix mazu sp. nov.

(Figs. 271-273)

Diagnosis. Small species; total body length 2.1 mm in female; subpetiolar process devepoled, higher than long, bearing acute triangle.

Description. Holotype alate female. Head rectangular, 1.10 times as long as wide, with almost straight posterior margin and parallel sides in full face view. Anterior margin of clypeus weakly convex. Compound eye 0.18 mm in maximum diameter. Antenna 10-segmented; scape short and flat, SI = 37; 3rd to 9th segments each wider than long; terimnal segment large and flat, 0.18 mm long and 1.7 times as long as wide.

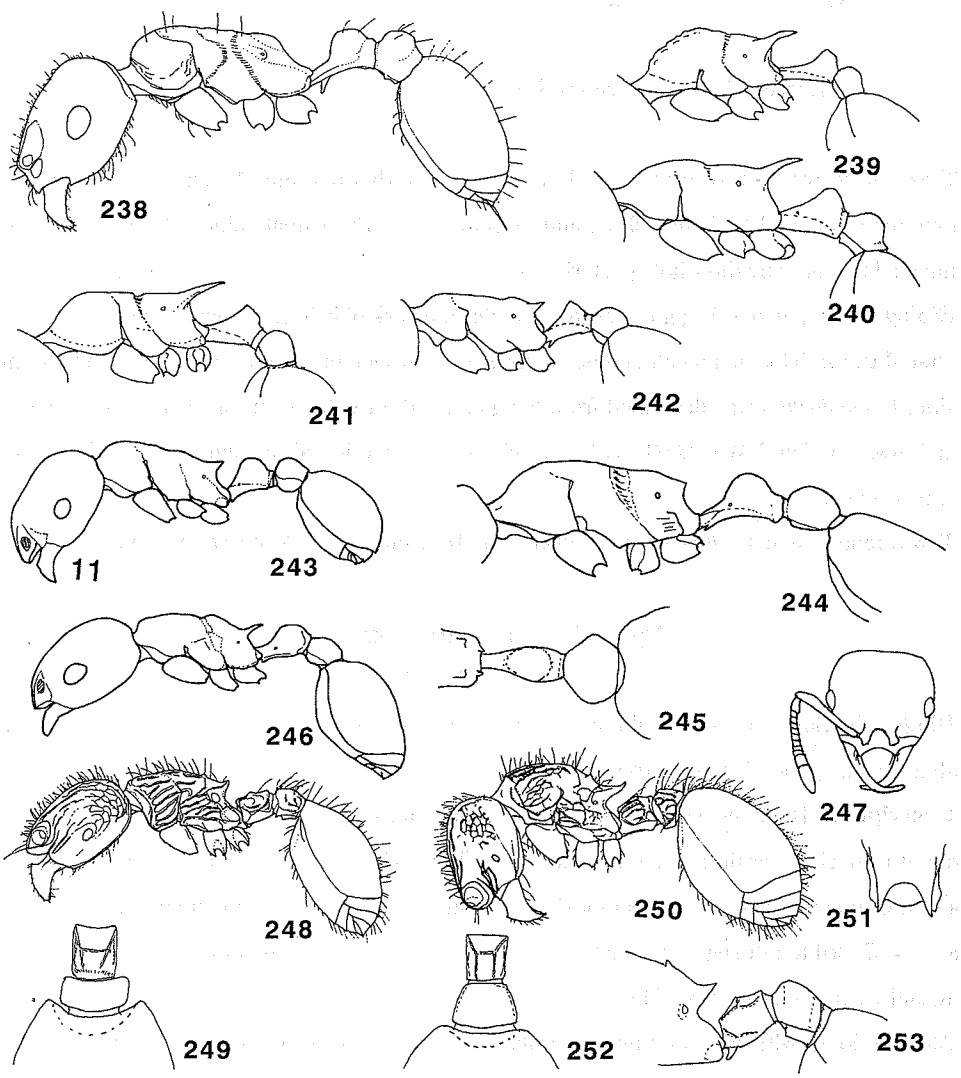
Alitrunk long, with flat dorsum; posterolateral corner of propodeum dully angulate. Petiole short and high; peduncle short, node trapezoidal, with anterodorsal and posterodotsal corners; anterior margin straigt, dorsal margin almost straigt; in dorsal view, dorsal disc wider than long, with convex anterior margin and straight posterior margin; subpetiolar process devepoled, higher than long, bearing acute triangle. Postpetiole slightly higher than long, and shorter than petiole.

Femora flat and broad, fore femur twice as long as wide, middle anf hind femora each 1.6 times as long as wide.

Measurements (mm). HL 0.35, HW 0.29, SL 0.21, WL 0.42, PNL 0.11, PH 0.15, DPW 0.16, PPL 0.08, PPH 0.10, PPW 0.14, TL 2.1.

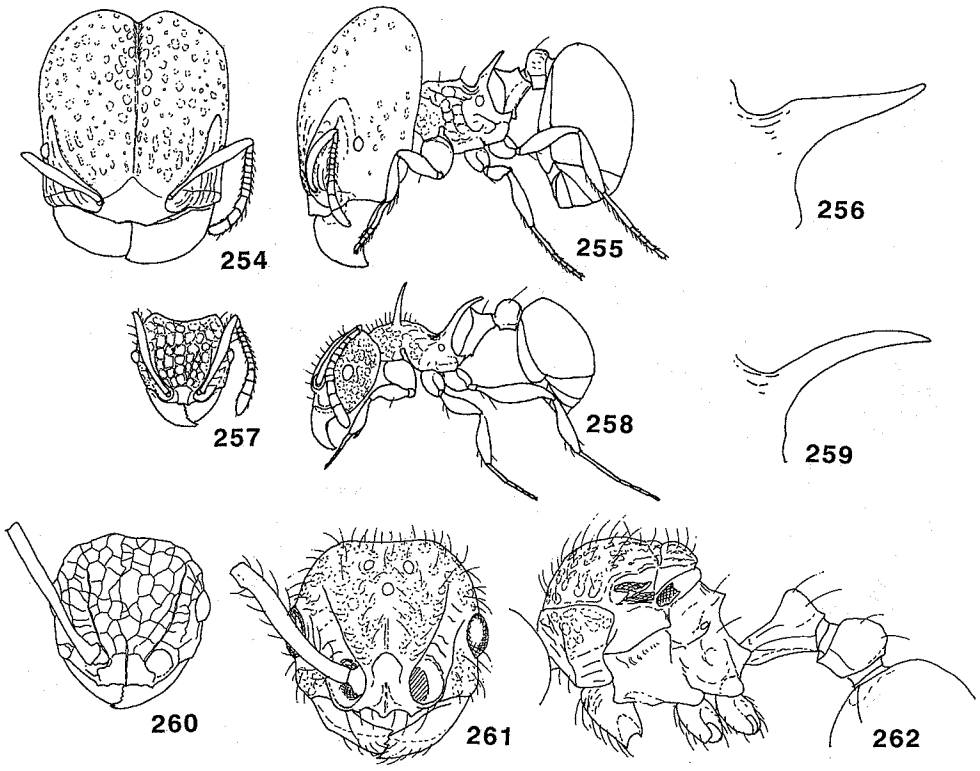
Color. Brown.

Holotype. Worker, Taidong City, 20. viii. 1980, M. Terayama leg.



Figs. 238-253, Subfamily Myrmicinae, 8.

238, *Temnothorax leimu* **sp. nov.**; 239, *Temnothorax taivanensis* (Wheeler, 1929); 240, *Temnothorax tianpeng* **sp. nov.**; 241, *Temnothorax yanwang* **sp. nov.**; 242, *Temnothorax huatuo* **sp. nov.**; 243, *Cardiocondyla minutior* Forel, 1899; 244, 245, *Cardiocondyla kagutsuchi* Terayama, 1999, 245, pedicel, dorsal view; 246, 247, *Cardiocondyla wroughtonii* (Forel, 1890), 247, ergatoid male; 248, 249, *Myrmecina sauteri* Forel, 1912, 249, pedicel and anterior potion of 1st gastral segment, dorsal view; 250, 251, *Myrmecina taiwana* Terayama, 1985, 251, propodeal spine, dorsal view; 252, 253, *Myrmecina kaigong* **sp. nov.**, 252, pedicel and anterior potion of 1st gastral segment, dorsal view.



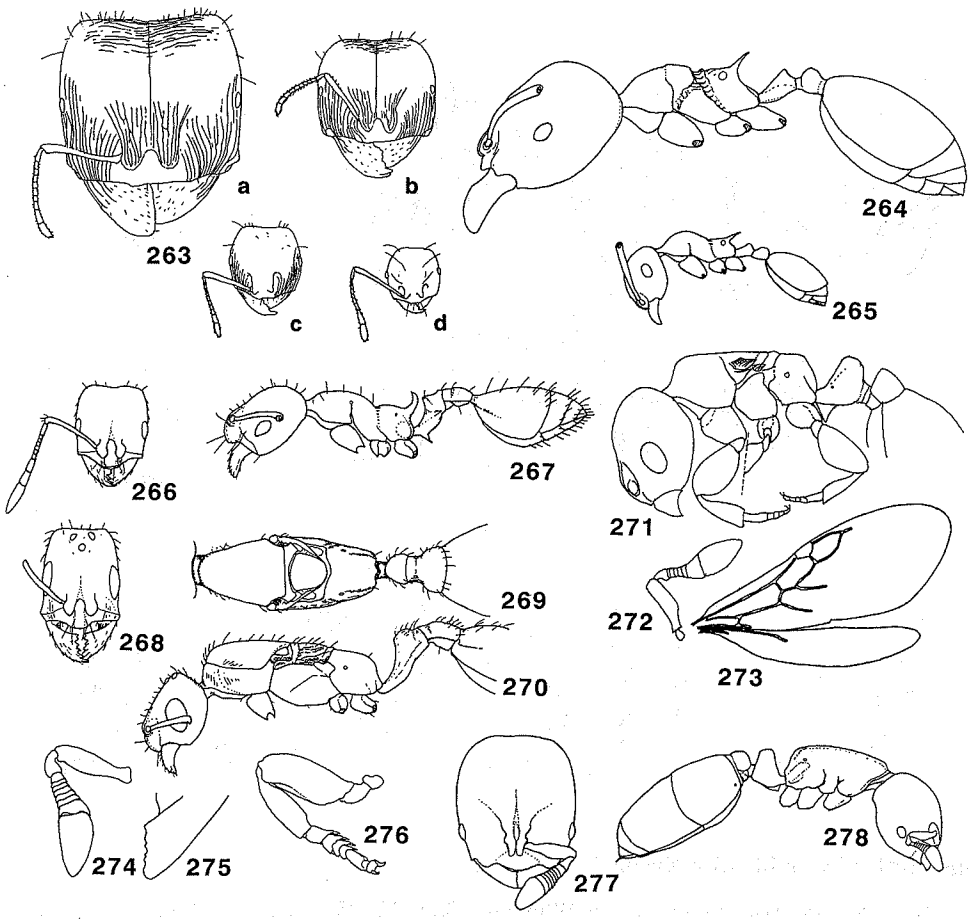
Figs. 254-262, Subfamily Myrmicinae, 9.

254-259, *Acanthomyrmex crassispinus* Wheeler, 1930, 254-256, major worker, 257-259, minor worker, 256, 259, propodeal tooth; 260, *Pristomyrmex punctatus* (F. Smith, 1860); 261, 262, *Pristomyrmex formosae* Lin & Wu, 1999, female.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Mazu (媽祖) which is the name of a Taiwanese goddess.

Remarks. Although female of *R. omotoensis* Terayama, 1996, has not been known yet, this species is distinctly smaller, and has a well developed subpetiolar process (subpetiolar process low, longer than high, with an anteroventral angle in *omotoensis* worker).

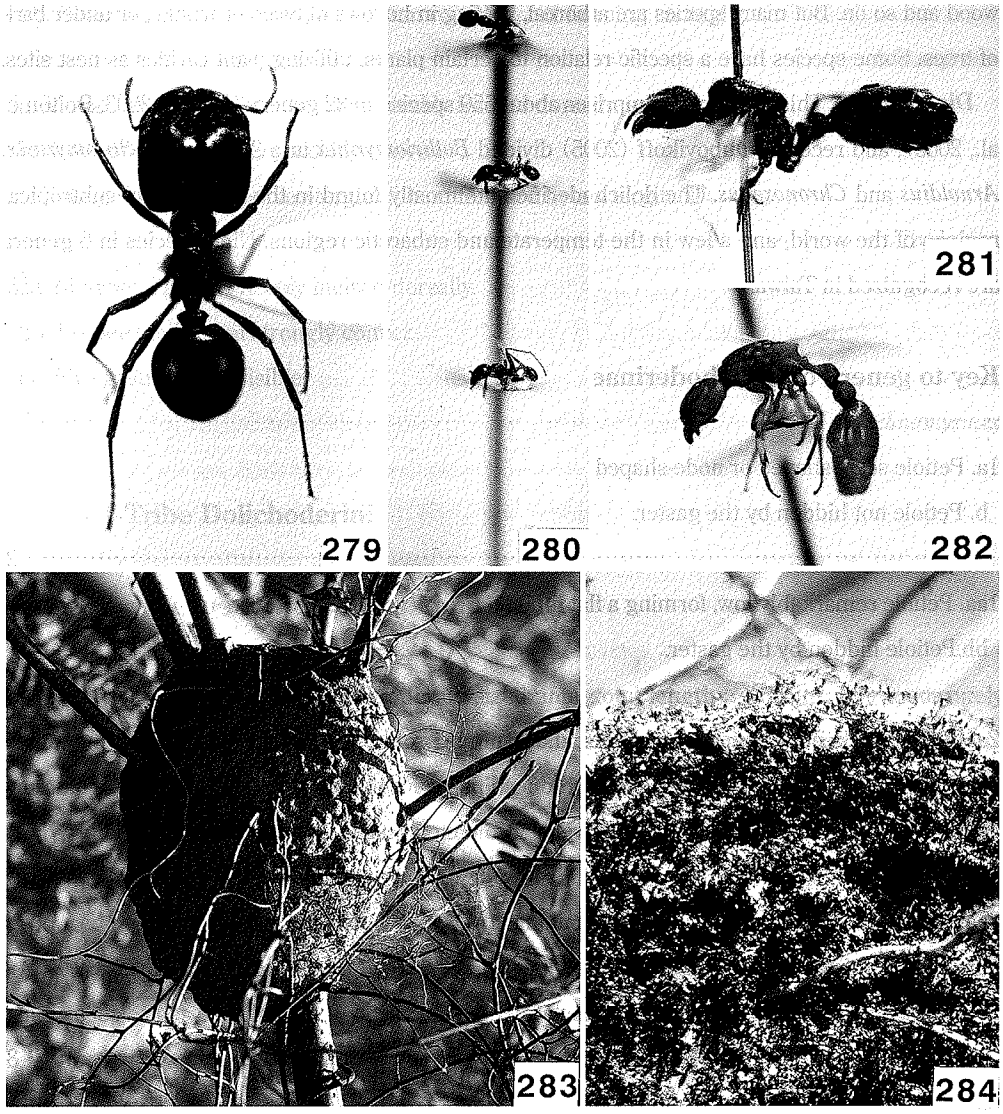


Figs. 263-278, Subfamily Myrmicinae, 10.

263-265, *Pheidologeton diversus* (Jerdon, 1851), 263 a-d, worker polymorhism, 264, major worker, 265, minor worker; 266-270, *Recurvidris recurvispinosa* (Forel, 1890), 268-270, female; 271-273, *Rhopalomastix mazu* **sp. nov.**, female, 272, antenna; 274-278, *Rhopalomastix omotoensis* Terayama, 1996, 274, antenna, 275, mandible, 276, foreleg.

Subfamily Doilchoderinae

Taxonomy and morphology. In the worker, eyes usually developed, but ocelli almost always absent. Antenna generally 12-segmented (rarely 11- or 10-segmented). Abdominal pedicel one-segmented, varying in shape from nodiform, scale-like to tubular. Gastral segment 2 without anterior secondary constriction. Gastral tip with a slit-like opening not surrounded by a fringe of hairs. Sting absent.



