

SYSTEMATIC STUDY ON THE ANT GENUS *PYRAMICA* ROGER (HYMENOPTERA, FORMICIDAE) OF CHINAXU Zheng-Hui¹, ZHOU Xing-Guo²

1. The College Library, Southwest Forestry College, Kunming, Yunnan 650224, China; zhxu@public.km.yn.cn

2. Faculty of Conservation Biology, Southwest Forestry College, Kunming, Yunnan 650224, China

Abstract Twenty-six species of the ant genus *Pyramica* Roger are recorded in China. Three new species are described and one new combination, *Pyramica dayui* (Xu) is proposed. Geographic distribution is provided for each species. A key is prepared for 25 species based on worker caste. *P. formosa* (Terayama, Lin & Wu) is known only from queen caste. The 26 known Chinese species are: *P. doherti* (Emery), *P. hirashimai* (Ogata), *P. lachesis* Bolton, *P. emeswangi* Bolton, *P. membranifera* (Emery), *P. takasago* (Terayama, Lin & Wu), *P. nongba* sp. nov., *P. wilsoni* Wang, *P. japonica* (Ito), *P. formsimonticola* (Terayama, Lin & Wu), *P. benten* (Terayama, Lin & Wu), *P. leptothrix* (Wheeler), *P. elegantula* (Terayama & Kubota), *P. ailaoshana* sp. nov., *P. mazu* (Terayama, Lin & Wu), *P. kichijo* (Terayama, Lin & Wu), *P. yangi* sp. nov., *P. sinensis* Wang, *P. hexamera* (Brown), *P. tisiphone* Bolton, *P. dayui* (Xu), *P. canina* (Brown & Boisvert), *P. sauteri* (Forel), *P. mitis* Brown, *P. mutica* (Brown), *P. formosa* (Terayama, Lin & Wu).

Key words Hymenoptera, Formicidae, *Pyramica*, systematics, China.

The ant genus *Pyramica* was erected by Roger in 1862. Roger (1863), Brown & Wilson (1959), Brown (1960) and Bolton (1995) all considered *Pyramica* as a junior synonym of *Strumigenys*. In 1999, Bolton revived *Pyramica* from synonym as a valid genus and treated 24 small genera including *Epitritus*, *Trichoscapa*, *Pentastruma*, *Smithistruma*, *Weberistruma* and *Kyidris* as junior synonyms of *Pyramica*. After such a large scale revision, the contemporary *Pyramica* is a worldwide distributed large genus with 324 species.

In China, no complete systematic study on the genus *Pyramica* has been carried out except for separate descriptions of new species. Forel (1912) and Wheeler (1929) described the first two species from Taiwan. Terayama & Kubota (1989) and Terayama, Lin & Wu (1995, 1996) reported the Taiwanese species. Tang *et al.* (1995) recorded 1 species from Zhejiang and Hunan Provinces. Recently, Bolton (2000) and Wang (Bolton, 2000) recorded majority of the Chinese species of the genus. Xu (2000) described a new species from Southwestern China. Zhou (2001) reported 3 species of the genus from Guangxi. In this study, 3 new species are described from China, i. e., *P. nongba* sp. nov., *P. ailaoshana* sp. nov. and *P. yangi* sp. nov. Up to date, 26 species of *Pyramica* are known in China, among them, *P. for-*

mosa is known only from queen, the other 25 species are known from worker caste.

Standard measurements and indices follow Bolton (2000): TL-Total length, HL-Head length, HW-Head width, CI-Cephalic index = $HW \times 100 / HL$, MI-Mandible length, MI-Mandibular index = $MI \times 100 / HL$, SL-Scape length, SI-Scape index = $SL \times 100 / HW$, PW-Pronotal width, AL-Alitrunk length. All measurements are given in millimeters.

The type specimens are deposited in the Insect Collection, Faculty of Conservation Biology, Southwest Forestry College, Kunming, Yunnan, China.

***Pyramica* Roger**

Pyramica Roger, 1862: 251. Type-species: *Pyramica gundlachi* Roger, 1862: 253, by monotypy.

Epitritus Emery, 1869: 136. Type-species: *Epitritus argiolus* Emery, 1869: 136, by monotypy. [Synonymy with *Pyramica* by Bolton, 1999: 1667]

Trichoscapa Emery, 1869: 24 (as subgenus of *Strumigenys*). Type-species: *Strumigenys (Trichoscapa) membranifera* Emery, 1869: 24, by monotypy. [Synonymy with *Pyramica* by Bolton, 1999: 1667]

Pentastruma Forel, 1912: 50. Type-species: *Pentastruma sauteri* Forel, 1912: 51, by monotypy. [Synonymy with *Pyramica* by Bolton, 1999: 1667]

Smithistruma Brown, 1948: 104. Type-species: *Cephaloxys capitata* Smith, 1865: 77. [Synonymy with *Pyramica* by Bolton, 1999: 1668]

Weberistruma Brown, 1948: 106 (as subgenus of *Smithistruma*). Type-species: *Strumigenys (Cephaloxys) leptothrix* Wheeler, 1929: 55,

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by original designation. [Raised to genus by Brown, 1949: 7. Synonymy with *Smithistruma* by Brown, 1973: 35. Synonymy with *Pyramica* by Bolton, 1999: 1668]

Kyidris Brown, 1949: 3. Type-species: *Kyidris mutica* Brown, 1949: 3, by original designation. [Synonymy with *Pyramica* by Bolton, 1999: 1668]

Key to known Chinese species of *Pyramica* based on worker caste

(Followed the key of Bolton, 2000. The species *P. formosa* (Terayama, Lin & Wu, 1995) (Figs.37-38) which is known only from queens is not included)

1. With head in full-face view the leading edge of the scape with a row of conspicuous projecting curved hairs, of which one or more, distal to the subbasal bend, distinctly curves toward the base of the scape. These hairs may be spatulate, remiform, spoon-shaped or broadly clavate apically; basal stem of each hair (which may be short) erect or suberect with respect to the long axis of the scape 2
2. With head in full-face view the leading edge of the scape lacking projecting hairs that curve toward the base of the scape. Scape edge may have elongate simple straight projecting hairs present, or entirely apically directed short hairs that may be simple, narrowly to broadly spatulate, or spoon-shaped; in some species the leading edge may be hairless 8
2. With head in full-face view the dorsolateral margin with a distinctly isolated, very conspicuous, laterally projecting apicoscrobial hair; apicoscrobial hair conspicuously differentiated from other pilosity on the margin, may be simple, clavate or flagellate. (Bolton, 2000, figs. 248, 282) (China: Guangxi Region; Bhutan, Burma, Thailand, Malaysia, Philippines, Indonesia) ***P. dohertyi* (Emery)**
With head in full-face view the dorsolateral margin without a distinctly isolated apicoscrobial hair that is conspicuously differentiated from other pilosity on the margin; either hair absent or duplicated by others on the margin 3
3. Mandibles elongate and narrow, linear; in full-face view and at full closure only their extreme apices engage. Leading edge of scape with a large, strongly prominent subbasal lobe 4
4. Mandibles subtriangular to triangular, not linear; in full-face view and at full closure they engage for half or more of their exposed length. Leading edge of scape with a gradual subbasal curve or subbasal angle, without a large, strongly prominent subbasal lobe 5
4. Dorsal surface of mandible without longitudinal rows of anteriorly directed spoon-shaped or scale-like hairs. The two pairs of hairs closest to the midline on the anterior clypeal margin short, narrowly spoon-shaped and curved or inclined toward the midline. Orbicular hairs on clypeus all of approximately the same size (Figs.1-2) (China: Taiwan Province; Japan) ***P. hirashimai* (Ogata)**
Dorsal surface of mandible with two longitudinal rows of anteriorly directed spoon-shaped or scale-like hairs. The two pairs of hairs closest to the midline on the anterior clypeal margin long and strap-like, directed anteriorly and curved slightly away from the midline. Orbicular hairs on clypeus much smaller centrally than near lateral and posterior margin. (China: Guangdong Province) ***P. lachesis* Bolton**
5. Pronotal humeral hair present; may be simple, flagellate, remiform or subclavate. (China: Fujian Province) ***P. emeswangi* Bolton**
Pronotal humeral hair absent 6
6. Fully closed mandibles in full-face view with teeth extending from apex of masticatory margin to the point where the margin intersects the anterior clypeal margin. (Figs.3-4) (China: Fujian Province, Taiwan Province, Macao; Cosmopolitan tramp species) ***P. membranifera* (Emery)**

- Fully closed mandibles in full-face view with crowded series of small teeth on the distal halves of the masticatory margins, but the proximal halves are edentate and concave, and enclose a broad subovate gap in front of the anterior clypeal margin 7
7. Metanotal groove deeply impressed. Propodeum with a pair of acute teeth. Petiolar node relatively low. (Figs.5-6) (China: Taiwan Province) ***P. takasago* (Terayama, Lin & Wu)**
Metanotal groove shallowly impressed. Propodeum without teeth. Petiolar node relatively high (Figs.7-8) (China: Yunnan Province) ***P. nongba* sp. nov.**
8. Petiolar node in profile long and low; either anterior face of node much shorter than the long dorsum, or the anterior face shallowly sloped and grading evenly into the peduncle so that the entire segment is subclavate. Petiolar node in dorsal view long and narrow, sometimes with a posterior peduncle, always much longer than broad and generally at least equal in length to the disc of the postpetiole 9
- Petiolar node in profile short and relatively high; either anterior face of node at least subequal in length to the dorsum, or the anterior face steeply sloped and meeting the peduncle through an obtuse but marked angle, or both. Petiolar node in dorsal view short and broad, usually at least as broad as long and generally shorter than the disc of the postpetiole 15
9. Mandibles elongate and narrow in full-face view; masticatory margin engage only in the apical third or less of their length at full closure; proximally with a large gap between the mandibles, and between them and the anterior clypeal margin; labral lobes visible through the gap; MI > 25. Fully closed mandibles edentate from base to about the midlength in full-face view (Bolton, 2000, figs. 277, 298) (China: Zhejiang Province) ***P. wilsoni* Wang**
Mandibles stoutly triangular in full-face view; masticatory margins engage throughout their length at full closure; proximally without a gap between the mandibles nor between them and the anterior clypeal margin; labral lobes not visible; MI < 25. Fully closed mandibles dentate from anterior clypeal margin to apex in full-face view 10
10. Dorsal (outer) surface of hind tibia without suberect to erect straight simple projecting hairs; any hairs present are decumbent to closely appressed 11
- Dorsal (outer) surface of hind tibia with suberect to erect straight simple projecting hairs 13
11. Lateral spongiform lobe of petiole in profile merely a small flap at the posterolateral angle of the node. With head in full-face view sides of occipital lobes without freely projecting simple hairs. Dorsum of head from highest point of vertex to occipital margin without erect to suberect straight simple hairs. (Figs.9-10) (China: Taiwan Province; Korea, Japan) ***P. japonica* (Ito)**
Lateral spongiform lobe of petiole in profile elongate, extending forward almost to the level of the anterior face of the node. With head in full-face view side of each occipital lobe with 4-5 freely projecting short hairs. Dorsum of head from highest point of vertex to occipital margin with distinct erect to suberect straight simple hairs 12
12. Pronotal dorsum with numerous long erect simple hairs. (Figs.11-12) (China: Taiwan Province) ***P. formosimonticola* (Terayama, Lin & Wu)**
Pronotal dorsum without long erect simple hairs. (Figs.13-14) (China: Taiwan Province; Japan) ***P. benten* (Terayama, Lin & Wu)**
13. With head in full-face view the upper scrobe margin with straight or curved elongate simple hairs that freely project laterally or dorsolaterally beyond the margins; similar or even longer hairs project from the occipital lobes. (Figs.15-16) (China: Taiwan Province; Japan) ***P. leptothrix* (Wheeler)**