Figs. 279-284, Subfamily Myrmicinae, 11.

279, 280, *Pheidologeton diversus* (Jerdon, 1851), 279, major worker, 280, minor workers; 281, *Messor aciculatus* (F. Smith, 1874), alate female; 292, *Paratopula ceylonica* (Emery, 1901), alate female; 283, 284, carton nest of *Crematogaster rogenhoferi* Mayr, 1878; 284, many workers in the nest.

Dolichorerinae resembles formicine species in general appearance, but distinguished from the shape of opening at the tip of gaster.

Biology. They are generally indigenous and nests are found in the soil, under stones or dead

wood and so on. But many species are arboreal, nesting in hollows of twigs or trunks, or under bark of trees. Some species have a specific relation to certain plants, utilizing plant cavities as nest sites.

Distribution. This subfamily comprises about 550 species in 22 genera (Bolton, 2003; Bolton et al., 2005), and recently Dubovikoff (2005) divided *Bothriomyrmex* into 3 genera, *Bothriomyrmex, Arnoldius* and *Chronoxenus*. The dolichoderine ants mostly found in the tropical and subtropical regions of the world, and a few in the temperate and subarctic regions. Nine species in 6 genera are recognized in Taiwan.

Key to genera of Dolichoderinae

1a. Petiole scale-shaped or node-shaped.

b. Petiole not hidden by the gaster.

..... 2

1aa. Petiole remarkably low, forming a flat tube.

bb.Petiole hidden by the gaster.

..... 5

2a. Petiole thick, node-shaped, with a round dorsum in profile.

b. Posterodorsal margin of propodeum produced posteriorly.

c. Head and alitrunk covered with relatively large punctures.

..... *Dolichoderus*

2aa. Petiole thin, scale-shaped, higher than long.

bb. Posterodorsal margin of propodeum not produced.

cc. Head and alitrunk smooth and impunctate.

..... 3

3a. Mandible with 5 or 6 teeth and 0-5 denticles.

b. Maxillary palpi with 4 or 2, labial with 3 or 2 segments.

..... *Chronoxenus*

3aa. Mandible with 7 or 8 teeth and 2 to 5 denticles.

bb. Maxillary palpi 6 or 5, labial with 4 or 3 segments.

..... 4

4a. Propodeal declivity concave in profile.

b. Posterodorsal corner of propodeum forming an angle.

..... *Ochetellus*

4aa. Propodeal declivity convex to flat in profile.

bb. Posterodorsal corner of propodeum rounded, not forming an angle.
..... *Iridomyrmex*

5a. Metanotal groove absent or only weakly incised dorsally.
b. Propodeal dorsum very weakly convex.
c. Four gastral terga visible (tergite 5 bent forward below tergite 4).
..... *Tapinoma*

5aa. Metanotal groove deeply incised dorsally.
bb. Propodeal dorsum strongly convex.
cc. Five gastral terga visible.
..... *Technomyrmex*

Tribe Dolichoderini

Genus *Dolichoderus* Lund, 1831

Taxonomy and morphology. Moderate-sized ants; total length 2.5-5 mm. Eye moderately large, and slightly produced. Antenna with 12 segments. Posterodorsal margin of propodeum variable in shape from angulate to spinose. Petiole nodiform, not overhung by 1st gastral tergum. Body cuticle thick, covered with strong punctures in many species.

Biology. Many of these are arboreal, and take as main food items plant exudates or honey-dew produced by homopterous insects.

Distribution. One hundred eighty-seven species have been known in the world. In Taiwan, a single species has been known to occur.

Taiwanese species: *Dolichoderus thoracicus* (F. Smith, 1860) (= *D. bituberculatus* (Mayr, 1862)).

Genus *Ochetellus* Shattuck, 1992

Taxonomy and morphology. Small ants. Eye large, situated slightly anteriorly on head. Anterior margin of clypeus more or less convex. Metanotal groove distinctly incised dorsally. Posterodorsal margin of poropodeum angulate; propodeal declivity weakly concave. Petiole scale-shaped, thin and high.

Biology. Nests are found in dead wood or twigs, and in the soil on grasslands and at forest edges. It tends to be carnivorous, often attacking nests of paper wasps or sphecid wasps.

Distribution. Nine species are distributed in the Oriental and Australian regions. One species

has been known in Taiwan.

Taiwanese species: *Ochetellus glaber* (Mayr, 1862) (= *Iridomyrmex glaber* Mayr, 1862).

Genus *Iridomyrmex* Mayr, 1862

Taxonomy and morphology. Small to moderate-sized ants. Eye large, situated slightly anteriorly on head. Anterior margin of clypeus more or less convex. Metanotal groove distinctly incised dorsally. Posterodorsal margin of poropodeum angulate or convex; propodeal declivity straight or weakly convex. Petiole scale-shaped, thin and high.

This genus resembles the genus *Ochetellus*, but is separated from the latter by the straight or weakly convex propodeal declivity.

Biology. Nests are found in dead wood or twigs, and in the soil on grasslands and at forest edges.

Distribution. Eighty-eight species are recorded of which 45 species (63 forms) are distributed in the Australian region, and a few species in the Oriental region.

Taiwanese species: *Iridomyrmex anceps* Roger, 1863; *I. bicknelli formosae* Forel, 1912.

Key to the species of *Iridomyrmex*

1a. Body uniformly dark brown to blackish brown.

..... *Iridomyrmx anceps* Roger, 1863

1aa. Body light brown, legs lighter.

..... *Iridomyrmex bicknelli formosae* Forel, 1912

Genus *Tapinoma* Foerster, 1850

Taxonomy and morphology. Small-sized in many species; worker body length 1.5-5 mm. Eye moderate in size, and situated in the middle or slightly anteriorly on head. Metanotal groove distinct. Dorsal surface of propodeum short. Petiole tube-shaped, and hidden under 1st gastral segment. Only four segments are recognized when the gaster is seen from above.

Biology. Nests are made in the soil, and under the bark of trees or stones. Workers run very quickly. Some species, e.g. *T. melanocephalum*, are house pests in the tropics.

Distribution. Ninety-three species are recorded in the world. Two species are known to occur in Taiwan.

Taiwanese species: *Tapinoma melanocephalum* (Fabricius, 1793); *T.* sp. (erroneously applied as *T. indicum* in Taiwan).

Species excluded from the Taiwanese fauna: *Tapinoma indicum* Forel, 1895.

Remarks. *Tapinoma indicum* is removed from the Taiwanese fauna, since recently it has proved to be a different species. A true *T. indicum* is larger and much darker species.

Key to species of *Tapinoma*

1a. Eye large; its diameter larger than the length between anterior margin of eye and posterior margin of clypeus.

b. Bicolored species; body dark brown and pale yellow.

..... *Tapinoma melanocephalum* (Fabricius, 1793)

1aa. Eye smaller; its diameter smaller than the length between anterior margin of eye and posterior margin of clypeus.

bb. Concolorous yellow species.

..... *Tapinoma* sp.

Genus *Technomyrmex* Mayr, 1872

Taxonomy and morphology. Medium to small-sized ants. Anterior margin of clypeus convex medially. Metanotal groove distinctly incised. Propodeal dorsum convex above. Petiole flat, tube-shaped, and overhung by 1st gastral segment. Most resembles *Tapinoma* species, but it is easily distinguished from the Taiwanese *Tapinoma* and *Chronoxenus* species by the strongly incised metanotal groove and the convex propodeum.

Biology. They inhabit dry grasslands or forest edges, and nests in rotten wood, stubs, or dead twigs. A common Taiwanese species, *T. brunneus* (erroneously used as *T. albipes* in many Taiwanese and Japanese entomologists), is polycalic, and forms super colonies containing mirions of workers. Besides normal queens and males, there are wingless ergatoid queens and males. A large colony is maintained by them.

Distribution. Ninety-four species are known in the world. Two species are recorded from Taiwan.

Taiwanese species: *Technomyrmex brunneus* Forel, 1895 (= *T. albipes* (F. Smith, 1861), misidentification; = *T. modigliannii angustior* Forel, 1912.); *T. horni* Forel, 1912.

Species excluded from the Taiwanese fauna: *Technomyrmex albipes* (F. Smith, 1861) (= *T.*

albipes var. *bruneipes* Forel, 1895).

Remarks. East Asian *T. brunneus* is erroneously applied as *T. albipes*. A true *T. albipes* is distributed in South and South East Asia, and *T. brunneus* in Viet Nam, southern China, Japan, and Taiwan.

Key to the species in *Technomymex*

1a. Bicolored species: head, alitrunk and propodeum yellowish brown, gaster black.

b. Metanotal groove deeply incised dorsally.

..... *Technomyrmex horni* Forel, 1912

1aa. Body uniformly black.

bb. Metanotal groove weakly incised.

..... *Technomyrmex brunneus* Forel, 1895

Genus *Chronoxenus* Dubovikoff, 2005

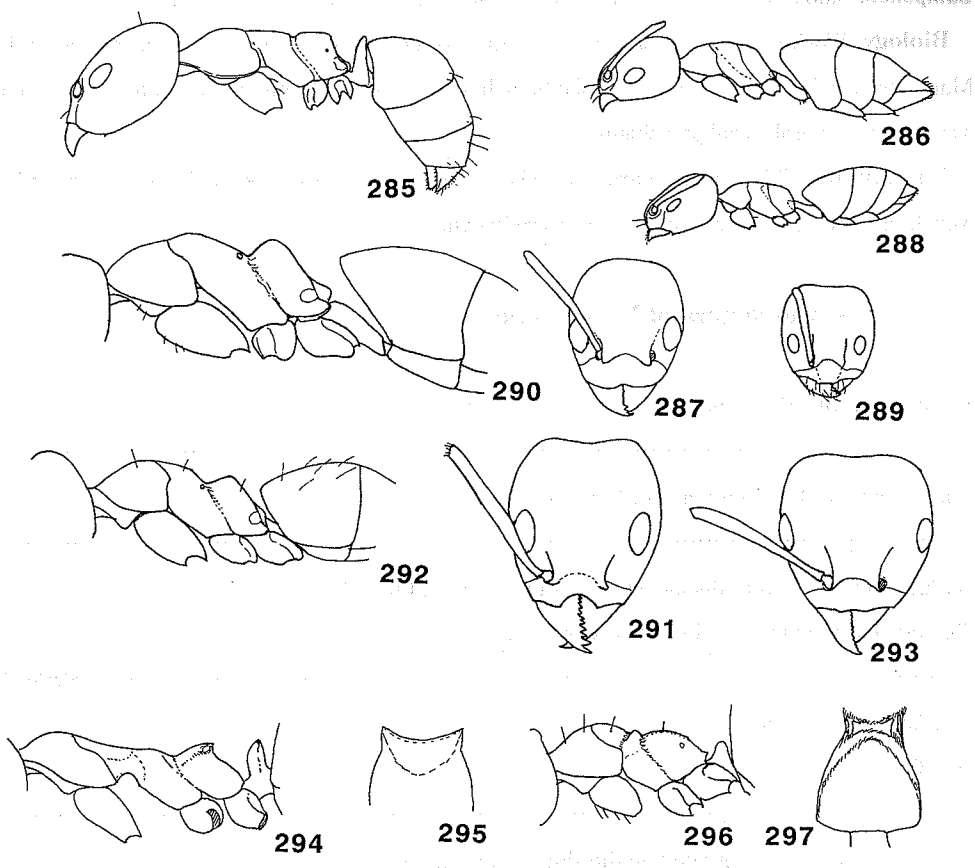
Taxonomy and morphology. Small ants. Head square, mandible with 5-6 teeth and 0-5 small denticles. Anterior margin of clypeus straight or slightly convex. Antenna short. with 12 segments. Eye relatively small. Palpi formula 4, 2 or 2, 2. Propodeum short. Petiole low. Gaster with 5-segmented.

This genus resembles to *Tapinoma* species, but separated from *Tapinoma* by the small eyes. Recently, Dubovikoff (2005) divided the genus *Bothriomyrmex* into 3 genera, *Chronoxenus*, *Bothriomyrmex*, and *Arnoldius*. The Oriental species is included in the genus *Cronoxenus*.

Biology. Nests are found in soil or rotten wood. Workers are relatively commonly found foraging on trees. They are found in a wide variety of habitats, including grasslands and dry woodlands.

Distribution. Three species have been known to occur in the Oriental region and a single species in Taiwan.

Taiwanese species: *Chronoxenus wroughtonii formosensis* (Forel, 1913) (= *Bothriomyrmex wroughtonii* r. *formosensis* Forel, 1913).



Figs. 285-293, Subfamily Dolichoderinae. Figs. 294-297, Subfamily Formicinae, 1. 285, *Ochetellus glaber* (Mayr, 1862); 286, 287, *Tapinoma melanocephalum* (Fabricius, 1912); 288, 289, *Tapinoma* sp.: 290, 291, *Technomyrmex horni* Forel, 1912; 292, 293, *Technomyrmex brunneus* Forel, 1895; 294, 295, *Lepisiota hexiangu* **sp. nov.**, 295, petiolar scale, frontal view; 296, 297, *Plagiolepis longwang* **sp. nov.**, 297, metanotum and propodeum, dorsal view.

Subfamily Formicinae

Taxonomy and morphology. This subfamily has the following characteristics: Abdominal pedicel 1-segmented; sting absent at gastral apex; apical segment of gaster conical with a rounded opening usually surrounded by a fringe of hairs (in Taiwan, the genus *Polyrhachis* lack the hairs); frons generally well defined; eye usually developed, but rarely reduced or absent; ocelli present in workers of several genera.

It is divided into 2 tribal groups, lasiine t.g. and formicine t.g. (Bolton, 2003): *Polyrhachis*,

Camponotus and *Formica* are belong to the formicine t.g. and others to the lasiine t.g.

Biology. Workers of many species are found foraging on the ground and attract attention. Many species feed on honeydew of plants or homopterans and omnivorous, but some perform slavery or temporal social parasitism.

Distribution. This is a large group consisting of about 2,500 species in 49 genera around the world. In Taiwan, 59 species in 11 genera are known.

Key to genera of Formicinae

1a. Antenna with 12 segments.
..... 2

1aa. Antenna with 11 segments or less.
..... 8

2a. Alitrunk armed with distinct spines or teeth (except for a few species).

2b. Petiole armed with distinct spines or teeth.
..... *Polyrhachis*

2aa. Alitrunk without spines nor teeth.

2bb. Petiole without spines nor teeth.
..... 3

3a. Mesonotal spiracle situated on the side of mesonotum.
..... 4

3aa. Mesonotal spiracle situated on the dorsum of mesonotum or close to dorsum.
..... *Camponotus*

4a. Propodeal spiracle slit-shaped.
..... *Formica*

4aa. Propodeal spiracle round.
..... 5

5a. Eye small.

b. Maxillary palp with 2-4 segments.

c. Strongly dimorphic species.
..... *Pseudolasius*

5aa. Eye small to large.

bb. Maxillary palp with 6 segments.

cc. Monomorphic species.

..... 6

6a. Anterior face of 1st gastral segment broadly transversely concave.

b. Mandible with 6 teeth.

..... *Prenolepis*

6aa. Anterior face of 1st gastral segment not broadly concave.

bb. Mandible with at least 7 teeth.

..... 7

7a. Eye situated at almost midlength of head capsule.

b. Pro- and mesonotal dorsa with pairs of strong erect hairs.

..... *Paratrechina*

7aa. Eye situated behind the midlength of head capsule.

bb. Pro- and mesonotal dorsa with many erect, but weaker hairs.

..... *Lasius*

8a. Pronotum elongate.

b. Petiole long, seen from above longer than wide.

c. Antenna and legs extremely long; antennal scape, hind femur and hind tibia as long as or longer than alitrunk.

..... *Anoplolepis*

8aa. Pronotum of usual shape or shorter.

bb. Petiole short, seen from above shorter than wide.

cc. Antenna and legs shorter; antennal scape, hind femura and hind tibia shorter than alitrunk.