- With head in full-face view the upper scrobe margin with a continuous row of short anteriorly directed decumbent to appressed hairs only, without elongate simple hairs that freely project beyond the margin; one or two freely projecting simple hairs may occur on the lateral occipital lobes well behind the level of the eyes 14
14. In profile view dorsum of mesonotum distinctly convex. Dorsum of petiolar node almost straight, anterodorsal corner prominent. Dorsum of alitrunk microreticulate. Lateral sides of propodeum microreticulate. (Figs.17-18) (China: Taiwan Province, Guangdong Province, Hong Kong; Thailand) ***P. elegantula* (Terayama & Kubota)**
- In profile view dorsum of mesonotum only slightly convex. Dorsum of petiolar node roundly convex, without prominent anterodorsal corner. Dorsum of alitrunk finely longitudinally striate and finely reticulate. Lateral sides of propodeum smooth, sparsely striate. (Figs.19-20) (China: Yunnan Province) ***P. ailaoshana* sp. nov.**
15. Dorsal (outer) surfaces of middle and hind tibiae with one or more conspicuous freely laterally projecting long hairs that are at a right-angle or near right-angle to the long axis of the segment; these hairs may be straight, curved or flagellate; one or more similar hairs present on basitarsi 16
- Dorsal (outer) surfaces of middle and hind tibiae and basitarsi with small simple to spatulate decumbent or appressed hairs, or with minute appressed pubescence only; lacking freely laterally projecting long hairs that are at a right-angle or near right-angle to the long axis of the segment 17
16. Cuticle on side of head within the scrobe smooth and shining. Anterior clypeal margin transverse to shallowly concave in full-face view. Dorsal alitrunk smooth and shining. Eye of a single ommatidium. (Figs.21-22) (China: Taiwan Province, Hong Kong; Japan) ***P. mazu* (Terayama, Lin & Wu)**
- Cuticle on side of head within the scrobe reticulate-punctate. Anterior clypeal margin evenly convex in full-face view. Dorsal alitrunk sculptured, at least in part. Eye of more than one ommatidium. (Figs.23-24) (China: Fujian Province, Taiwan Province; Bhutan; Thailand; Japan) ***P. kichijo* (Terayama, Lin & Wu)**
17. With the head in full-face view and the mandibles fully closed the dorsal surface of each massively triangular mandible has, near its base, a very distinct sharp transverse rim that extends across the width of the mandible (Figs.25-26) (China: Yunnan Province) ***P. yangi* sp. nov.**
- With the head in full-face view and the mandibles fully closed the dorsal surface of each mandible, near its base, without a sharp transverse rim that extends across the width of the mandible; if dorsum of mandible slightly depressed basally then mandible is linear, not triangular 18
18. With the head in full-face view the entire dorsum clothed with ground-pilosity of very conspicuous pale spoon-shaped to orbicular hairs 19
- With the head in full-face view the dorsum either without hairs or with ground-pilosity of short hairs that are simple to narrowly spatulate and usually inconspicuous 22
19. Apicodorsal tooth of mandible short, not spiniform, at most only fractionally longer than the apicoventral tooth; at full closure apicodorsal tooth partially overlaps but does not completely cross over the tooth from the opposite mandible, and never projects beyond the outer margin of the opposite mandible (China: Fujian Province) ***P. sinensis* Wang**
- Apicodorsal tooth of mandible spiniform and extremely long, enormously longer than the apicoventral tooth; at full closure apicodorsal tooth completely crosses over the tooth from the opposite mandible and usually projects beyond the outer margin of the opposite mandible 20
20. Apical half of mandible with two preapical teeth, the proximal slightly longer than the distal. With alitrunk in profile posterior surface of mesonotum narrowly convex and weakly bulging, overhanging the metanotal groove. Posterodorsal corner of propodeum dentate. Head broader than long, CI 106-108. (Figs.27-28) (China: Taiwan Province; Korea; Japan; USA) ***P. hexamera* (Brown)**
- Apical half of mandible with or without a single small inconspicuous preapical tooth, if present which located very close to the spiniform apicodorsal tooth. With alitrunk in profile mesonotum meets propodeum at the metanotal groove, the former not narrowly convex nor bulging posteriorly, not overhanging the metanotal groove. Posterodorsal corner of propodeum rounded. Head slightly longer than broad, CI < 100 21
21. Apical half of mandible with a single small inconspicuous preapical tooth, located very close to the spiniform apicodorsal tooth. Dorsal surface of mandible with 3 longitudinal rows of scale-like to spoon-shaped hairs. Body smaller, with TL 2.0 mm, HL 0.50 mm, HW 0.48 mm (China: Guangdong Province) ***P. tisiphone* Bolton**
- Apical half of mandible without any preapical tooth. Dorsal surface of mandible with 2 longitudinal rows of scale-like to spoon-shaped hairs. Body larger, with TL 2.6 mm, HL 0.63 mm, HW 0.60 mm. (Figs.29-30) (China: Yunnan Province) ***P. dayui* (Xu)**
22. With head in full-face view the outer margins of the fully closed mandibles intersect the anterior clypeal margin mesad of the anterolateral clypeal angles, so that there is a section of the anterior clypeal margin that projects laterally beyond the outer line of the mandible 23
- With head in full-face view the outer margins of the fully closed mandibles intersect the anterior clypeal margin at the anterolateral clypeal angles, so that there is no section of the anterior clypeal margin that projects laterally beyond the outer line of the mandible 24
23. Anterior clypeal margin broadly shallowly transversely concave across its entire width. Mandible with 14 teeth distal of a long low basal lamella. Counting from the basal lamella teeth 1, 3, 5, 7 and 9 are relatively large; the fifth tooth from the lamella is easily the longest on the margin. (Figs.31-32) (China: Zhejiang Province, Hunan Province, Guangxi Region, Hong Kong; Japan) ***P. canina* (Brown & Boisvert)**
- Anterior clypeal margin with a deep semicircular median impression, the anterolateral angles broadly convex on each side of the impression. Mandible with 12 teeth distal of a triangular rounded basal lamella. Counting from the basal lamella teeth 1-5 are relatively large; the third tooth from the lamella is the longest on the margin. (Figs.33-34) (China: Taiwan Province, Fujian Province, Guangxi Region, Hong Kong; Thailand; Japan) ***P. sauteri* (Forel)**
24. With head in full-face view the fully closed mandibles triangular, with teeth present along entire length of exposed inner margin; proximal half of inner margin dentate, without a long diastema between basal tooth and basal lamella; without a large space basally through which the apices of the labral lobes are visible. (Bolton, 2000, figs. 267, 290) (China: Guangdong Province, Hong Kong; Thailand, Philippines, Malaysia, Singapore, Indonesia, Brunei, Papua New Guinea) ***P. mitis* Brown**
- With head in full-face view the fully closed mandibles narrow or elongate-triangular, with teeth present only on distal half of exposed length of inner margin; proximal half of inner margin edentate and forming a long diastema between basal tooth and basal lamella; a large space present basally between the opposed mandibles through

which the apices of the labral lobes are visible. (Figs.35-36)
 (China: Taiwan Province, Yunnan Province, Guangxi Region; Korea; Japan; Malaysia; Singapore; Indonesia)

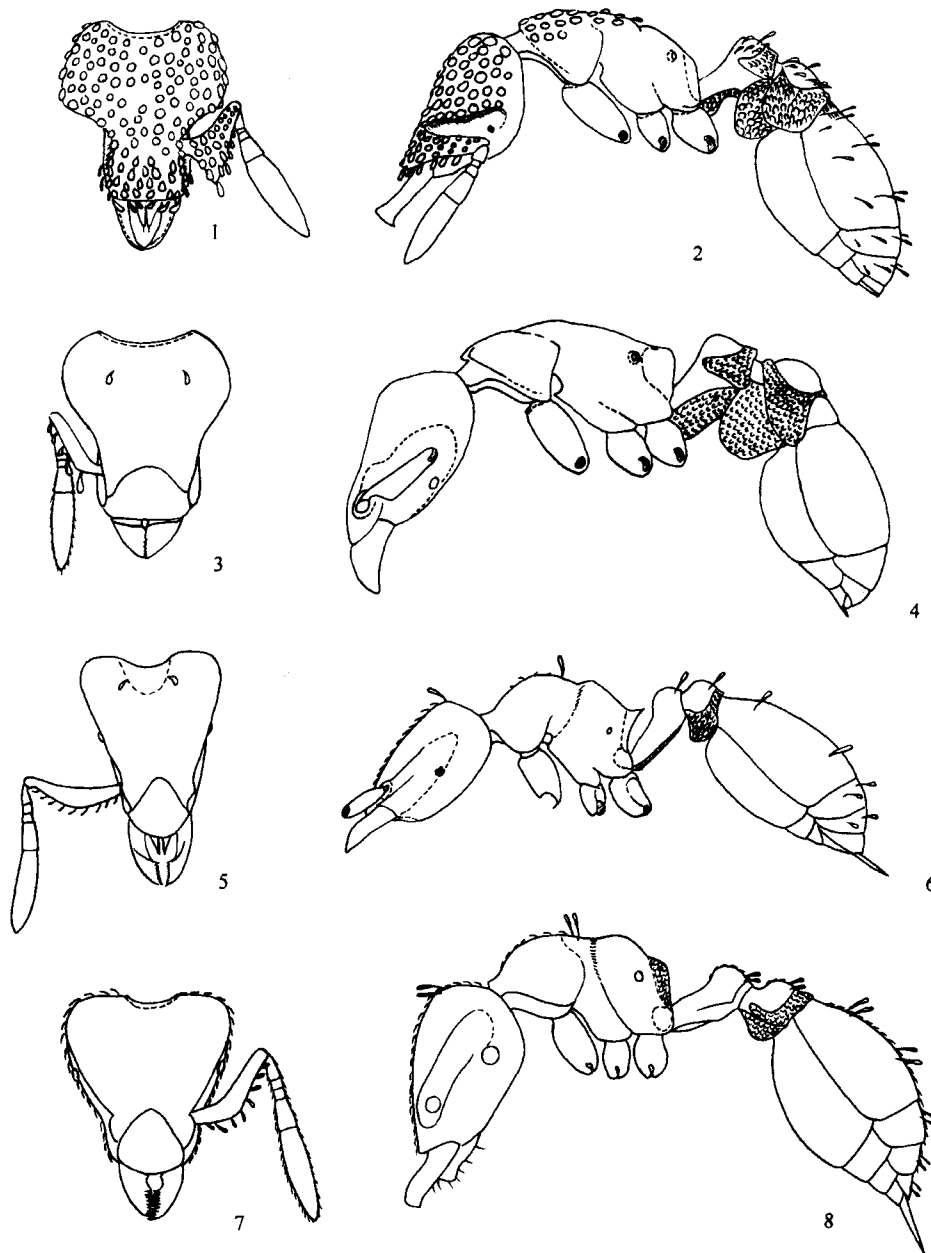
..... *P. mutica* (Brown)

Descriptions of new species and discussion of a new combination species

1 *Pyramica nongba* sp. nov. (Figs.7-8)

Holotype worker. TL 1.8, HL 0.48, HW 0.40, CI 84, ML 0.11, MI 24, SL 0.28, SI 69, PW 0.28,

AL 0.48. Head triangular, longer than broad and narrowed forward. In full-face view, occipital margin weakly roundly concave in the middle, occipital corners rounded. Lateral sides weakly concave. Mandible elongate triangular, basal corner angled, basal half of masticatory margin without teeth, apical half with about 10 slender spine-like teeth. Clypeus nearly triangular, anterior margin roundly convex. Antennal scrobe distinctly depressed. Antenna with 6 segments,

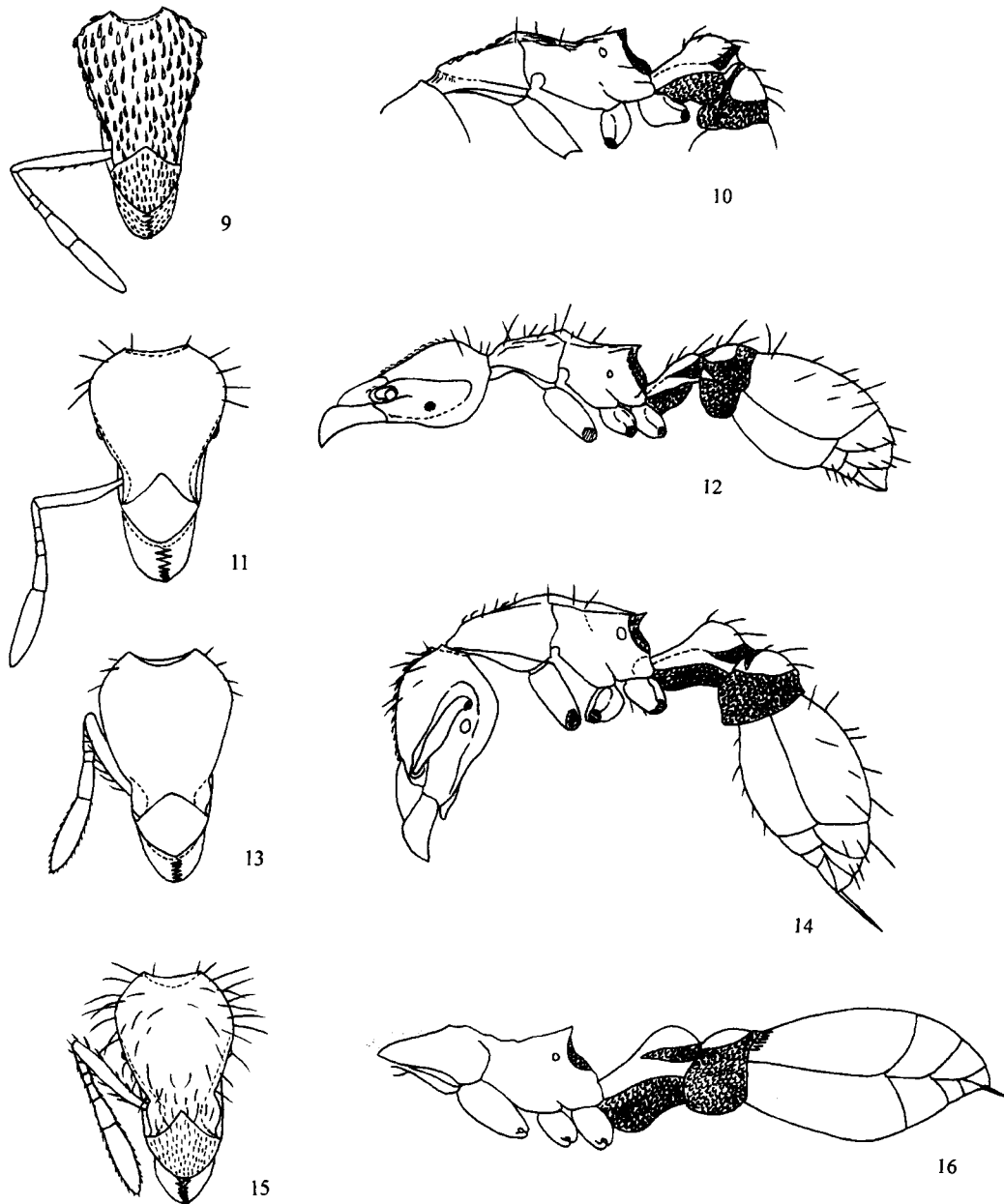


Figs.1-8. *Pyramica* workers. 1-2. *P. hirashimai* (Ogata). 3-4. *P. membranifera* (Emery) (pilosity omitted in 4). 5-6. *P. takasago* (Terayama, Lin & Wu). 7-8. *P. nongba* sp. nov. 1, 3, 5, 7. Head in full-face view. 2, 4, 6, 8. Body in profile view. 1-2. After Ogata (1990). 3. After Terayama & Kubota (1989). 4. After Ogata & Onoyama (1992). 5-6. After Terayama *et al.* (1995).

antennal club 2-segmented, apex of scape reached to $3/4$ of the distance from antennal socket to occipital corner. Eye small, with 6 ommatidia. In profile view, vertex roundly prominent. Pronotum roundly convex, promesonotal suture indistinct. Dorsum of mesonotum straight, metanotal groove shallowly depressed. Dorsum of propodeum convex anteriorly, slope down backward and rounded into declivity. Declivity weakly concave, lateral sides with narrow vertical ridge-like spongiform appendages, posterodorsal corner of the

spongiform appendage bluntly angled. Petiole without spongiform appendages, ventral face with a narrow longitudinal ridge, dorsum of petiolar node roundly convex. Postpetiolar node roundly convex, posterior border with a narrow spongiform appendage, lateral sides each with a triangular spongiform appendage.