..... 9

9a. Mesonotum separated from the metanotum by a conspicuous transverse groove or impression in dorsal view.

b. Eye small, consisting of about 10 facets, or less.

c. Palpal formula 5 : 3, or less.

d. Antenna with 10 or 11 segments.

..... *Acropyga*

9aa. Mesonotum fused with the metanotum, the two not separated by a transverse groove or impression.

bb. Eye larger, consisting of more than 20 facets, and usually much more.

cc. Palpal formula 6 : 4.

dd. Antenna with 11 segments.

..... 10

10a. Propodeum without teeth nor denticles.

b. Petiolar scale without teeth nor denticles.

..... *Plagiolepis*

10aa. Propodeum armed with a pair of teeth or denticles.

bb. Dorsum of petiolar scale with a pair of teeth or denticles.

..... *Lepisiota*

Tribe Lasiini

Genus *Acropyga* Roger, 1862

Taxonomy and morphology. Small ants; total length less than 4 mm. Eye small, usually smaller than the width of antennal scape, or lacking. Mandible with 3-5 teeth. Maxillary palpus consisting of 5 segments or less, and labial 3 or less. Antenna with 4-11 segments (10 or 11 segments in the Taiwanese species). Alitrunk short and small. Gaster disproportionately large.

Three subgenera, *Atopodon*, *Rhizomyrma* and *Malacomyrma*, were synonymized with the genus *Acropyga* by LaPolla (2004).

Biology. *Acropyga* species engage in trophobiosis with the mealybug genera *Eumyrmococcus, Xenococcus* and *Chavesia* in the subfamily Rhizoechinae. They are completely hypogaeic, and feed on honeydews of mealybugs. Nests are seen in the soil or under stones. In *A. sauteri*, nuptial flights are seen from late May to June. Each alate female leaves the parent nest with a gravid mealy bug, *Eumyrmococcus smithi*, in her mandibles.

Distribution. Forty species are known from the temperate to tropical areas in the world. In Taiwan 4 species are recorded.

Taiwanese species: *Acropyga butteli* Forel, 1912 (= *A. baodaoensis* Terayama, 1985); *A. sauteri* Forel, 1912; *A. yaeyamensis* Terayama & Hashimoto, 1996; *A. yushi* **sp. nov.**

Key to species of *Acropyga*

1a. Mandible with 5 teeth; basalmost tooth truncated apically.

..... *Acropyga butteli* Forel, 1912

1aa. Mandible with 4 teeth; basal most tooth triangular.

..... 2

1aa. Mandible with 3 or 4 teeth; basal most tooth triangular.

..... *Acropyga sauteri* Forel, 1912

2a. Eye consist of about 10 facets.

b. Propodeum with straight dorsal margin and concave posterior margin in profile.

..... *Acropyga yushi* **sp. nov.**

2aa. Eye consist of a single facet.

bb. Propodeum with convex dorsal margin in profile.

..... *Acropyga yaeyamensis* Terayama & Hashimoto, 1996

Acropyga yushi sp. nov.

(Figs. 317. 318)

Diagnosis. Resembling *A. yaeyamensis* Terayama & Hashimoto, 1996, but is easly separated from the latter by the 11-segmented antenna, large eye consist of about 10 facets, moderately convex promesonotal dorsum, and straight dorsal margin and concave posterior margin of propodeum.

Description. Holotype worker. Head 1.12 times as long as wide, with concave posterior margin and parallel sides; frons and vertex largely smooth, but very weakly microreticulate. Mandible with 4 acute triangular teeth. Antenna with 11 segments; scape not reaching posterior margin of head, 3rd to 8th segments each wider than long, 9th and 10th segments each as long as wide; terminal segment 2.3 times as long as wide. Eye consist of about 10 facets; ca. 0.05 mm long.

Promesonotum with weakly convex dorsal margin and about 10 erect hairs on the dorsum; metanotum incised dorsally; propodeum with straight dorsal margin and concave posterior margin. Petiole thin and high, dorsum forming acute angle; in frontal view, node with straight dorsal margin and parallel sides.

Measurements (mm). HL 0.70, HW 0.63, SL 0.58, WL 0.75, PL 0.05, PH 0.18, DPW 0.13, TL 2.0.

Color. Head, alitrunk, petiole yellow; gaster brownish.

Holotype. Worker, Liukuei, Kaohsiung Pref., 21. viii. 1987, M. Terayama leg.

Paratype. 1w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Yushi (雨師) which is the name of a Taiwanese god.

Remarks. A possible female of this species was collected in Nanshanxi, Nanfen-Cun, Nantou Pref. (collection date: 21. viii. 1987).

Genus *Anoplolepis* Santschi, 1914

Taxonomy and morphology. Medium-sized ants, with developed eyes and long antennal scapes which are far beyond posterior margin of head. Antenna consisting of 11 segments; funicular segments each longer than wide. Metanotal groove not visible. Metanotum small, not distinctly separable from mesonotum. Legs slender.

Biology. The Taiwanese species nests in the soil or under stones, and commonly found in grasslands, forest egdes and roadsides on Taiwan. It is also seen frequently foraging on tree trunks. It is considered to have spread over the world by through human activities.

Distribution. This genus comprises 22 species, distributed mostly in Africa. A single species has been known to occur in Taiwan and Southeast Asia. *Anoplolepis longipes* is a junior synonym of *A. gracilipes*.

Taiwanese species: *Anoplolepis gracilipes* F. Smith, 1857 (= *A. longipes* Jerdon, 1851).

Genus *Lasius* Fabricius, 1805

Taxonomy and morphology. Medium-sized ants. Eye variable in size, from well developed to very small (consisting of only several facets). Workers with 3 ocelli and distinct frontal carina. Mandible with 8-12 teeth. Antenna 12-segmented; segments 3-7 each shorter than each of segments 8 to 12. Alitrunk with convex promesonotal dorsum and raised propodeal dorsum. Propodeal spiracle round. Dorsum of promesonotum with abundant pubecences and hairs.

Biology. They are ranging from grasslands to forests, and nest in soil, rotten woods, and rotten parts of trees. Workers routinely attend to aphid colonies and often monopolize them.

Distribution. The genus comprises 141 species distributed mostly in the Palaearctic and Nearctic regions. Four nomenculaturally determined species in 3 subgenera are known from Taiwan of which 3 species are distributed in the mountainous regions. Lin & Wu (2003) gave 2 more unnamed species in their taxonomic list.

Taiwanese species: Subgenus *Cautolasous*: *Lasius talpa* Wilson, 1955.

Subgenus *Dendrolasius*: *Lasius nipponensis* Forel, 1912 (= *L. capitatus* (Kuznetzov-Ugamskj, 1928), sensu Kupyanskaya, 1989; = *L. crispus* Wilson, 1955, sensu Kupyanskaya, 1989).

Subgenus *Lasius*: *Lasius coloratus* Santschi, 1937; *L. japonicus* Santschi, 1941.

Species excluded from the Taiwanese fauna: *Lasius niger* (Linnaeus, 1758); *L. hayashi* Yamauchi & Hayashida, 1970; *L. capitatus* (Kuznetzov-Ugamskj, 1928), sensu Kupyan skaya,1989; *L. crispus* Wilson, 1955, sensu Kupyanskaya, 1989.

Remarks. *Lasius talpa* is a mountain species, confined to the altitudes higher than 2,000m, and a forest species *L. nipponensis* to the altitudes higher than 1,000m. On the other hand, *L. japonicus* may probably have been artificially introduced by human commerce. The first record of this species is Wheeler (1929) from Funkiko (= Fenchifu, Chiayi Pref.) as *L. niger.*

Lasius niger, L. hayashi and *L. capitatus* are errorneously identified by the difficulty of taxonomy of this genus.

Key to species of *Lasius*

1a. Body brown to blackish brown.
b. Labial palpi long, reaching the neck.
c. Eye large.
..... (Subgenus *Lasius*) 2

1aa. Body yellow.
bb. Labial palpi short, not reaching the neck.
cc. Eye small, consist of 6-17 facets.
..... (Subgenus *Cautolasius*) ..... *Lasius talpa* Wilson, 1954

1aaa. Body jet black.
bbb. Labial palpi short, not reaching the neck.
ccc. Eye large.
..... (Subgenus Dendrolasius) ..... *Lasius nipponensis* Forel, 1912

3a. Body dark brown (alitrunk often slightly paler than head and gaster).
b. Petiolar scale apically less acute in profile; its anterior margin with a blunt angle.
c. Antennal scape as long as head width.
..... *Lasius japonicus* Santschi, 1937

3aa. Head and alitrunk light brown; gaster dark brown.
bb. Petiolar scale apically acute in profile; its anterior margin without an angle.
cc. Antennal scape usually shorter than head width.
..... *Lasius coloratus* Santschi, 1941

Tribe Plagiolepidini

Genus *Lepisiota* Santschi, 1926

Taxonomy and morphology. Small ants; workers around 4 mm or less. Head round. Eye large, situated anterior portion of head. Three ocelli present but small and often obscure. Antenna 11-segmented; scape long, exceeding posterior margin of head. palpal formula 6 : 4. Pronotum short, mesonotum small. Mesonotum and mesopleuron separated by a shallow groove with transverse short striae. Propodeum with a pair of teeth or spines. Petiole thin and high, and dorsolateral margin forming an acute tooth in frontal view.

Biology. They are found in habitats ranging from open land to woodland, nesting under stones or logs.

Distribution. This genus comprises about 70 species, and is distributed in the Etiopian, Palaearctic and Oriental regions. Three species are known from Taiwan.

Taiwanese species: *Lepisiota rothneyi taivanae* (Forel, 1913) (= *Plagiolepis rothneyi taivanae* Forel, 1913); *L. wroughtonii* (Forel, 1894) (= *Plagiolepis rothneyi wroughtonii* Forel, 1902); *Lepisiota hexiangu* **sp. nov.**

Remarks. Although Bolton (1995) removed *Plagiolepis rothneyi taivanae* Forel, 1913, and *P. wroughtonii* (Forel, 1894) to the genus *Lepisiota*, Zhou (2001) situated these two species to the genus *Plagiolepis* by their morphological features. In this paper, these are tentatively situated in the genus *Lepisiota*.

Lepisiota hexiangu sp. nov.

(Figs. 294, 295)

Diagnosis. Easily separated from the East Asian congeners by the elongate head, the long mesonotum, and short dorsal spines of petiole.

Description. Head microreticulate, 1.20 times as long as wide excluding eyes, with straight posterior margin and convex lateral margin in full face view. Anterior margin of clypeus convex. Antenna long, with 11 segments; scape long, without distinct hairs, SI =137; funicular segments each longer than wide. Legs long and slender.

Alitrunk long and slender, microreticulate; mesonotm 0.5 times as wide as pronotal width in dorsal view; propodeum with blunt and triangular dorsolateral tooth; propodeal spiracle prersent at near the tooth. Petiole thin and high; in frontal view, dorsal tooth blunt, forming an obtuse angle; dorsal margin concave.

Gaster very weakly microreticulate.

Measurements (mm). HL 0.75, HW 0.68, HW-II 0.63, SL 0.93, WL 1.15, PL 0.20, PH 0.35, DPW 0.26, TL 3.2.

Color. Head black, alitrunk reddish brown, petiole blackish brown, gaster black; antenna

brown, legs blackish brown.

Holotype. Worker, Wulu, Haituan, Taidong, 24. ix. 1986, J. C. Lien leg.

Paratypes. 3w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Hexiangu (何仙姑), one of the eight deities of fortune in Taiwan.

Remarks. Four species in the genus *Lepisiota* (= *Acantholepis*) have been known in the continental China (Xu, 1994; Wu & Wang, 1995; Zhou & Zheng, 1998; Zhou, 2001). Both of Taiwanese species, *Lepisiota rothneyi taivanae* and *L. wroughtonii*, are black colored species.

Genus *Paratrechina* Motschoulsky, 1863

Taxonomy and morphology. Small ants; total length around 1.5-3.5 mm. Eye moderate in size, and positioned relatively forward on head. Antenna consisting of 12 segments. Mandible with 5 or 6 teeth. Alitrunk with convex promesonotal dorsum and usually dorsally incised metanotum (metanotal groove weak in some species). Dorsum of promesonotum with a few erect or suberect hairs. Propodeal spiracle round.

Biology. Those are found in dry habitats such as open areas or grasslands to forests, and nests in the soil, rotten wood, leaf litter, and under stones. *P. longicornis* is commonly found in dry habitats as in grasslands and at roadsides. The workers are often enter houses.

Distribution. This genus comprises 158 species in the world. Ten species have been known in Taiwan.

Taiwanese species: *Paratrechina amia* (Forel, 1913) (= *Prenolepis bourbonica* var. *amia* Forel, 1913); *P. formosae* (Forel, 1912) (= *Prenolepis formosae* Forel, 1912); *P. kraepelini* Forel, 1905; *P. longicornis* (Latreille, 1802); *P. otome* Terayama, 1999; *P. ryukyuensis* Terayama, 1999, **new record**; *P. sauteri* (Forel, 1913) (= *Prenolepis minutula sauteri* Forel, 1913); *P. yaeyamensis* Terayama, 1999, **new record**; *P. guanyin* **sp. nov.**; *P. kongming* **sp. nov.**

Species excluded from the Taiwanese fauna: *Paratrechina flavipes* (Mayr, 1874); *P. bourbonica* Forel, 1860.

Remarks. *Paratrechina flavipes* is excluded from the Taiwanese Fauna since the Taiwanese one should be closely resembles but different species by the morphological feature and distribution range of *P. flavipes*. The species which was identified as *P. flavipes* in Taiwan should be *P. ryukyuensis* or *P. yaeyamensis* both distributed in the Ryukyus, southern Japan. Actually, this is very difficult genus to separate species. It is needed for taxonomic study using the molecular

data. Trager (1984) mentioned that the Taiwanese population is distinguished from true *P. bourbonica* by the size, head width, pubercence and genital structure. Terayama (1999) treated the Taiwanese population is distinct species from *P. bourbonica* and applied it as *P. amia*.

Key to species of *Paratrechina* (*Kraepelini* and *formosae* are unknown to me, so excluded in this key.)

1a. Antennal scape very long, exceeding the posterior margin of head by its half length.

b. Eye large; length between upper margin of eye and posterior margin of head 1-1.5 times as large as eye diameter.

..... 2

1aa. Antennal scape exceeding the posterior margin of head by less than its half length.

bb. Eye smaller; length between upper margin of eye and posterior margin of head 3 times as large as eye diameter.

..... 3

2a. Hind tibia and tarsus with erect hairs.

b. Mandible with 5 teeth.

c. Mesonotal dorsum with 3 pairs of erect hairs.

..... *Paratrechina longicornis* (Latreille, 1802)

2aa. Hind tibia and tarsus without erect hairs.

bb. Mandible with 6 teeth.

cc. Mesonotal dorsum with a pair of erect hairs.

..... *Paratrechina otome* Terayama, 1999

3a. Promesonotal dorsum with more than 5 pairs of erect hairs.

..... *Paratrechina amia* (Forel, 1913)

3aa. Dorsa of pronotum and mesonotum each with 2 pairs of erect hairs.

..... 4

4a. Dorsum of propodeum with a pair of erect hairs.

b. Antennal segments 4 and 5 each wider than long.

c. Antennal scape just reaching or slightly exceeding the posterior margin of head.

..... 5

4aa. Dorsum of propodeum without erect hairs.

bb. Antennal segments 4 and 5 each longer than wide.

cc. Antennal scape exceeding the posterior margin of head by its 3/10 length at least.

..... 6

5a. Body light brown to yellowish brown.

..... *Paratrechina sauteri* (Forel, 1913)

5aa. Body blackish brown (restricted in high mountain more than 2,500 m in altitude).

..... *Paratrechina kongming* **sp. nov.**

6a. Head and alitrunk jet black.

b. Gaster black (distributed in high mountain more than 3,000 m in altitude).

..... *Paratrechina guanyin* **sp. nov.**

6aa. Head and alitrunk yellowish brown.

bb. Second and 3rd gastral terga each with dark brown anterior and yellowish posteior portions.