Mandibles smooth and shining. Head, petiole and postpetiole densely finely punctuate and opaque. Alitrunk densely micro-reticulate and less shining. Gaster smooth and shining. Head, antennae and legs



Figs. 9-16. *Pyramica* workers. 9-10. *P. japonica* (Ito). 11-12. *P. formosimonticola* (Terayama, Lin & Wu). 13-14. *P. benten* (Terayama, Lin & Wu). 15-16. *P. leptothrix* (Wheeler) (pilosity omitted in 16). 9, 11, 13, 15. Head in full-face view. 10, 12, 14, 16. Body in profile view. 9-14. After Terayama *et al.* (1996). 15. After Terayama & Kubota (1989). 16. After Wheeler (1929).

with abundant depressed pubescences. Alitrunk, petiole, postpetiole and gaster with sparse depressed pubescences. Body surface with sparse pilosity. Leading edge of antennal scape with a row of spatulate hairs, five of them curved apically, three of them curved basally. Vertex, mesonotum, petiole and postpetiole each with a pair of clavate hairs. Gaster with 2 pairs of clavate hairs on first tergite, 1 pair similar hairs on tergites 2-3 separately. Body color yellow, mandibles brownish yellow, eyes black.

Paratype workers. TL 1.9-2.0, HL 0.50, HW 0.41-0.43, CI 83-85, ML 0.13, MI 25, SL 0.28, SI 65-67, PW 0.29-0.30, AL 0.49-0.51 (3 individuals measured). As holotype.

Holotype: worker, No. A95-236, 1 200 m, Tongbiguan Nature Reserve, Leiliang Village, Nongba Town, Longchuan County, Yunnan Province, 29 Dec. 1995, collected by Mr. XU Zheng-Hui. Paratypes: 3 workers, with same data as holotype.

Etymology. The new species is named after the type locality Nongba Town.

This new species is close to *P. takasago* (Terayama, Lin & Wu), but head relatively broader, metanotal groove only shallowly depressed, propodeum without spines.

2 *Pyramica ailaoshana* sp. nov. (Figs. 19-20)

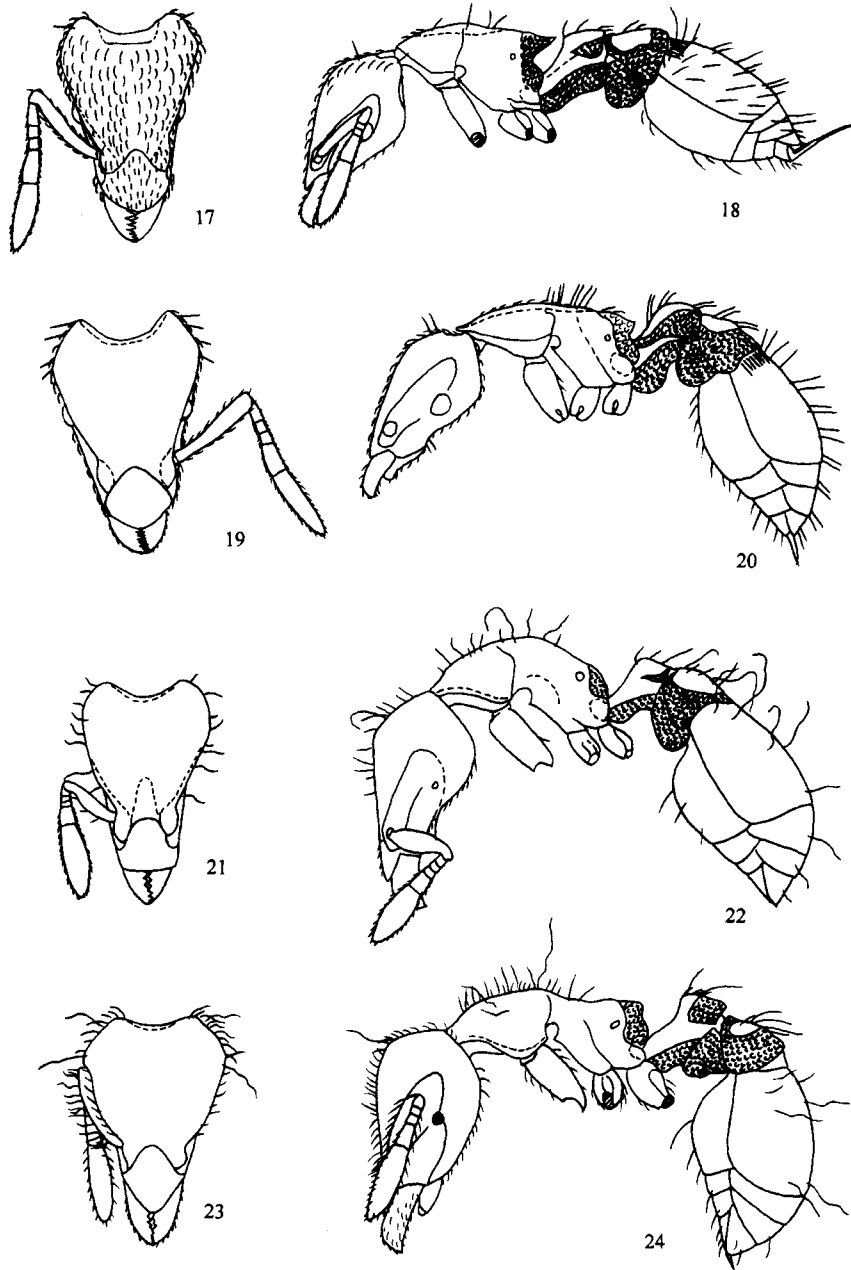
Holotype worker. TL 2.6, HL 0.70, HW 0.50, CI 71, ML 0.10, MI 14, SL 0.33, SI 65, PW 0.29, AL 0.68. Head elongate triangular, distinctly longer than broad and narrowed forward. Occipital margin widely and deeply concave. Occipital corners prominent and triangular. Lateral sides of head prominent and bluntly angled at posterior 1/4. Mandible triangular and down curved at apex, masticatory margin with about 10 spine-like slender teeth. Clypeus rhombic, anterior margin roundly prominent in the middle. Antennal scrobe distinct. Antenna with 6 segments, antennal club 2-segmented, apex of scape reached to 5/8 of the distance from antennal socket to occipital corner. Eye with 4-5 ommatidia along the maximum diameter. Lateral sides of alitrunk dorsum distinctly marginate. In profile view ventral face of head deeply concave. Pronotum flat, promesonotal suture indistinct. Mesonotum slightly convex. Metanotal groove absent. Dorsum of propodeum weakly convex and slope down backward. Propodeal spines long and acute, with apex slightly curved upward. Lateral sides of declivity with developed curtain-like spongiform lamellae, the upper margin connecting the propodeal spine,

with posterior margin deeply concave. In profile view petiole with large longitudinal curtain-like subpetiolar spongiform lobe, petiolar node long and low, with dorsum roundly convex, lateral sides with wing-like spongiform lobes. Postpetiole with large semicircular subpostpetiolar spongiform lobe, dorsum of postpetiolar node weakly convex, lateral sides with wing-like spongiform lobes. In dorsal view petiolar node rectangular, distinctly longer than broad. Postpetiolar node nearly square, slightly broader than long.

Mandibles punctuate. Head finely reticulate, occiput finely longitudinally striate. Antennal scrobes densely finely punctuate, interface appears as microreticulations. Dorsum of alitrunk finely longitudinally striate and finely reticulate. Lateral sides of pronotum and propodeum smooth, sparsely striate. Lateral sides of mesothorax and metathorax sparsely striate and densely finely punctuate, interface appears as reticulations. Petiole finely reticulate, dorsum of petiolar node sparsely transversely striate. Postpetiolar node smooth and shining. Gaster smooth and shining, with longitudinal basal costulae. Head with dense depressed pubescences, occipital margin with a pair of erect hairs in the middle, ventral face with a pair of erect hair at the concaved position. In full-face view lateral side of occipital lobe with 4 decumbent hairs. Alitrunk, petiole and postpetiole with sparse depressed pubescences. Dorsum of pronotum without erect hairs, but humeral corners each with a laterally pointed long hair. Mesonotum, propodeum, petiole and postpetiole with sparse erect to decumbent hairs, 2 pairs on mesonotum, 3 pairs on propodeum, 3 pairs on petiole, and 2 pairs on postpetiole. Gaster with abundant erect hairs, hairs on the basal dorsum anterodorsally pointed, pubescences almost absent. Scapes with dense depressed pubescences. Femora and tibiae with abundant decumbent longer hairs. Body color brown, eyes and lateral margins of alitrunk black.

Paratype workers. TL 2.5-2.7, HL 0.68-0.73, HW 0.48-0.53, CI 68-74, ML 0.09-0.10, MI 13-15, SL 0.30-0.33, SI 60-68, PW 0.25-0.30, AL 0.63-0.70 (7 individuals measured). As holotype.

Paratype queen. TL 3.1, HL 0.73, HW 0.55, CI 76, ML 0.10, MI 14, SL 0.35, SI 64, PW 0.48, AL 0.85 (1 individual measured). Similar to the holotype worker, but body much larger, head with 3 ocelli, eyes large. Thorax quite developed, with tegulae. Metanotum large with longitudinal dorsal ridge. Pronotum and anterior part of mesonotum coarsely and



Figs. 17-24. *Pyramica* workers. 17-18. *P. elegantula* (Terayama & Kubota). 19-20. *P. ailaoshana* sp. nov.. 21-22. *P. mazu* (Terayama, Lin & Wu). 23-24. *P. kichijo* (Terayama, Lin & Wu). 17, 19, 21, 23. Head in full-face view. 18, 20, 22, 24. Body in profile view. 17-18. After Terayama & Kubota (1989). 21-24. After Terayama *et al.* (1996).

transversely striate. Mesothorax and metathorax densely and finely punctate. Petiolar node transversely striate, anterodorsal corner roundly prominent.

Holotype. worker, No. A1037, 1 250 m, Ailaoshan Mountain, Jinping Town, Jingdong County, Yunnan Province, 14 Apr. 2002, collected by Miss CHAI Zheng-Qun in the *Pinus kesiya* forest. Paratypes: 7 workers and 1 queen, with same data as

holotype; 2 workers, with same data as holotype but No. A1042; 1 worker, with same data as holotype but No. A1071.

Etymology. The new species is named after the mountain Ailaoshan where the type specimens collected.

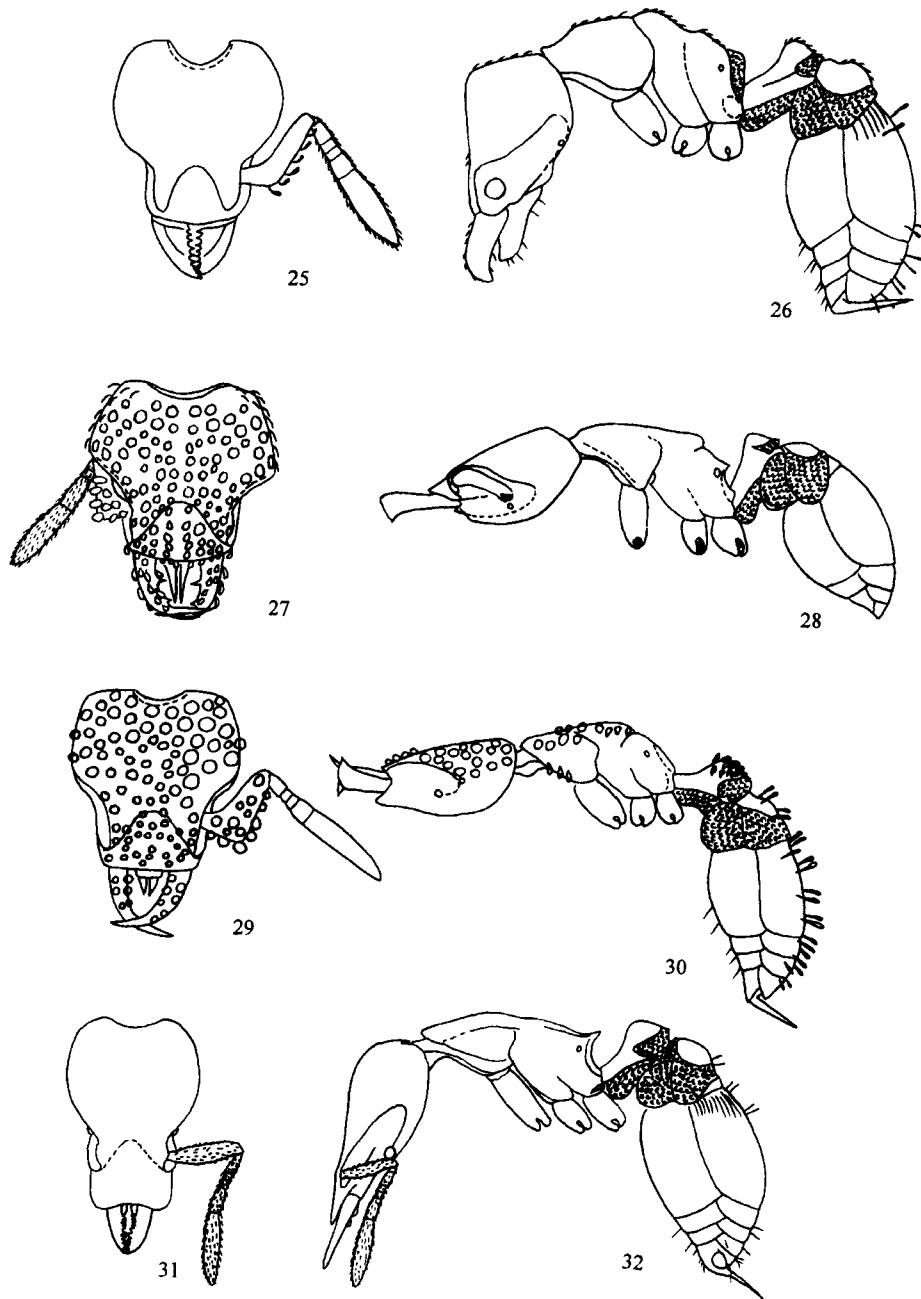
This new species is close to *P. elegantula* (Terayama & Kubota), but pronotum finely longitudinally

striate and finely densely reticulate. In profile view dorsum of mesonotum only slightly convex. Dorsum of petiolar node roundly convex, anterodorsal corner not prominent.