..... *Paratrechina yaeyamensis* Terayama, 1999

6aaa. Head and alitrunk blackish brown.

bbb. Gaster concolorous blackish brown.

..... *Paratrechina ryukyuensis* Terayama, 1999

Paratrecina guanyin sp. nov.

(Fig. 328)

Diagnosis. Separated from *Paratrechina ryukyuensis, P. flavipes*, and *P. yaeyamensis* by the jet black body color.

Description. Holotype worker. Head 1.11 times as long as wide, with even concave posterior margin and convex sides in full face view; posterolateral corner round, not forming distinct angle; frons and vertex smooth and shining. Mandible with 6 teeth. Antenna relatively long; scape exceeding posterior margin of head by 2/5 its length, with several long erect or suberect hairs; 3rd to 5th segment each longer than wide. Eye 0.14 mm in maximum diameter.

Pronotum smooth and shining, with 2 pairs of erect hairs; mesonotum smooth and shining, with 2 pairs of erect hairs; the longest hair ca. 0.10 mm long; metanotal groove incised dorsally; propodeum with convex dorsal margin; posterodorsal corner well convex, posterior margin steep and straight. Petiolar node thin and high.

Gaster smooth and shining.

Measurements (mm). HL 0.59, HW 0.53, SL 0.76, WL 0.75, PL 0.13, PH 0.20, DPW 0.13, TL 2.0.

Color. Body jet black; mandible, antenna and legs yellowish brown.

Holotype. Worker, Tayulin (3,000 m asl), Nantou Pref., 20-21. ix. 1997, Sk. Yamane leg.

Paratype. 1w, same date as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Guanyin (観音) which is the name of a Taiwanese goddess.

Remarks. *Paratrechina ryukyuensis* and *P. yaeyamensis* are commonly distributed from the lowland to mountain area until 2,500 m in altitude. On the other hand, *P. guanyin* is high mountain species, distributed in the area at about 3,000 m in altitude.

Paratrechina kongming sp. nov.

(Figs. 327)

Diagnosis. Resembles *Paratrechina sauteri* (Forel, 1913), by the small body size, short antennal scape, and a pair of erect hairs on the dorsum of propodeum, however, easily separated from the latter by the blackish brown body and larger body size (body yellowish brown and HL ca. 0.40 mm, HW ca. 0.32 mm, TL ca. 1.1 mm in *sauteri*).

Description. Holotype worker. Head almost as long as wide, with straight posterior margin and convex sides in full face view. Mandible with 5 teeth. Antenna relatively short; scape short, exceeding posterior margin of head by 1/5 its length, with short decumbent hairs, but without long erect or suberect hairs; 3rd segment as long as wide; 4th and 5th segments each wider than long. Eye 0.10 in maximum diameter.

Pronotum with weakly convex dorsal margin, and with 2 pairs of erect hairs; mesonotum with 2 pairs of erect hairs; metanotal groove shallowly incised dorsally; popodeum with convex dorsal margin and with a pair of erect hairs. Petiole small and low, scale acute triangular in profile.

Measurements (mm). HL 0.53, HW 0.51, SL 0.56, WL 0.65, PL 0.13, PH 0.13, DPW 0.10, TL 1.7.

Color. Blackish brown; antennal 1-3 segments yellowish brown, 4-12 segments brown; legs yellowish brown.

Holotype. Worker, Tayulin (3,000 m asl), Nantou Pref., 21. ix. 1999, Sk. Yamane leg.

Paratype. 1w, same data as the holotype.

Type depository. NIAES.

Etymology. The specific epithet is the Chinese noun Kongming (孔明) which is the name of a Taiwanese god.

Remarks. This species is confined to the altitudes higher than 3,000 m.

Genus *Plagiolepis* Mayr, 1861

Taxonomy and morphology. Small ants; workers around 4 mm or less. Body light yellow to black. Eye large, with 20 or more facets. Three ocelli present but small and often obscure. Antenna 11-segmented; scape slightly exceeding posterior margin of head. palpal formula 6 : 4. Pronotum short; mesonotum small; mesonotum and mesopleuron separated by a shallow groove with transverse short striae. Petiole small, with small, rounded node.

Biology. They are found in habitats ranging from open land to woodland, nesting under stones or logs.

Distribution. This genus comprises eighty-six species, and is distributed in the tropics to temperate zones of Africa and Eurasia. Three species are known from Taiwan of which one is described as a new to science herein.

Taiwanese species: *Plagiolepis alluaudi* Emery, 1909 (= *P. mactavishi* Wheeler, 1908); *P. exigua* Forel, 1894; *P. longwang* **sp. nov.**

Key to species of *Plagiolepis*

1a. Body pall yellow.
..... *Plagiolepis alluaudi* Emery, 1909

1aa. Body black to brownish black.
..... 2

2a. Small species; TL less than 2.0 mm.
..... *Plagiolepis exigua* Forel, 1894

2aa. Larger species; TL ca. 2.8 mm.
..... *Plagiolepis longwang* **sp. nov.**

Plagiolepis longwang sp. nov.

(Figs. 296, 297)

Diagnosis. This species is separated from the East Asian congeners by the black color and the large body size.

Description. Holotype worker. Head slightly longer than wide, with straight posterior margin and convex sides in full face view; frons and vertex smooth and shining. Antennal scape exceeding posterior margin of head by 1/3 its length, without distinct hairs; 3rd to 11th (terminal) segments each longer than wide. Eye 0.18 in maximum diameter.

Pronotum smooth and shining, with 3-4 pairs of erect hairs on the dorsum; mesonotum with a pair of erect hairs; metanotal groove incised dorsally; propodeum shining, with flat dorsum, with a pair of erect hairs in profile; in dorsal view, dorsal disc broad and trapezoidal, widest at posteriorend, as long as maximum width; maximum width 0.37 mm. Petiole low, longer than high, scale obtuse triangular; anterior margin steeper than posterior margin.

Gaster smooth and shining.

Measurements (mm). HL 0.76, HW 0.73, SL 0.73, WL 0.95, PL 0.31, PH 0.24, DPW 0.18, TL 2.8.

Color. Body black; antenna dark brown.

Holotype. Worker, Chaochow, Pongtung Pref., 25. ix. 1986, J. C. Lien leg.

Type depository. 2w, same data as the holotype; 1w, Chihpenxi, Taidong Pref., 17. v. 1986, J. C. Lien leg.

Etymology. The specific epithet is the Chinese noun Longwang (龍王), which is the name of a Taiwanese god.

Genus *Prenolepis* Mayr, 1861

Taxonomy and morphology. Small to moderate-sized ants: total length of workers around 2-6.5 mm. Antennal scape long, without erect hairs. Eye situated behind the midlength of head. Mesosoma as a whole dumbbell-shaped in dorsal view: prothorax and propodeum wide and globular; mesonotum narrow, its width less than half the pronotal width in dorsal view.

Biology. *Prenolepis* ants generally nest directly in the soil. The main food is liquid obtained from plants and aphids.

Distribution. This genus comprises 25 species, and are distributed in southeastern Europe and Asia, and one in North America. Three undetermined species have been known to occur in Taiwan (Lin & Wu, 2003).

Taiwanese species: *Prenolepis* sp. 1; *P.* sp. 2; *P.* sp. 3.

Genus *Pseudolasius* Emery, 1877

Taxonomy and morphology. Dimorphic species; large worker with disproportionately large head, and small worker with usual size. Eye small. Antenna with 12 segments. Mandible triangular with 4-6 teeth. Labial palpi with 2-4 segments. Promesonotum largely convex; metanotal groove incised dorsally; propodeum convex in profile. Petiole higher than long.

Biology. Nests are found in the soil of forests or forest edges.

Distribution. Sixty-four species are distributed in the tropics and subtropics in the world.

Taiwanese species: *Pseudolasius binghami taivanae* Forel, 1912; *P. sauteri* Forel, 1913.

Remarks. *Pseudolasius sauteri* is known from the female (queen) only. Judging from the original description, *sauteri* is separated from *P. binghami taivanae* by the few hairs and pubescences on the body, wide head, and smaller eyes.

Tribe Camponotini

Genus *Camponotus* Mayr, 1861

Taxonomy and morphology. Medium- to large-sized ants: total length of workers ranging from 2.5 mm to over 25 mm; most are over 4 mm long. Eye large; ocelli absent in the worker. Antennal insertion well separated from posterior margin of clypeus. Antenna 12-segmented. Dorsal outline of alitrunk evenly arched in profile in at least the Taiwanese species. Petiole with a thick scale, without spines or teeth. Metapleural grand orifice absent.

In many species worker size quite variable. In some species, the worker caste with two morphologically distinct subcastes, larger one often being called soldier.

This genus has been divided into many subgenera, whose boundary is often unclear. The subgenus *Colobopsis* is often regarded as an independent genus, and the recent molecular phylogenetic study also suggest that *Colobopis* is an independent genus. It is tentatively treated *Colobopsis* as a subgeneric state in this paper.

Biology. Nesting habits vary from subterranean to arboreal. Foraging times vary among species, with some found during the days and others found only at night. They are general scavengers and predators and will collect nectar and plant secretions, and tend aphids and coccids for honeydew.

Distribution. *Camponotus* is one of the largest genus, including 1,584 described species. It is widely distributed from the tropics to cool temperate regions of the world. In Taiwan, this genus has the largest number of species, counting 15, of which several species are nomenculaturally undetermined. It is tentatively divided into 6 subgenera.

Taiwanese species: Subgenus *Camponotus:* *Camponotus formosensis* Wheeler, 1909.

Subgenus *Myrmamblys*: *Camponotus lighti* Wheeler, 1927.

Subgenus *Paramyrmambly*: *Camponotus kiusiuensis* Santschi, 1937, **new record**.

Subgenus *Myrmentoma*: *Camponotus treubi* Forel, 1910 (= *C. treubi* var. *arnoldi* Forel, 1912; =

C. itoi var. *genaiai* Santschi, 1928, provisionally).

Subgenus *Tanaemyrmex*: *Camponotus albosparsus* Bingham, 1903 (= *C. albosparsus* var. *formosae* Wheeler, 1909); *C. carin tipunus* Forel, 1913 (= *C. dorycus* var. *tipunus* Forel, 1913); *C. friedae* Forel, 1912 (= *C. friedae* var. *amia* Forel); *C. habereri* Forel, 1911; *C. irritans* F. Smith, 1867; *C. monju* Terayama, 1999; *C. siemsseni* Forel, 1901; *C. variegatus dulcis* Dalla Torre, 1893 (*C. variegatus* var. *dulcis* Emery, 1889); *C. nicobarensis* Mayr, 1865, **new record.**

Subgenus *Colobopsis*; *Camponotus taivanae* Forel, 1913 (= *C. rothneyi* var. *taivanae* Forel, 1913, **state nov.**).

Species excluded from the Taiwanese fauna: *Camponotus vitiosus* F. Smith, 1874 (= *C.* (*Myrmamblys*) *itoi tokioensis* Ito, 1912, in Forel, 1913); *C. punctatissimus* Forel, 1907.

Quadriniminal infrasubspecific unavailable name: *Camponotus maculates taylori* var. *formosae* Forel, 1912.

Remarks. Although Wang & Wu (1989) recorded *Camponotus itoi tokioensis* (current scientific name is *C. vitiosus*) from Taiwan, Taiwanese population should be different species by the examining the material between Taiwan and Japan. *C. rothneyi* var. *taivanae* is raised to the species rank, since it is indicated the different shape of petiole from the nomonotypical subspecies, *C. r. rothneyi* from India. A possible type specimen of *taiwanae* is preserved in TARI (female (gaster lost), labeled as Koshun, iv. 1918 [coll. Shiraki]). *C. nicobarensis*, large and reddish species, is recorded from Taiwan for the first time (collection data: 3w, Taidong City, 2. x. 1993, M. Terayama leg.; 5w, Hengchun, Pingdong Pref., 5. x. 1993, M. Terayama leg.). This species is widely distributed from India, Indo-China, to southern China (Gunagdong, Guangxi, Hong Kong, Yunnan, Hainan is.). *Componotus kiusiuensis* Santschi, 1937, in the subgenus *Paramyrmamblys* is also recorded from Taiwan for the first time (collection data: 5w, Nanshanxi, Nanfeng-Cun, Nantou Pref., 11. vii. 1982, M. Terayama leg., collected in a dead twig in forest). The subgenus *Paramyrmamblys* is comprises 16 species, and *kiusiuensis* is distributed in Japan, Korea and Taiwan.

Key to species of *Camponotus* (Taxonomically ambiguous several taxa are excluded in this key.)

1a. Head of the major worker and queen truncated apically.

b. Fore femur of the minor worker strongly broadened.

c. Posterodorsal corner of propodeum forming a right angle in profile; propodeal dorsum seen from above narrow in the minor.

..... *Camponotus taivanae* Forel, 1913

1aa. Head of the major and queen not truncated apically.

bb. Fore femur of the minor not strongly broadened (with a few exceptions).

cc. Posterodorsal corner of propodeum forming an obtuse angle in profile (with a few exceptions); propodeal dorus seen from above wider in the minor.

..... 2

2a. Mesonotum and propodeum red to yellow.

..... 3

2aa. Mesonotum and propodeum blackish brown to black.

..... 5

3a. First to 4th gastral terga each with brownish broad band, and anterior portion and posterior margin whitish in each tergite; large species with reddish head and alitrunk.

..... *Camponotus habereri* Forel, 1911

3aa. Gaster black with a pair of yellow spots on the 1st and 2nd terga.

..... *Camponotus albosparatus* Bingam 1903

3aaa. First to 4th gastral terga each with subtriangular, brown infuscations at posterior margin; anterior margin yellow.

..... *Camponotus variegates dulcis* Emery, 1889

3aaaa. First and 2nd gastral terga reddish brown; 2nd tergum varies from reddish brown in anterior half to whole portion reddish brown; 3rd to tip of gaster blackish.

..... *Camponotus nicobarensis* Mayr, 1865

3aaaaa. Gastral terga concolourous black or blackish brown, 1st and 2nd terga without pale spots.

..... 4

4a. Dorsum of pronotum with erect hairs.

b. Head and gaster with abundant erect hairs.

..... *Camponotus monju* Terayama, 1999

4aa. Dorsum of pronotum without erect hairs.

bb. Head and gaster with erect hairs moderately.

..... *Camponotus siemsseni* Forel, 1901

5a. Alitrunk with more than 10 long erect hairs dorsally.

b. Posterodorsal corner of propodeum with a right angle in profile; posterior margin of propodeum steeply sloping.

..... *Camponotus friedae* Forel, 1912

5a. Alitrunk with less than 10 long erect hairs dorsally.

b. Posterodorsal corner of propodeum with an obtute angle in profile; posterior margin of propodeum gently sloping.

..... 6

6a. Larger species; total length more than 7 mm (body including legs black).

b. Body black, with numerous long golden standing hairs from head to gaster.

c. Anterior margin of clypeus truncated, without incision.

..... *Camponotus formosensis* Wheeler, 1909

6aa. Larger species; total length more than 7 mm (body black; legs yellowish brown to brown).

bb. Dorsum of alitrunk with a few hairs, without golden hairs.

cc. Anterior margin of clypeus incised medially.

..... *Camponotus kiusiuensis* Santschi, 1937

6aaa. Smaller species; total length less than 7mm.

bbb. Body without long golden hairs.

ccc. Anterior margin of clypeus truncated or weakly incised medially.

..... 7

7a. Propodeal dorsum almost straight, very weakly concave in profile.

b. Dorsum of promesonotum and propodeum without erect hairs.

c. Anterior margin of clypeus weakly incised medially.

..... *Camponotus treubi* Forel, 1910

7aa. Propodeal dorsum strongly concave in profile.

bb. Dorsum of promesonotum and propodeum with erect hairs.

cc. Anterior margin of clypeus truncated.

..... *Camponotus lighti* Wheeler, 1927

Genus *Polyrhachis* Smith, 1857

Taxonomy and morphology. Medium- to large-sized ants: total length 5-10 mm. Eye developed; ocelli absent in the worker. Antenna 12-segmented; antennal insertion situated far from posterior margin of clypeus. Alitrunk often with spines on pronotum, mesonotum and/or propodeum. Petiole armed with spines or teeth. Gastral tergum 1 well developed, in dorsal view longer than exposed parts of the following terga together. Opening at gastral apex lacking a radial fringe of hairs.

Bology. Many species are arboreal in nesting habits, and some species nest in the soil or at roots of trees. *P. dives* builds a nest made of woven leaves and dead twigs together using final

inster larval silk. Nests are found on grasses or trees. This is a polygynous species and an average of 50 queens are found in a nest. *P. lamellidens* is a temporal social parasitic species. A queen invades a nest of *Camponotus* species, and takes over the nest.

Distribution. This is a large genus, comprises 603 described species, and is distributed mostly in tropical and subtropical areas, excluding those of the New World. It is the second largest genus next to *Camponotus* within this subfamily. There are 9 known Taiwanese species in 4 subgenera.

Taiwanese species: Subgenus *Polyrhachis*: *Polyrhachis lamellidens* F. Smith, 1887.

Subgenus *Cyrtomyrma*: *Polyrhachis rastellata* Latreille, 1802.

Subgenus *Myrma*: *Polyrhachis latona* Wheeler, 1909; *P. illaudata* Walker, 1859 (= *P. mayri* Roger, 1863; = *P. latona* var. *dorsirugosa* Forel, 1913); *P. murina* Emery, 1878; *P. pyrgops* Viehmeyer, 1912; *P. wolfi* Forel, 1912.

Subgenus *Myrmhopla*: *Polyrhachis dives* F. Smith, 1857 (= *P. dives* var. *euclides* Forel, 1913); *Polyrhachis moesta* Emery, 1887 (= *P. hyppomanes* var. *moesta* Emery, 1887).

Species excluded from the Taiwanese fauna: *Polyrhachis tyrannicus* F. Smith, 1858.

Remarks. *Polyrhachis dives* var. *euclides* described by Forel (1913) was myrmithergate of *P. dives* F. Smith (Hung, 1966). *Polyrhachis tyrannicus* known from continental China is excluded from the Taiwanese fauna, since no reliable record is present in Taiwan.

Key to species of *Polyrhachis*

1a. Mesosoma without teeth or spines.

b. Dorsum of alitrunk strongly convex in profile.

..... *Polyrhachis rastellata* Latreille, 1802

1aa. Mesosoma with teeth or soines.

bb. Dorsum of alitrunk modelately convex to almost straight in profile.

..... 2

2a. Body bicolorous; alitrunk red; head and gaster black.

b. Mesonotum with a pair of teeth dorsally.

..... *Polyrhachis lamellidens* F. Smith, 1887

2aa. Body concolorous black or jet-black.

bb. Mesonotum without teeth.

..... 3

3a. Dorsum of alitrunk flat; dorsolateral margin carinate.

..... 4

3aa. Dorsum of alitrunk convex; dorsolateral margin not carinate.
..... 8

4a. Head and antennal scape withour long erect or suberect hairs.
b. Eye weakly convex in full face view.
..... 5

4aa. Head and antennal scape abundant with long erect or suberect hairs.
bb. Eye produced laterally, and strongly convex or triangular in full face view.
..... 7

5a. Pronotal spine short.
b. Two pairs of spines of petiolar scale almost the same length.
..... *Polyrhachis murina* Emery, 1878

5aa. Pronotal spine longer.
bb. Inter pair of spines of petiolar scale longer than outer pairs.
..... 6

6a. Frontal carina thick.
b. Outer pair of spines of petiolar scale with acute tip.
..... *Polyrhachis illaudata* Walker, 1859

6aa. Frontal carina thin.
bb. Outer pair of spines of petiolar scale with truncate tip.
..... *Polyrhachis latona* Wheeler, 1909

7a. Eye almost half-sphere and U-shaped outer margin in full face view.
..... *Polyrhachis wolfi* Forel, 1912

7aa. Eye conic, outer margin dull but distinctly angulate in full face view.
..... *Polyrhachis pyrgops* Viehmeyer, 1912

8a. Pronotal humerus without a tooth.
b. Body jet-black; legs reddish.
..... *Polyrhachis moesta* Emery, 1887

8aa. Pronotal humerus armed with a tooth.
bb. Body including legs black.
..... *Polyrhachis dives* F. Smith, 1857

Tribe Formicini

Genus *Formica* Linnaeus, 1758

Taxonomy and morphology. Medium-sized ants. Eye relatively large; workers with distinct ocelli. Antenna with 12 segments. Mandible triangular, with 5-12 teeth. Promesonotal dorsum convex in profile. Metanotal groove distinctly incised dorsally. Propodeum distinctly lower than promesonotum in profile. Propodeal spiracle positioned far from posterior margin of propodeum, slit-shaped. Petiolar scale thin and high.

Bolton (1995) rejected the subgeneric status in this genus, and tentatively separated this genus to 7 species groups.

Biology. Nests are found in the soil of sunny open areas, grasslands and at forest edges. *F. yessensis* make distinct mound which is made by gathered decaided leaves and twigs.

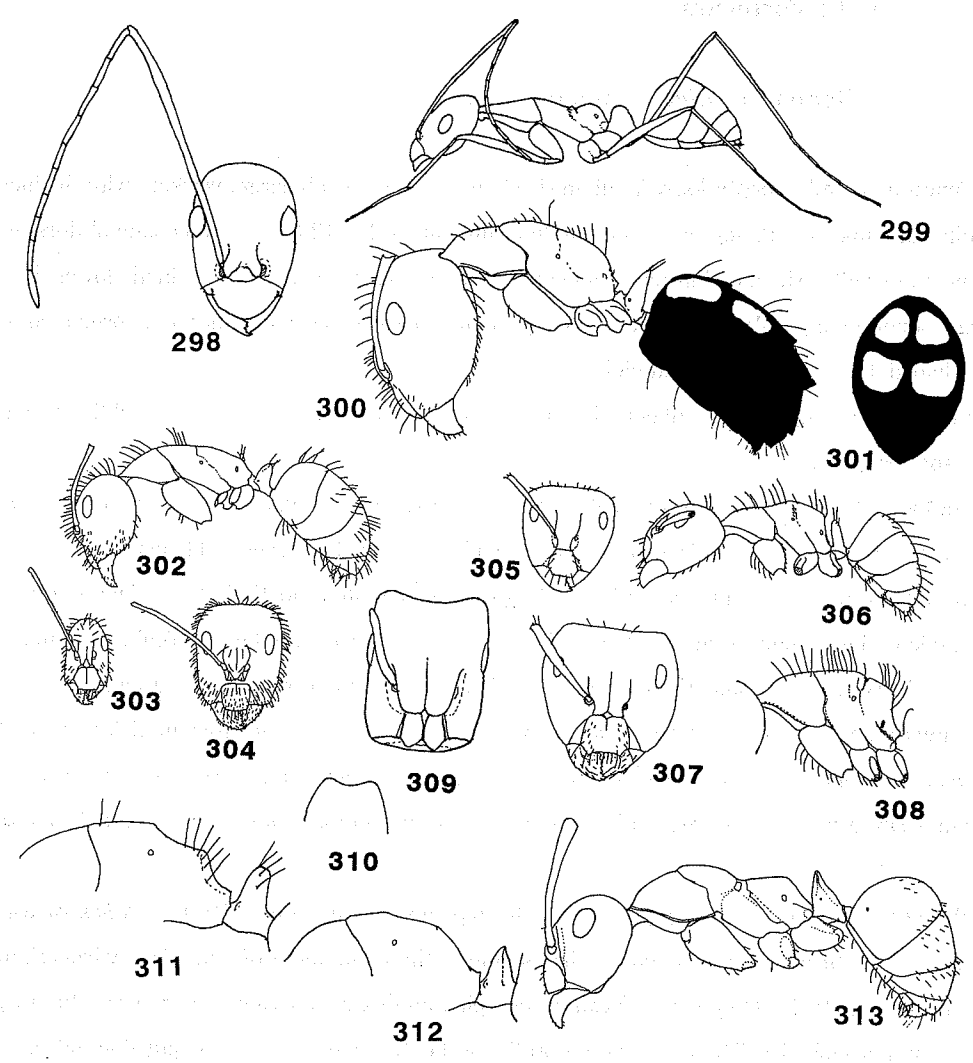
Distribution. This genus comprises 343 species distributed mostly in the Palaearctic and Nearctic regions. Four species are known from Taiwan, of which 2 are taxonomically ambiguous to me. *F. yessensis* and *F. japonica* are distributed in the mountainous regions in Taiwan.

Taiwanese species: *Formica yessensis* Wheeler, 1913; *F. japonica* Motschoulsky, 1866; *F. obsidiana* Emery, 1923; *F. candida formosae* Emery, 1925 (= *F. picea* var. *formosae* Emery, 1925).

Quadrinominal infrasubspecific unavailable name: *Formica fusca r. picea* var. *formosae* Forel, 1913.

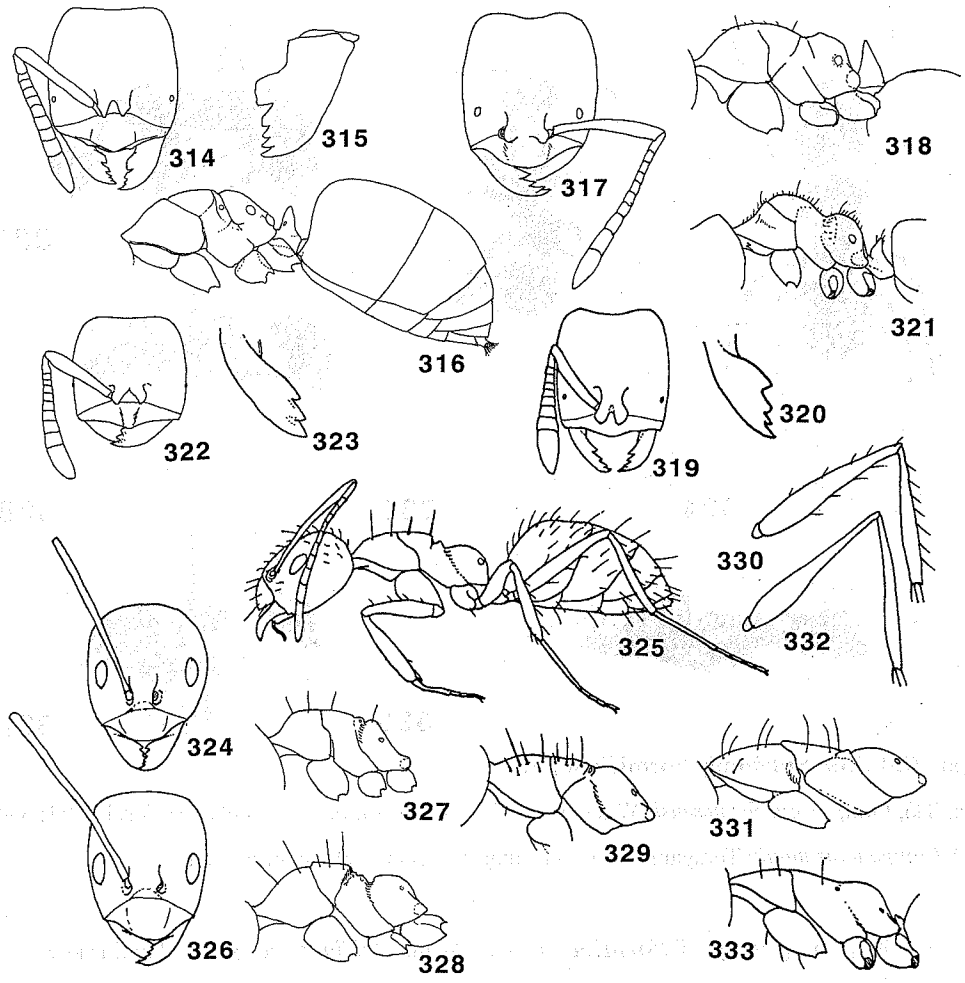
Remarks. Recent study suggested that the Japanese population of *Formica japonica* was separated 4 sibring species by comparisons among the component of cuticular hydrocarbon (Akino et al., 2002). They form '*japonica*'-complex and extremely hard to separate them by external morphologies. The hydrocarbon profile of the Taiwanese *japonica* population indicated that another component profiles (Terayama & Akino, unpublished data). So it is suggested that Taiwanese population is an independent species as *F. japonica*. However, I tentatively applied the Taiwanese population as the scientific name *F. japonica* in this paper.

First available use of *Formica rufa* r. *trunciola* var. *yessensis* Forel, 1901, is *F. trunciola* var. *yessensis* Wheeler, 1913. Therefore current scientific name is *F. yessensis* Wheeler, 1913, not Forel, 1901. First available use of *Formica fusca r. picea* var. *formosae* Forel, 1913 is *F. picea* var. *formosae* Emery, 1925. *F. obsidiana* Emery, 1923 was described by female only, and workers have not been known up to the present.



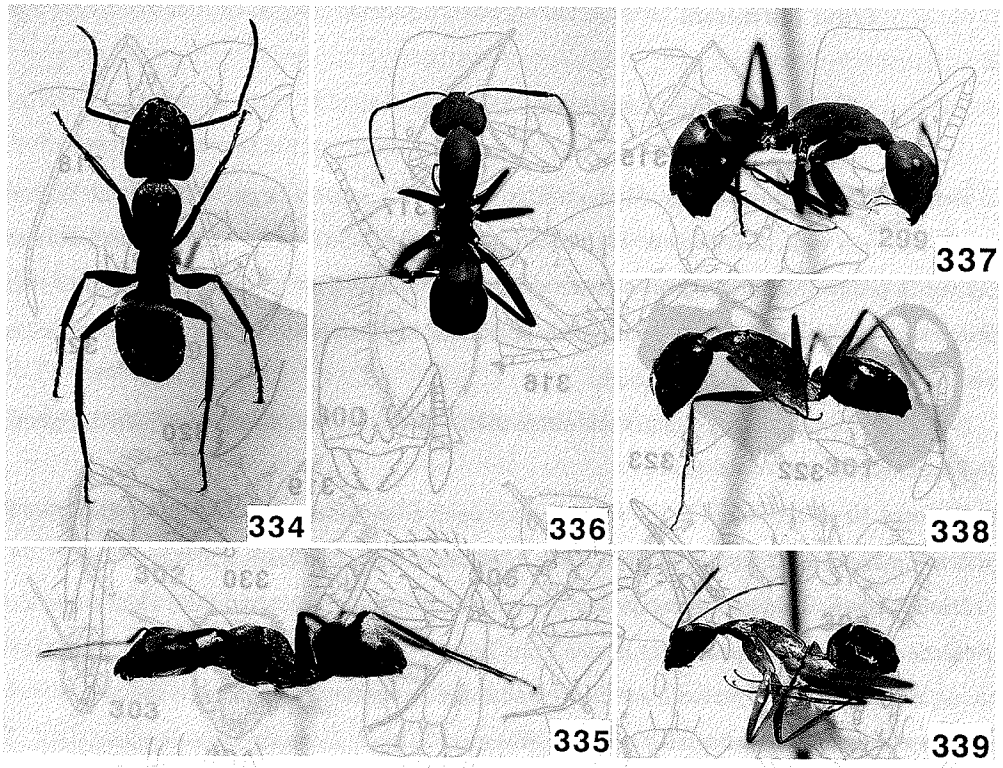
Figs. 298-313, Subfamily Formicinae, 2.

298, 299, *Anoplolepis gracillipes* (F. Smith, 1857); 300, 301, *Camponotus albosparsus* Bingham, 1903; 302-304, *Camponotus monju* Terayama, 1999, 303, minor worker, 302, 304, major worker; 305-308, *Camponotus friedae* Forel, 1912, 305, 306, minor worker, 307, 308, major worker; 309, 310, *Camponotus taivanae* Forel, 1913, major worker, 310, petiolar scale, frontal view; 311, *Camponotus lighti* Wheeler, 1927; 312, *Camponotus treubi* Forel, 1910; 313, *Formica japonica* Motschulsky, 1866.