3 *Pyramica yangi* sp. nov. (Figs.25-26)

Holotype worker. TL 1.8, HL 0.45, HW 0.40, CI 89, ML 0.13, MI 28, SL 0.23, SI 56, PW 0.24,

AL 0.50. Head violin-like, longer than broad, posterior portion distinctly broader than anterior portion. In full face view, occipital margin deeply and roundly concave, occipital corners roundly prominent. Lateral sides of posterior 2/3 roundly convex, lateral sides of anterior 1/3 straight and slightly widened forward, and angularly notched just behind the antennal sockets. Mandible triangular, dorsum depressed, with a

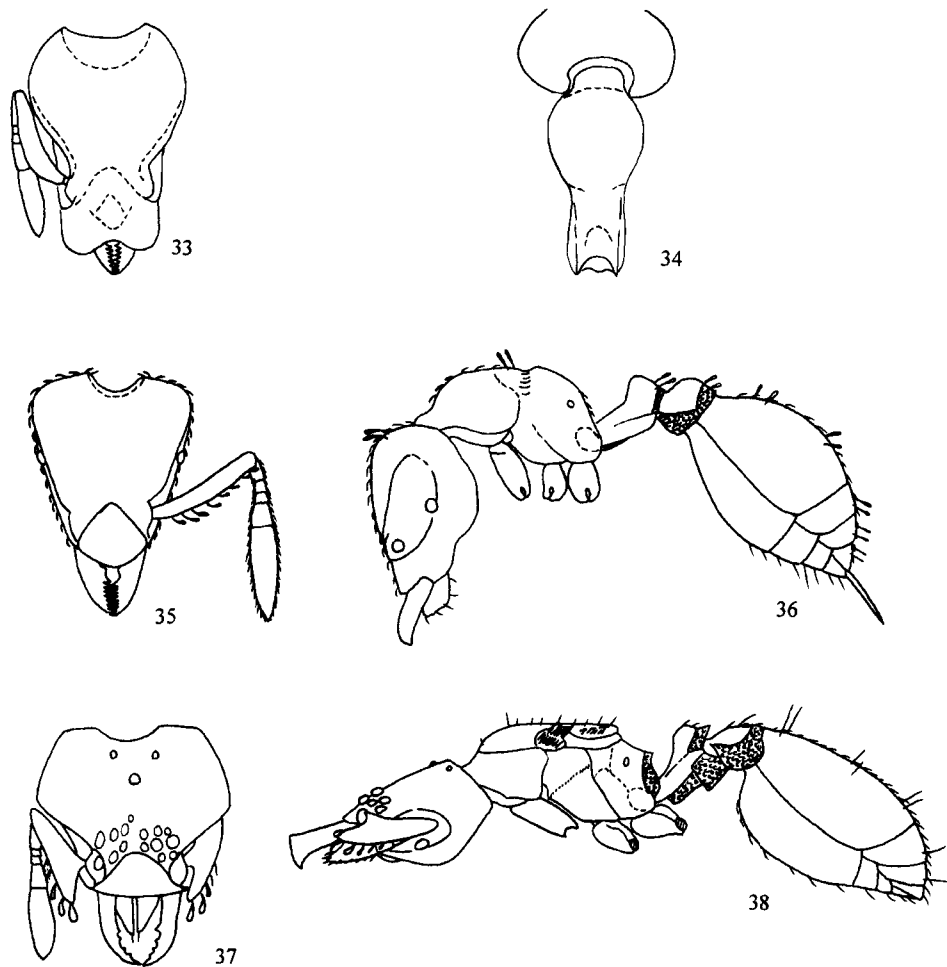


Figs.25-32. *Pyramica* workers. 25-26. *P. yangi* sp. nov. 27-28. *P. hexamera* (Brown) (pilosity omitted in 28). 29-30. *P. dayui* (Xu). 31-32. *P. canina* (Brown & Boisvert). 25, 27, 29, 31. Head in full-face view. 26, 28, 30, 32. Body in profile view. 27. After Terayama & Kubota (1989). 28. After Ogata & Onoyama (1992). 29-30. After Xu (2000). 31-32. After Brown & Boisvert (1978).

transverse basal rim and an oblique dorsolateral ridge along the depressed dorsal surface, masticatory margin with about 10 small acute teeth. Dorsum of clypeus depressed, anterior margin weakly convex. Antennal scrobe distinctly depressed. Antenna with 6 segments, antennal club 2-segmented, basal corner of scape prominent and bluntly angled, apex of scape reached to 2/3 of the distance from antennal socket to occipital corner. Eye indistinct and with only 1 ommatidium. In profile view, vertex strongly prominent and formed nearly a right angle, dorsal face and posterior face straight. Dorsum of pronotum nearly straight, dorsum of mesonotum roundly convex, promesonotal suture and metanotal groove weakly impressed. Dorsum of propodeum nearly straight and slope down backward, posterodorsal corner rounded. Declivity roundly and deeply concave, lateral sides with narrow vertical

spongiform lobes, posterodorsal corner of the lobe bluntly angled. In dorsal view, pronotum weakly depressed in central area and with blunt lateral margins. In profile view, petiole with rectangular ventral spongiform appendage, petiolar node roundly prominent, posterior border with narrow spongiform appendage. Postpetiolar node roundly convex, lateral sides and posterior border with large triangular spongiform appendages.

Mandibles and clypeus with micro-punctures and relatively shining. Head densely coarsely punctured and opaque. Dorsum of alitrunk with micro-punctures and relatively shining. Lateral sides of alitrunk smooth and shining. Petiolar node with micro-punctures and relatively shining. Postpetiolar node and gaster smooth and shining, first tergite of gaster with longitudinal basal costulae. Body surface with sparse pubescences,



Figs. 33-38. *Pyramica* workers and queens. 33-34. *P. sauteri* (Forel) (pilosity omitted). 35-36. *P. mutica* (Brown). 37-38. *P. formosa* (Terayama, Lin & Wu). 33, 35, 37. Head in full-face view. 34. Head and alitrunk in dorsal view. 36, 38. Body in profile view. 33-34. After Terayama & Kubota (1989). 37-38. After Terayama *et al.* (1995)

pilosity rare. Antennae and legs with abundant pubescences. Leading edge of scape with a row of rightly curved and apically directed spatulate hairs. Head, alitrunk, petiole and postpetiole without standing hairs. First tergite of gaster with 2 pairs of clavate erect hairs, tergites 2-4 each with 1 pair of apically blunt hairs. Body color yellow, the spongiform appendages light yellow.