Figs. 314-333, Subfamily Formicinae, 3.

314-316, *Acropyga butteli* Forel 1912; 317, 318, *Acropyga yushi* **sp. nov.**; 319-321, *Acropyga yaeyamensis* Terayama & Hashimoto, 1996; 322, 323, *Acropyga sauteri* Forel, 1912; 324, 325, *Paratrechuna yaeyamensis* Terayama, 1999; 326, *Paratrechina ryukyuensis* Terayama, 1999; 327, *Paratrechina guanyin* **sp. nov.**; 328, *Paratrechina kongming* **sp. nov.**; 329, *Paratrechina amia* (Forel, 1913); 330, 331, *Paratrechina longicornis* (Latreille, 1802), 330, hind leg; 332, 333, *Paratrechina otome* Terayama, 1999, 332, hind leg.



Figs. 334-339, Subfamily Formicinae, 4.

334, 335, *Camponotus formosensis* Wheeler, 1927; 336, 337, *Camponotus habereri* Forel, 1911; 338, 339, *Camponotus monju* Terayama, 1999, 338, major worker, 339, minor worker.

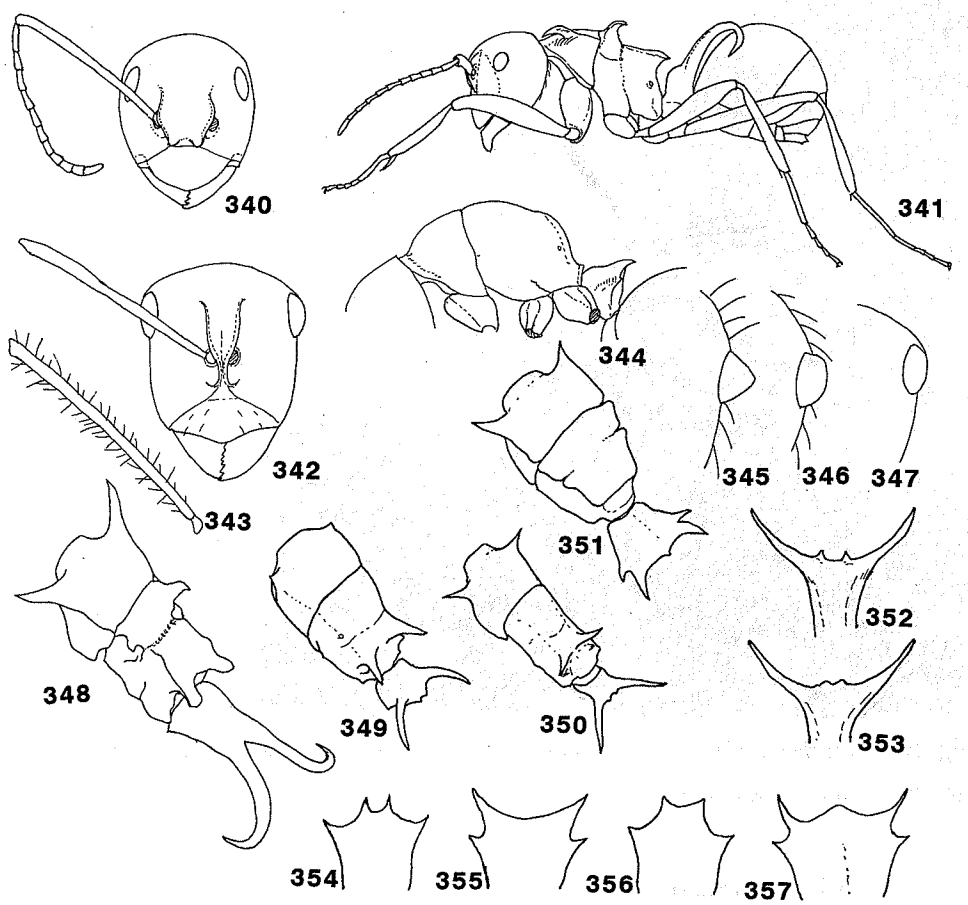
Key to species of *Formica* (*F. candida* and *obsidiana* are excluded in this key.)

1a. Head and alitrunk red, gaster blackish.

……*Formica yessensis* Wheeler, 1913

1aa. Body uniformly grayish black.

…… *Formica japonica* Motschoulsky, 1866



Figs. 340-357, Subfamily Formicinae, 5.

340, 341, 348, *Polyrhachis lamellidens* F. Smith, 1887; 342, 347, 351, 357, *Polyrhachis latona* Wheeler, 1909, 347, eye, full face view, 357, petiole, frontal view; 343, 346. *Polyrhachis wolfi* Forel, 1912, 343, antennal scape, 346, eye, full face view; 344, 354, *Polyrhachis rastellata* Latreille, 1802, 354, petiole, frontal view; 345, *Polyrhachis pyrgops* Viehmeyer, 1912, eye, full face view; 349, 352, *Polyrhachis moesta* Emery, 1887, 352, petiole frontal view; 350, 353, *Polyrhachis dives* F. Smith, 1857, 353, petiole, frontal view; 355, *Polyrhachis illaudata* Walker, 1859, petiole, frontal view; 356, *Polyrhachis murina* Emery, 1878, petiole, frontal view.

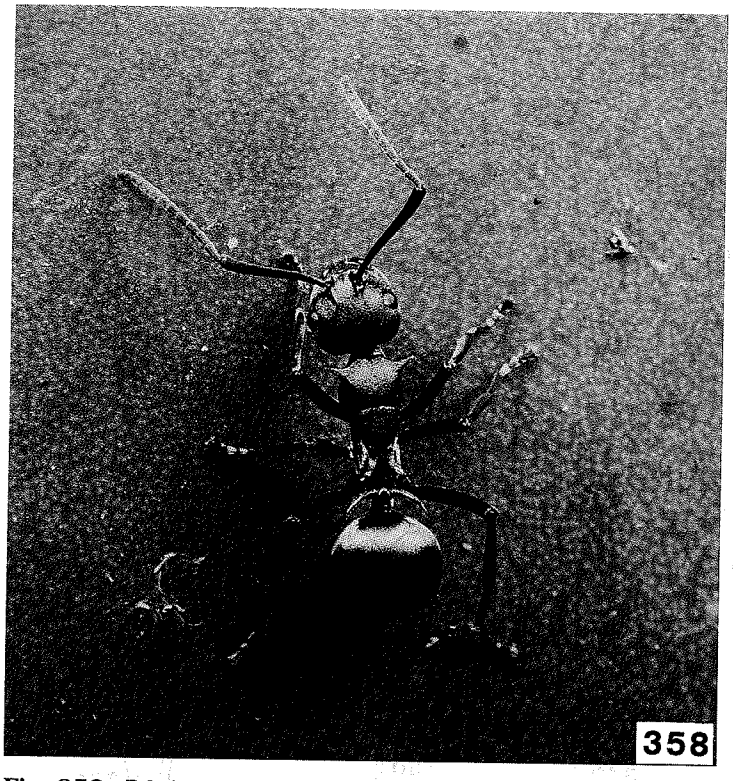


Fig. 358. *Polyrhachis dives* F. Smith, 1857, taken at Nanshanxi, Nanfen-Cun, Nantou Pref. in 21. viii. 1987 (photo: S. Kubota).

A list of ants of Taiwan

Figures in parentheses of subfamily names are numbers of genera and species.

Subfamily Amblyoponinae (2, 5)

Tribe Amblyoponini

Amblyopone bruni (Forel, 1912)

Stigmatomma bruni Forel, 1912 [Transferred to *Amblyopone* by Brown, 1960.]

Stigmatomma bruni juergi Forel, 1922 [Synonymized with *bruni* by Brown, 1960.]

Amblyopone zaojun **sp. nov.**

Amblyopone sakaii Terayama, 1989

Amblyopone silvestrii (Wheeler, 1928)

Prionopelta kraepelini Forel, 1905

Subfamily Proceratiinae (3, 5)

Tribe Proceratiini

Discothyrea sauteri Forel, 1912

Discothyrea globus var. *sauteri* Forel, 1912 [Raised to specific rank by Brown, 1958.]

Discothyrea yueshen **sp. nov.**

Proceratium japonicum Santschi, 1937

Proceratium formosicola Terayama, 1985 [Synonymized with *japonicum* by Onoyama, 1991.]

Proceratium itoi (Forel, 1917)

Tribe Probolomyrmecini

Probolomyrmex longinodus Terayama & Ogata, 1988

Subfamily Ectatomminae (1, 1)

Tribe Ectatommini

Gnamptogenys taivanensis (Wheeler, 1929)

Stictoponera taivanensis Wheeler, 1929 [Transferred to *Gnamptogenys* by Brown, 1958.]

Subfamily Ponerinae (11, 39)

Tribe Ponerini

Anochetus subcoecus Forel, 1912

Anochetus taiwaniensis Terayama, 1989

Anochetus taiwanensis [sic.] Terayama, 1989. [Misspelled as *taiwaniensis*. Zool. Rec., 129 (1990).]

Anochetus sp. 1 [Lin & Wu, 2003.]

Anochetus sp. 2 [Lin & Wu, 2003.]

Centromyrmex feae (Emery, 1889)

Cryptopone butteli Forel, 1913

Cryptopone taivanae (Forel, 1913)

Euponera taivanae Forel, 1913 [Transferred to *Cryptopone* by Brown, 1963.]

Euponera takahashii Wheeler, 1930 [Transferred to *Cryptopone* by Brown, 1963.]

Cryptopone takahashii (Wheeler, 1930) [Provisional synonymy of *Cryptopone taivanae* by Terayama, 1989.] **Syn. nov.**

Diacamma sp.

Diacamma rugosum sclptum (Jerdon, 1851) [Wheeler, 1909.]

Diacamma rugosum var. *anceps* Matsumura & Uchida, 1926 [First available use of *Diacamma rugosum vagans* var. *anceps* Emery, 1896. Possibly misidentification, see Viginier et al, 2004.]

Diacamma rugosum vagans var. *anceps* Emery, 1896 [Unavailable name. Forel, 1912.]

Hypoponera beppin Terayama, 1999

Hypoponera biroi (Emery, 1900)

Hypoponera schauinslandi (Emery, 1899)

Hypoponera bondroiti (Forel, 1911) [Synonymized with *schauinslandi* by Seifert, 2003.]

Hypoponera greadowi (Forel, 1895)

Ponera japonica formosae Forel, 1913 [Synonymized with *greadowi* by Taylor, 1967.]

Hypoponera nippona (Santschi, 1937)

Hypoponera opaciceps (Mayr, 1887)

Ponera perkinsi Forel, 1899 [Synonymized with *opaciceps* by Wilson & Taylor, 1967.]

Hypoponera sauteri Onoyama, 1989

Ponera gleadwi decipiens var. *sauteri* Forel, 1912 [Unavailable name.]

Hypoponera sauteri Onoyama, 1989 [First available use of *Ponera gleadwi decipiens* var. *sauteri* Forel, 1912.]

Hypoponera truncata (F. Smith, 1861)

Hypoponera zwaluwenburgi (Wheeler, 1933)

Leptogenys confucii Forel, 1912

Leptogenys diminuta (F. Smith, 1857)

Leptogenys diminuta palliseri Forel, 1900. [Wheeler, 1930. See Terayama, 1990.]

Leptogenys kitteli Mayr, 1870

Leptogenys chinensis Mayr, 1870

Myopias nops Willey & Brown, 1983

Odontomachus monticola Emery, 1892

Odontomachus monticola var. *formosae* Forel, 1912 [Synonymized with *monticola* by Yasumatsu, 1962.]

Odontomachus monticola var. *major* Forel, 1913 [Synonymized with *monticola* by Yasumatsu, 1962.]

Odontoponera transversa (F. Smith, 1857)

Ponera alisana Terayama, 1986

Ponera chiponensis Terayama, 1986

Ponera takaminei Terayama, 1996

Ponera tamon Terayama, 1996

Ponera rishen **sp. nov.**

Ponera shennong **sp. nov.**

Ponera taiyangshen **sp. nov.**

Ponera yuhnang **sp. nov.**

Pachycondyla chinensis (Emery, 1895)

Brachyponera chinensis (Emery, 1895) [Transferred to *Pachycondyla* by Bolton, 1995.]

Euponera solitaria F. Smith, 1874 [Junior primary homonym of *Euponera solitaria* F. Smith, 1860.]

Pachycondyla darwinii (Forel, 1893)

Belonopelta darwinii Forel, 1893 [Transferred to *Pachycondyla* by Emery, 1900,]

Pacycondyla darwinii (Forel, 1893) [Transferred to *Trachymesopus* by Wilson, 1958.]

Trachymesopus darwinii (Forel, 1893) [Transferred to *Pachycondyla* by Bolton, 1995.]

Euponera darwinii var. *indica* Emery, 1899 [Forel, 1913. Provisional synonymy by Lin & Wu, 2003.]

Pachycondyla nigrita (Emery, 1895)

Brachyponera sp. [Terayama, 1990.]

Pachycondyla stigma (Fabricius, 1804)

Euponera stigma quadridentata F. Smith, 1858 [Synonymized with *stigma* by Wilson, 1958.]

Pachycondyla luteipes (Mayr, 1862)

Euponera luteipes Mayr, 1862 [Transferred to *Pachycondyla* by Bolton, 1995.]

Pachycondyla horni Forel, 1913

Ectomomyrmex javanus Mayr, 1867 [Yasumatsu, 1962; Terayama, 1990. Transferred to *Pachycondyla* by Bolton, 1995. Tentatively applied *Pachycondyla horni* Forel to the Taiwanese population here, since *javana* (sensu Yasumatsu, 1962) should be separated by several species.]

Pachycondyla sauteri Forel, 1912 [See Bolton, 1995.]

Ectomomyrmex sauteri (Forel, 1912) [Unresolved junior primary homonym of *Pachycondyla sauteri* Wheeler, 1906 (Bolton, 1995). Provisional synonymy by Yasumatsu, 1962.]

Ectomomyrmex horni Forel, 1913 [Synonymized with *Ectomomyrmex javanus* Mayr, 1867 by Yasumatsu, 1962.]

Ectomomyrmex denticeps Wheeler, 1929. [Synonymized with *Ectomomyrmex javanus* Mayr, 1867 by Yasumatsu, 1962.]

Pachycondyla tianzun **sp. nov.**

Trachymesopus sharpi (Forel, 1901) [In Terayama, 1990. Misidentification.]

Subfamily Cerapachyinae (2, 6)

Tribe Cerapachyni

Cerapachys biroi Forel, 1907

Cerapachys longitarsus (Mayr, 1878)

Cerapachys reticulatus Emery, 1923

Cerapachys sauteri Forel, 1913

Cerapachys sp. [Lin & Wu, 2003.]

Simopone huode **sp. nov.**

Subfamily Aenictiinae (1, 6)

Tribe Aenictini

Aenictus ceylonicus (Mayr, 1866)

Aenictus ceylonicus var. *formosensis* Forel, 1917 [Synonymized with *ceylonicus* by Wilson, 1964.]

Aenictus latiscapus satoi Santschi, 1937

Aenictus lifuiae Terayama, 1984

Aenictus longi taivanae Forel, 1913

Aenictus punctiventris Emery, 1901

Aenictus sp. [Hung et al., 1972.]

Subfamily Liptanillinae (2, 2)

Teibe Leptanillini

Leptanilla taiwanensis Ogata, Terayama & Masuko, 1995

Tribe Anomalomyrmini

Protanilla lini **sp. nov.**

Subfamily Pseudmyrmecinae (1, 3)

Tribe Pseudomyrmecini

Tetraponera allaborans Walker, 1859

Tetraponera attenuata F. Smith, 1877

Tetraponera thagatensis Forel, 1907 [Synonymized with *attenuata* by Ward, 2001.]

Tetraponera modesta (F. Smith, 1860)

Subfamily Myrmicinae (29, 128)

Dacetine Tribe group

Tribe Basicerotini

Eurhopalothrix procera (Emery, 1897)

Rhopalothix sp. [Brown, 1949.]

Tribe Dacetini

Pyramica sauteri (Forel, 1912)

Pentastruma sauteri Forel, 1912 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica formosa (Terayama, Lin & Wu, 1995)

Epitritus formosus Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica hexamera (Brown, 1958)

Epitritus hexamerus Brown, 1958 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica hirashimai (Ogata, 1990)

Epitritus hirashimai Ogata, 1990 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica mutica (Brown, 1949)

Kyidris mutica Brown, 1949 [Transferred to *Pyramica* by Bolton, 2000.]

Kyidris nuda Brown, 1949 [Synonymized with *mutica* by Brown, 1952.]

Pyramica takasago (Terayama, Lin & Wu, 1995)

Kyidris takasago Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica elegantula (Terayama & Kubota, 1989)

Smithistruma elegantula Terayama & Kubota, 1989 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica japonica (Ito, 1914)

Strumigenys japonicus Ito, 1914 [Transferrerred to *Smithistruma* by Brown, 1948.]

Smithistruma japonica (Ito, 1914) [Transferrerred to *Weberistruma* by Brown, 1949.]

Weberistruma japonica (Ito, 1914) [Transferrerred to *Pyramica* by Bolton, 2000.]

Pyramica leptothrix (Wheeler, 1929)

Strumigenys leptothrix Wheeler, 1929 [Transferred to *Smithistruma* by Brown, 1953.]

Smithistruma leptothrix (Wheeler, 1929) [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica benten (Terayama, Lin & Wu, 1995)

Smithistruma benten Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica formosimonticola (Terayama, Lin & Wu, 1995)

Smithistruma formosimonticola Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by

Bolton, 2000.]

Pyramica kichijo (Terayama, Lin & Wu, 1995)

Smithistruma kichijo Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica mazu (Terayama, Lin & Wu, 1995)

Smithistruma mazu Terayama, Lin & Wu, 1995 [Transferred to *Pyramica* by Bolton, 2000.]

Pyramica membranifera (Emery, 1869)

Trichoscapa membranifera (Emery, 1869) [Transferred to *Pyramica* by Bolton, 2000.]

Strumigenys chuchihensis Lin & Wu, 2001.

Strumigenys emmae (Emery, 1890)

Quadristruma emmae (Emery, 1890) [Trensferred to *Strumigenys* by Bolton, 1999.]

Strumigenys formosensis Forel, 1912

Strumigenys feae var. *formosensis* Forel, 1912 [Raised to specific rank by Brown, 1949.]

Strumigenys hispida Lin & Wu, 1996

Strumigenys konteiensis Lin & Wu, 2001

Strumigenys lacunosa Lin & Wu, 1996

Strumigenys lewisi Cmeron, 1886

Strumigenys godeffroyi Mayr, 1866 [In Lin & Wu, 1996. Misidentification.]

Strumigenys lichiaensis Lin & Wu, 1996

Strumigenys liukueiensis Terayama & Kubota, 1989

Strumigenys minutula Terayama & Kubota, 1989

Strumigenys nanzanensis Lin & Wu, 1996

Strumygenys orchidensis Lin & Wu, 2001

Strumigenys solifontis Brown, 1949

Strumigenys trada Lin & Wu, 1996

Solenopsidine tribe group

Tribe Stenammini

Lordomyrma sp. [Lin & Wu, 2003]

Vollenhovia acanthinas (Karavaiev, 1935) [Lin & Wu, 2003.]

Vollenhovia satoi Santschi, 1937

Vollenhovia shunfenger **sp. nov.**

Vollenhovia menshen **sp. nov.**

Vollenhovia xingjun **sp. nov.**

Teibe Solenopsidini

Anillomyrma sp. [Lin & Wu, 2003.]

Carebara amia (Forel, 1913)

Solenopsis amia Forel, 1913 [Transferred to *Aneleus* by Emery, 1923.]

Aneleus amius (Forel, 1913) [Transferred to *Oligomyrmex* by Ettershank, 1966.]

Oligomyrmex amia [sic.] (Forel, 1913) [Misspelled as *amius*. Trensferred to *Carebara* by Bolton et al., 2005.]

Carebara oni (Terayama, 1996)

Oligomyrmex oni Terayama, 1996 [Transferred to *Carebara* by Bolton et al., 2005.]

Carebara sauteri (Forel, 1912)

Oligomyrmex sauteri Forel, 1912 [Transferred to *Carebara* by Fernandez, 2004.]

Carebara qianliyan **sp. nov.**

Monomorium chinense Santschi, 1925

Monomorium destructor (Jerdon, 1851)

Monomorium floricola (Jerdon, 1851)

Monomorium hiten Terayama, 1997

Monomorium sechellense Emery, 1894

Monomorium fossulatum Emery, 1894 [Synonymized with *sechellense* by Bolton, 1995.]

Monomorium intrudens F. Smith, 1874

Monomoruim nipponense Wheeler, 1906 [Synonymized with *intrudens* by Bolton, 1987 (in text), Ogata & Bolton, 1989.]

Monomorium latinode Mayr, 1872

Monomorium pharaonis (Linnaeus, 1758)

Monomorium zhinu **sp. nov.**

Pheidologeton affinis (Jerdon, 1851)

Pheidologeton diversus (Jerdon, 1851)

Pheidologeton diversus fictus [sic.] Forel, 1911 [Misspelled as *ficta*. Provisionally synonymized with *diversus* by Lin & Wu, 2003. See also Emery, 1922.]

Pheidologeton yanoi Forel, 1912

Pheidologeton dentiviris Forel, 1913 [Provisionally synonymized with *yanoi* by Lin & Wu, 2003.]

Idrisella dentiviris (Forel, 1913) [Emery, 1922; Santschi, 1937. Transferred to *Pheidologeton* by Ettershank, 1966.]

Solenopsis geminata (Fabricius, 1840)

Solenopsis indagatrix Wheeler, 1928

Solenopsis invicta Buren, 1972

Solenopsis tipuna Forel, 1912

Formosimyrma lanyuensis **gen. et sp. nov.**

Myrmicine tribe group

Tribe Myrmicini

Myrmica formosae Wheeler, 1929

Myrmica margaritae var. *formosae* Wheeler, 1928 [Nomen nudum.]

Myrmica margaritae var. *formosae* Wheeler, 1929 [Raised to specific rank by Radchenko, 1994. Unreselved junior primary homonym of *formosa* F. Smith, 1858 (Bolton, 1995).]

Myrmica ritae formosae Wheeler, 1929 [Weber, 1950.]

Myrmica margaritae var. *pulchella* Santschi, 1937 [Synonymized with *formosae* by Elmes & Radchenko, 1998.]

Myrmica serica Wheeler, 1928

Myrmica ritae var. *serica* Wheeler, 1928 [Raised to specific rank by Radchenko, 1994.]

Myrmica arisana Wheeler, 1930

Myrmica rugosa var. *arisana* Wheeler, 1930 [Raised to specific rank by Elmes & Radchenko, 1998.]

Myrmica kurokii st. *tipuna* Santschi, 1937 [Synonymized with *arisana* by Elmes & Radchenko, 1998.]

Myrmica mirabile Elmes & Radchenko, 1998

Tribe Tetramoriini

Rhoptromyrmex wroughtonii Forel, 1902

Rhoptromyrmex rothneyi var. *taiwanensis* Wheeler, 1930 [Synonymized with *wroughtonii* by Bolton, 1964.]

Teramorium kraepelini Forel, 1905

Tetramorium mixtum r. *amia* [sic.] Forel, 1912 [Misspelled as *amium*. Raised to specific rank by Bolton, 1977.]

Tetramorium amium Forel, 1912 [Provisional synonym.]

Tetramorium bicarinatum (Nylander, 1846)

Tetramorium guineense Fabricius, 1793. See Bolton, 1977.]

Tetramorium indicum Forel, 1913

Tetramoruim guineense var. *indica* [sic.] Forel, 1913 [Misspelled as *indicum*. Raised to

specific rank by Bolton, 1977.]

Tetramorium lanuginosum (Mayr, 1870)

Triglyphothrix stratidens Emery, 1889 [Synonymy by Bolton, 1977. Transferred to *Tetramorium* by Bolton, 1985.]

Tetramorium nipponense Wheeler, 1928

Tetramorium pacificum Mayr, 1870

Tetramorium pacificum var. *subscabrum* Emery, 1893 [Synonymy by Bolton, 1977.]

Tetramorium parvispinum (Emery, 1893)

Triglyphothrix parvispina [sic.] var. *formosae* Forel, 1922 [Misspelled as *parvispinum*. Synonymized with *parvispinum* by Bolton, 1976. Transferred to *Tetramorium* by Bolton, 1985.]

Tetramorium smithi Mayr, 1878

Tetramorium simillimum (F. Smith, 1851)

Tribe Pheidolini

Aphaenogaster lepida Wheeler, 1930

Aphaenogaster silverstrii Wheeler, 1929 [Homonym of *A. silvestrii* Menozzi, 1929 (Wheeler, 1930).]

Aphaenogaster funkikoensis Creighton, 1950 [Unnecessary replace name.]

Aphaenogaster tipuna Forel, 1913

Aphaeenogaster rothneyi r. *tipuna* Forel, 1913 [Raised to specific rank by Hung et al., 1972.]

Aphaenogaster takahashii Wheeler, 1930

Aphaenogaster baogong **sp. nov.**

Aphaenogaster wangtian **sp. nov.**

Aphaenogaster wangye **sp. nov.**

Aphaenogaster fenbo **sp. nov.**

Aphaenogaster xuantian **sp. nov.**

Lophomyrmex taivanae Forel, 1912

Lophomyrmex quadrispinosus r. *taivanae* Forel, 1912 [Raised to specific rank by Ettershank, 1966.]

Messor aciculatus (F. Smith, 1874)

Pheidole fervens F. Smith, 1858

Pheidole amia Forel, 1912 [Synonymized with *fervens* by Eguchi, 2004.]

Pheidole javana var. dolenda Forel, 1912 [Synonymized with *fervens* by Eguchi, 2004.]

Pheidole javana soror Santschi, 1937 [Synonymized with *fervens* by Eguchi, 2004.]

Pheidole funkikoensis Wheeler, 1929

Pheidole indica Mayr, 1878

Pheidole megacephala (Fabricius, 1793)

Pheidole noda F. Smith, 1874

Pheidole noda var. *flebilis* Santschi, 1937 [Provisional synonymy by Lin & Wu, 2003.]

Pheidole noda formosensis Forel, 1913

Pheidole rhombinoda var. *formosensis* Forel, 1913 [Transeferred *formosensis* to *noda* by Santschi, 1937.]

Pheidole nodus [sic.] var. *formosensis* Forel, 1913 [Misspelled as *noda*. Santschi, 1937. Raised to specific rank by Lin & Wu, 2003. Subspecific rank in Bolton et al., 2005.]

Pheidole ernsti Forel, 1912

Pheidole pieli Santschi, 1925

Pheidole parva Mayr, 1865

Pheidole rinae tipuna Forel, 1912 [Synonymized with *parva* by Eguchi, 2007.]

Pheidole sauteri Wheeler, 1909 [Synonymized with *parva* by Eguchi, 2007.]

Pheidole ryukyuensis Ogata, 1982

Pheidole taivanensis Forel, 1912

Tribe Paratopulini

Paratopula ceylonica (Emery, 1901)

Atopomyrmrx celyonicus Emery, 1901 [Trensferred to *Atopula* by Emery, 1912.]

Atopula ceylonica (Emery, 1901) [Transferred to *Paratopula* by Wheeler, 1919.]

Formicoxenine tribe group

Tribe Crematogasterini

Crematogaster dohrni fabricans Forel, 1911

Crematogaster rogenhoferi fabricans Forel, 1911 [Forel, 1913.]

Crematogaster dohrni fabricans Forel, 1911 [*Fabricans* transferred to *dohrni* by Wheeler, 1927.]

Crematogaster bison Forel, 1913 [Provisional synonymy of *dohrni fabricans* by Lin & Wu, 2003. Independent species in Bolton et al., 2005.]

Crematogaster pia taivanae Forel, 1913

Crematogaster tumidula var. *taivanae* Forel, 1913 [*Taivanae* trensferred to *pia* by Emery, 1922.]

Crematogaster pia var. *taivanae* Forel, 1913 [Raised to subspecific rank by Lin & Wu,

2003.]

Crematogaster popohana Forel, 1912

Crematogaster popohana amia Forel, 1913

Crematogaster popohana r. *amia* Forel, 1913 [Raised to specific rank by Lin & Wu, 2003. Subspecific rank in Bolton et al., 2005.]

Crematogaster nawai Ito, 1914

Crematogaster laboriosa F. Smith, 1874 [Preoccupied, nec *Crematogaster laboriosus* F. Smith, 1860, which was synonymized with *Solenopsis geminata rufa* (Jerdon) by Emery, 1922.]

Crematogaster rogenhoferi Mayr, 1878

Crematogaster subnuda formosae Wheeler, 1911

Crematogaster subnuda var. *formosae* Wheeler, 1911 [Raised to subspecific rank by Bolton et al., 2005.]

Crematogaster biroi Mayr, 1897

Crematogaster schimmeri Forel, 1912

Crematogaster treubi apilis Forel, 1913

Recurvidris recurvispinosa (Forel, 1890)

Trigonogaster recurvispinosus Forel, 1890 [Trensferred to *Recurvidris* by Bolton, 1992.]

Tribe Formicoixenini

Cardiocondyla kagutsuchi Terayama, 1999

Cardiocondyla nuda Mayr 1866 [Misidentification. See this text.]

Cardiocondyla minutior Forel, 1899

Cardiocondyla obscurior Wheeler, 1929

Cardiocondyla wroughtonii var. *obscurior* Wheeler, 1929 [Raised to specific rank by Seifert, 2003. Although *obscrior* was provisionally synonymized with *wroughtonii* by Lin & Wu 2003, both are separate species (see Seifert, 2003).]

Cardiocondyla wroughtonii (Forel, 1890)

Cardiocondyla wroughtonii var. *bimaculata* Wheeler, 1929 [Synonymized with *wroughtonii* by Smith, 1979.]

Temnothorax confucii (Forel, 1912)

Tetramorium confuchii Forel, 1912 [Transferred to *Leptothorax* by Bolton, 1977.]

Leptothorax confucii (Forel, 1912) [Transferred to *Temnothorax* by Bolton, 2004.]

Temnothorax taivanensis (Wheeler, 1929)

Leptothorax taivanensis Wheeler, 1929 [Transferred to *Temnothorax* by Bolton, 2004.]

Temnothorax kuixing **sp. nov.**

Temnothorax yanwang **sp. nov.**

Temnothorax leimu **sp. nov.**

Temnothorax leigong **sp. nov.**

Temnothorax huatuo **sp. nov.**

Temnothorax tianpeng **sp. nov.**

Tribe Meranoplini

Meranoplus bicolor (Guérin-Méneville, 1844)

Meranoplus bicolor var. *fuscescens* Wheeler, 1930 [Synonymized with *bicolor* by Schödl, 1998.]

Tribe Myrmecinini

Acanthomyrmex crassispinus Wheeler, 1930

Acanthomyrmex crassispina [sic.] Wheeler, 1930 [Misspelled as *crassispinus*.]

Myrmecina sauteri Forel, 1912

Myrmecina taiwana Terayama, 1985

Myrmecina strigis Lin & Wu, 1998

Myrmecina kaigong **sp. nov.**

Pristomyrmex brevispinosus Emery, 1887

Pristomyrmex formosae Lin & Wu, 1999 [First available use of *Pristomyrmex brevispinosus* r. *sulcatus* var. *formosae* Forel, 1912. Wang (2003) regarded as an unavilable name, description of Lin & Wu (1999) is available.]

Pristomyrmex punctatus (F. Smith,1860)

Pristomyrmex japonicus Forel, 1900 [Synonymized with *pungens* by Viehmeyer, 1922.]

Pristomyrmex pungens Mayr, 1886 [Synonymized with *punctatus* by Wang, 2003.]

Tribe Metaponini

Metapone sauteri Forel, 1912

Tribe Melissotarsini

Rhopalomastix omotoensis Terayama, 1996

Rhopalomastix mazu **sp. nov.**

Subfamily Dolichoderinae (6, 9)

Tribe Dolichoderini

Chronoxenus wroughtonii formosensis (Forel, 1913)

Bothriomyrmex wroughtonii r. *formosensis* Forel, 1913 [Transferred to *Chronoxenus* by

Dubovikoff, 2005.]

Bothriomyrmex wroughtoni [sic.] *formosensis* Forel, 1913 [Misspelled as *wroughtonii*. Santschi, 1919.]

Dolichoderus thoracicus (F. Smith, 1860)

Dolichoderus bituberculatus (Mayr, 1862) [Synonymized with *thoracicus* by Donisthorpe, 1932.]

Iridomyrmex anceps Roger, 1863

Iridomyrmex bicknelli formosae Forel, 1912

Iridomyrmex bicknelli var. *formosae* Forel, 1912 [Raised to subspecific rank by Shattack, 1994.]

Ochetellus glaber (Mayr, 1862)

Iridomyrmex glaber Mayr, 1862 [Transferred to *Ochetellus* by Shattuck, 1992.]

Tapinoma melanocephalum (Fabricius, 1912)

Tapinoma sp.

Tapinoma indicum Forel, 1895 [Misidentification.]

Technomyrmex brunneus Forel, 1895

Technomyrmex albipes (F. Smith, 1861) [Misidentification. See Bolton (2007) and this text.]

Technomyrmex albipes var. *bruneipes* Forel, 1895 [Raised to subspecific rank by Emery, 1912.]

Technomyrmex albipes bruneipes Forel, 1895 [Misidentification. Synonymized *albipes* by Bolton, 2007.]

Technomyrmex modiglianii var. *angustior* Forel, 1912 [Raised to subspecific rank by Shattuck, 1994. Synonymized *brunneus* by Bolton, 2007.]

Technomyrmex horni Forel, 1912

Subfamily Formicinae (11, 58)

Lasiine tribe group

Tribe Lasiini

Acropyga butteli Forel 1912

Acropyga baodaoensis Terayama, 1985 [Synonymized with *butteli* by LaPolla, 2004.]

Acropyga sauteri Forel, 1912

Acropyga yaeyamensis Terayama & Hashimoto, 1996

Acropyga yushi **sp. nov.**

Anoplolepis gracillipes (F. Smith, 1857)

Anoplolepis longipes (Jerdon, 1851) [Synonymized with *gracillipes* by Bolton, 1995.]

Lasius talpa Wilson, 1955

Lasius nipponensis Forel, 1912

Lasius capitatus (Kuznetzov-Ugamskij, 1928) [Misidentification.]

Lasius crispus Wilson, 1955 [Misidentification.]

Lasuis japonicus Santschi, 1941

Lasius niger (Linnaeus, 1758) [Misidentification.]

Lasius coloratus Santschi, 1937

Lasius niger st. *coloratus* Santschi, 1937 [Synonymized with *L. niger* (Linnaeus, 1758) by Wilson, 1955. Revived from synonymy by Seifert, 1992.]

Lasius hayashi Yamauchi & Hayashida, 1970 [Misidentification.]

Lasius sp. 1 [Lin & Wu, 2003.]

Lasius sp. 2 [Lin & Wu, 2003.]

Tribe Plagiolepidini

Paratrechina amia (Forel, 1913)

Prenolepis bourbonica var. *amia* Forel, 1913 [Transferred to *Paratrechina* by Emery, 1925.]

Paratrechina bourbonica var. *amia* (Forel, 1913) [Raised to specific rank by Terayama, 1999. See also Trager, 1984.]

Paratrechina formosae (Forel, 1912)

Prenolepis formosae Forel, 1912 [Transferred to *Paratrechina* by Emery, 1925.]

Paratrechina kraepelini Forel, 1905

Paratrechina ryukyuensis Terayama, 1999

Paratrechuna yaeyamensis Terayama, 1999

Paratrechina longicornis (Latreille, 1802)

Paratrechina otome Terayama, 1999

Paratrechina sauteri (Forel, 1913)

Prenolepis minutula sauteri Forel, 1913. [Raised to specific rank by Collingwood, 1976.]

Paratrechina guanyin **sp. nov.**

Paratrechina kongming **sp. nov.**

Plagiolepis alluaudi Emery, 1909

Plagiolepis mactavishi Wheeler, 1908 [Synonymized with *alluaudi* by Smith, 1958.]

Plagiolepis exigua Forel, 1894

Plagiolepis longwang **sp. nov.**

Lepisiota rothneyi taivanae (Forel, 1913)

Plagiolepis rothneyi r. *taivanae* Forel, 1913 [Transferred to *Lepisiota* by Bolton, 1995. Zhou (2001) regarded this species as a member of *Plagiolepis*.]

Lepisiota wroughtonii (Forel, 1894)

Plagiolepis rothneyi r. *wroughtonii* Forel, 1902 [Raised to specific rank by Bingham, 1903.]

Plagiolepis wroughtoni Forel, 1902 [Transferred to *Lepisiota* by Bolton, 1995. Zhou (2001) regarded this species as a member of *Plagiolepis*.]

Lepisiota hexiangu **sp. nov.**

Prenolepis sp. 1 [Lin & Wu, 2003.]

Prenolepis sp. 2 [Lin & Wu, 2003.]

Prenolepis sp. 3 [Lin & Wu, 2003.]

Pseudolasius binghami taivanae Forel, 1912

Pseudolasius sauteri Forel, 1913

Formicine tribe group

Tribe Camponotini

Camponotus formosensis Wheeler, 1927

Camponotus punctatissimus formosensis Wheeler, 1927 [Raised to specific rank by Yasumatsu & Brown, 1951.]

Camponotus herculeanus r. *punctatissimus* Emery, 1895 [In Forel, 1913. Misidentification.]

Camponotus punctatissimus Forel, 1907 [Emery, 1925. Misidentification. First available use of *Camponotus hercleanus pennsylvanicus* var. *punctatissimus* Emery, 1895, is *C. pennsylvanicus punctatissimus* Forel, 1907.]

Camponotus taivanae Forel, 1913 **stat. nov.**

Camponotus rothneyi var. *taivanae* Forel, 1913 [Raised to subspecies rank by Lin & Wu, 2003.]

Camponotus kiusiuensis Santschi, 1937

Camponotus lighti Wheeler, 1927

Camponotus itoi lighti Wheeler, 1927 [Raised to specific rank by Wu & Wang, 1992.]

Camponotus treubi Forel, 1910

Camponotus treubi var. *arnoldi* Forel, 1912 [Provisional synonymy by Lin & Wu, 2003.]

Camponotus itoi var. *genaiai* Santschi, 1928 [Provisional synonymy by Lin & Wu, 2003.]

Camponotus itoi tokioensis Ito, 1912 [In Forel, 1913. Misidentification. See Santschi, (1928), = *Camponotus itoi* var. *genaiai* Santschi, 1928. Trensferred var. *genaiai* to *treubi* by

Santschi, 1937.]

Camponotus albosparsus Bingham, 1903

Camponotus taylori var. *albosparsus* Bingham, 1903 [First available use of *Camponotus maculates* r. *taylori* var. *albosparsus* Forel, 1894. Raised to specific rank by Wang et al., 1989.]

Camponotus barbatus albosparsus Forel, 1894 [Forel, 1912.]

Camponotus carin tipuns Forel, 1913

Camponotus dorycus var. *tipuna* [sic.] Forel, 1913 [Misspelled as *tipunus*.]

Camponotus carin var. *tipuna* [sic.] Forel, 1913 [Misspelled as *tipunus*. Wheeler, 1930. Raised to subspecific rank by Lin & Wu, 2003.]

Camponotus friedae Forel, 1912

Camponotus friedae var. *amia* [sic.] Forel, 1912 [Misspelled as *amius*. Synonymized with *friedae* by Terayama, 1999.]

Camponotus habereri Forel, 1911

Camponotus irritans F. Smith, 1857

Camponotus monju Terayama, 1999

Camponotus nicobarensis Mayr, 1865

Camponotus siemsseni Forel, 1901

Camponotus varigatus dulcis Dalla Torre, 1893

Camponotus mitis var. *dulcis* Dalla Torre, 1893 [First available use of *Camponotus rubripes mitis* var. *dulcis* Emery, 1889.]

Camponotus varigatus var. *dulcis* Dalla Torre, 1893 [Raised to subspecific rank by Lin & Wu, 2003.]

Polyrhachis rastellata Latreille, 1802

Polyrhachis latona Wheeler, 1909

Polyrhachis illaudata Walker, 1859

Polyrhachis mayri Roger, 1863 [Synonymized with *illaudata* by Donisthorpe, 1932.]

Polyrhachis latona var. *dorsorugosa* Forel, 1913 [Raised to specific rank by Wang & Wu, 1991. Provisional synonymy by Lin & Wu, 2003.]

Polyrhachis murina Emery, 1878

Polyrhachis pyrgops Viehmeyer, 1912

Polyrhachis wolfi Forel, 1912

Polyrhachis dives F. Smith, 1857

Polyrhachis dives var. *euclides* Forel, 1913 [Myrmithergate. See Hung, 1966.]

Polyrhachis moesta Emery, 1887

Polyrhachis hyppomanes var. *moesta* Emery, 1887 [Raised to specific rank by Wang & Wu, 1991.]

Polyrhachis lamellidens F. Smith, 1887

Tribe Formicini

Formica yessensis Wheeler, 1913

Formica truncicola var. *yessensis* Wheeler, 1913 [First available use of *Formica rufa* r. *truncicola* var. *yessensis* Forel, 1901. Raised to specific rank by Collingwood, 1976.]

Formica japonica Motschulsky, 1866

Formica fusca japonica Motschulsky, 1866 [Emery, 1923; Wheeler, 1919. But see this text.]

Formica obsidiana Emery, 1923

Formica candida formosae Emery, 1925

Formica picea var. *formosae* Emery, 1925 [First available use of *Formica fusca* r. *picea* var. *formosae* Forel, 1913. Transferred *picea* to *candida* by Bolton, 1995.]

Quadrinominal infrasubspecific name (unavailable name)

The followings are quadrinominal infrasubspecific names and excluded from future use as specific epithets in the appropriate genera (see Bolton, 1995).

Aenictus latiscapus sauteri var. *satoi* Santschi, 1937

Diacamma rugosum geometricum var. *anceps* Emery, 1897

Ponera gleadowi decipiens var. *sauteri* Forel, 1912

Pheidole javana r. *jubilans* var. *formosae* Forel, 1912

Pristomyrmex brevispinosus sulcatus var. *formosae* Forel, 1912

Camponotus maculates taylori var. *formosae* Wheeler, 1909

Formica fusca r. *picea* var. *formosae* Forel, 1913

Nomen nudum

Btachyponera luteipes liteiped-jerdoni Forel, 1913 [See Terayama, 1990, and Bolton, 1995.]

Species excluded from the Taiwanese fauna (misidentification or doubtful distribution)

Diacamma rugosum var. *anceps* Matsumura & Uchida, 1916 [First available use of *Diacamma rugosum geometricum* var. *anceps* Emery, 1897.]

Pachycondyla sharpi (Forel, 1901) (= *Trachymesopus sharpi* (Forel, 1901))

Pachycondyla astuta F. Smith, 1858

Pachycondyla javana (Mayr, 1867) (= *Ectomomyrmex javanus* Mayr, 1869)

Leptogenys diminuta palliseri Forel, 1900

Pyramica incerta (Brown, 1949) (= *Smithistruma incerta* Brown, 1949)

Vollenhovia emeryi Wheeler, 1906

Cardiocondyla nuda Mayr, 1866

Cardiocondyla parvinoda Forel, 1902

Carebara yamatonis (Terayama, 1996) (= *Oligomyrmex yamatonis* Terayama, 1996)

Tapinoma indicum Forel, 1895

Technomyrmex albipes (F. Smith, 1861)

Lasius capitatus (Kuznetzov-Ugamskij, 1928)

Lasius crispus Wilson, 1955

Lasius niger (Linnaeus, 1758)

Lasius hayashi Yamauchi & Hayasahida, 1970

Paratrechina flavipes (F. Smith, 1874)

Paratrechina bourbonica Forel, 1866 (= *Paratrechina bourbonica* var. *bengalensis* Forel, 1984. Synonymized *bengalensis* with *bourbonica* by Wilson & Taylor, 1967.)

Camponotus punctassimus Forel, 1907

Camponotus vitiosus F. Smith, 1874 (= *Camponotus tokioensis* Ito, 1912; = *Camponotus itoi tokioensis* Ito, 1912)

Polyrhachis tyrannicus F. Smith, 1858

Table 3. Numbers of genera and species of Taiwanese ants.

Subfamily Amblyoponinae (2, 5)

Tribe Amblyoponini: *Amblyopone* (4), *Prionopelta* (1)

Subfamily Proceratininae (3, 5)

Tribe Proceratiini: *Discothyrea* (2), *Proceratium* (2)

Tribe Probolomyrmecini: *Probolomyrmex* (1)

Subfamily Ectatomminae (1, 1)

Teibe Ectatommini: *Gnamptogenys* (1)

Subfamily Ponerinae (11, 39)

Tribe Ponerini: *Anochetus* (4), *Centromyrmex* (1), *Cryptopone* (2), *Diacamma* (1), *Hypoponera* (9), *Leptogenys* (4), *Myopias* (1), *Odontomachus* (1), *Odontoponera* (1), *Pachycondyla* (7), *Ponera* (8)

Subfamily Cerapachyinae (2, 6)

Tribe: Cerapachyini: *Cerapachys* (5), *Simopone* (1)

Subfamily Aenictinae (1, 6)

Teibe Aenictini: *Aenictus* (6)

Subfamily Liptanillinae (2, 2)

Tribe Leptanillini: *Leptanilla* (1)

Tribe Anomalomyrmini: *Protanilla* (1)

Subfamily Pseudomyrmecinae (1, 3)

Tribe Pseudomyrmecini: *Tetraponera* (3)

Subfamily Myrmicinae (29, 128)

Tribe Basicerotini: *Eurhopalothrix* (1)

Tribe Dacetini: *Pyramica* (14), *Strumigenys* (14)

Tribe Stenammini: *Lordomyrma* (1), *Vollenhovia* (6)

Tribe Solenopsidini: *Anillomyrma* (1), *Carebara* (4), *Monomorium* (9), *Pheidologeton* (3), *Solenopsis* (4), *Formosimyrma* **gen nov.** (1)

Tribe Myrmicini: *Myrmica* (4)

Tribe Tetramoriini: *Rhoptromyrmex* (1), *Tetramorium* (9)

Tribe Pheidolini: *Aphaenogaster* (8), *Lophomyrmex* (1), *Messor* (1), *Pheidole* (10)

Tribe Paratopulini: *Palatopula* (1)

Tribe Crematogastrini: *Crematogaster* (10), *Recurvidris* (1)

Tribe Meranoplini: *Meranoplus* (1)

Tribe Formicoxenini: *Cardiocondyla* (4), *Temnothorax* (8)

Tribe Myrmecinini: *Acanthomyrmex* (1), *Myrmecina* (4), *Pristomyrmex* (3)

Tribe Metaponini: *Metapone* (1)

Tribe Melissotarsini: *Rhopalomastix* (2)

Subfamily Dolichoderinae (6, 9)

Tribe Dolichoderini: *Chronoxenus* (1), *Dolichoderus* (1), *Iridomyrmex* (2), *Ochetellus* (1), *Tapinoma* (2), Technomyrmex (2)

Subfamily Formicinae (11, 60)

Tribe Lasiini: *Acropyga* (4), *Anoplolepis* (1), *Lasius* (6)

Tribe Plagiolepidini: *Lepisiota* (3), *Paratrechina* (10), *Plagiolepis* (3), *Prenolepis* (3), *Pseudolasius* (2)

Tribe Camponotini: *Camponotus* (15), *Polyrhachis* (9)

Tribe Formicini: *Formica* (4)

Total: Subfamily 11, Genus 69, Species 264

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