Holotype worker, No. A98-1001, 700 m, Manyangguang Village, Menglun Town, Mengla County, Xishuangbanna Prefecture, Yunnan Province, 15 Mar. 1998, collected by Mr. YANG Xiao-Dong.

Etymology. The new species is named after the type specimen collector Mr. YANG Xiao-Dong.

This new species is close to *P. carinognatha* Bolton, but vertex without a pair of erect hairs, scape with a row of spatulate hairs on the leading edge, first tergite of gaster with only 2 pairs of clavate hairs.

4 *Pyramica dayui* (Xu), new comb. (Figs. 29-30)

Epitritus dayui Xu, 2000: 299, figs. 9-12. Holotype worker, China.
Epitritus dayui Xu; Xu, 2002: 40, figs. 85-88.

Discussion. Xu described and published as a new species in 2000, Bolton (personal communication) considered the names *Epitritus dayui* Xu (published on 31 Dec. 2000) and *Pyramica tisiphone* Bolton (published on 28 Dec. 2000) represent the same species. After a careful comparison between the description of *P. tisiphone* and the holotype worker of *E. dayui*, we noticed that mandible of the latter without any preapical tooth or denticle, dorsal surface of mandible with only 2 longitudinal rows of scale-like to spoon-shaped hairs, and the measurements are distinctly larger than in the former. And therefore we considered as a valid species which closely related to *P. tisiphone*.

Distribution in China: Yunnan Province (Mengla County: Nangongshan Mountain).

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REFERENCES

- Bolton, B. 1995. A new general catalogue of the ants of the world. Harvard University Press. Cambridge, Massachusetts & London, England. 504 pp.
- Bolton, B. 1999. Ant genera of the tribe Dacetoniini (Hymenoptera: Formicidae). *Journal of Natural History*, 33 (11): 1639-1689.
- Bolton, B. 2000. The ant tribe Dacetini. Part 1. *Memoirs of the American Entomological Institute*, 65 (1): 1-491.
- Bolton, B. 2000. The ant tribe Dacetini. Part 2. *Memoirs of the American Entomological Institute*, 65 (2): 492-1028.
- Brown, W. L. Jr. 1948. A preliminary generic revision of the higher Dacetini. *Transactions of the American Entomological Society*, 74: 101-129.
- Brown, W. L. Jr. 1949. Revision of the ant tribe Dacetini. 1. Fauna of Japan, China and Taiwan. *Mushi*, 20: 1-25.
- Brown, W. L. Jr. 1958. A new Japanese species of the dacetine ant genus *Epitritus*. *Mushi*, 31: 69-72.
- Brown, W. L., Jr. and Boisvert, R. G. 1978. The dacetine ant genus *Pentastruma*. *Psyche*, 85 (1978): 201-207.
- Emery, C. 1897. Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici, quas in Nova Guinea, colonia germanica, collegit L. Biro. *Termeszettajzi Füzetek*, 20: 571-599.
- Forel, A. 1912. H. Sauter's Formosa-Ausbeute: Formicidae. *Entomologische Mitteilungen*, 1: 45-81.
- Ito, T. 1914. Formicidarum Japonicum species novae vel minus cognitae. *Annales de la Societe Entomologique de Belgique*, 58: 40-45.
- Japanese Ant Database Group, 2003. Ants of Japan. Gakken. 224 pp.
- Myrmecological Society of Japan, 1992. A Guide for the Identification of Japanese Ants (III). Myrmicinae and supplement to Leptanillinae (Hymenoptera: Formicidae). The Myrmecological Society of Japan. 94 pp.
- Ogata, K. 1990. A new species of the ant genus *Epitritus* Emery from Japan (Hymenoptera, Formicidae). *Esakia*, Special Issue No. 1: 197-199.
- Ogata, K. and Onoyama, K. 1998. A revision of the ant genus *Smithistruma* Brown of Japan, with descriptions of four new species (Hymenoptera: Formicidae). *Entomological Science*, 1 (2): 277-287.
- Tang, J., Li, S., Huang, E. et al. 1995. Economic Insect Fauna of China. Fasc. 47. Hymenoptera, Formicidae (1). Science Press, Beijing. 134 pp.
- Terayama, M. and Kubota, S. 1989. The ant tribe Dacetini (Hymenoptera, Formicidae) of Taiwan, with descriptions of three new species. *Japanese Journal of Entomology*, 57 (4): 778-792.
- Terayama, M., Lin, C and Wu, W 1995. The ant genera *Epitritus* and *Kydidris* from Taiwan (Hymenoptera: Formicidae). *Proceedings of the Japanese Society of Systematic Zoology*, 53: 85-89.
- Terayama, M., Lin, C and Wu, W 1996. The Taiwanese species of the ant genus *Smithistruma* (Hymenoptera, Formicidae). *Japanese Journal of Entomology*, 64 (2): 327-339.
- Wang, M 2000. *P. wilsoni* Wang sp. n., *P. sinensis* Wang sp. n. In: Bolton, B. 2000. The ant tribe Dacetini. Part 1. *Memoirs of the*

- American Entomological Institute*, 65 (1): 1-491.
- Wheeler, W. M. 1928. Ants collected by Professor F. Silvestri in China. *Bollettino del Laboratorio di Zoologia generale e agraria del R. Istituto Superiore agrario di Portici*, 22: 3-38.
- Wheeler, W. M. 1929. Ants collected by Professor F. Silvestri in Formosa, the Malay Peninsula and the Philippines. *Bollettino del Laboratorio di Zoologia generale e agraria del R. Istituto Superiore agrario di Portici*, 24: 27-64.
- Wu, J and Wang, C 1995. The ants of China. China Forestry Publishing House, Beijing. 214 pp.
- Xu, Z-X 2000. A new species of the ant genus *Epitritus* Emery (Hymenoptera: Formicidae) from China. *Entomotaxonomia*, 22 (4): 297-300.
- Xu, Z-X 2002. A study on the biodiversity of Formicidae ants of Xishuangbanna Nature Reserve. Yunnan Science and Technology Press, Kunming. 181 pp.
- Zhou, S-Y 2001. Ants of Guangxi. Guangxi Normal University Press, Guilin. 255 pp.
- Zhou, S-Y and Xu, Z-H 2003 Taxonomic study on Chinese members of the ant genus *Strumigenys* F. Smith (Hymenoptera, Formicidae) from the mainland of China. *Acta Zootaxonomica Sinica*, 28 (4): 737-740. [动物分类学报]

中国塔蚁属系统分类研究 (膜翅目, 蚁科)

徐正会¹ 周兴国²

1. 西南林学院图书馆 云南昆明 650224, zhxu@public.km.yn.cn

2. 西南林学院保护生物学学院 云南昆明 650224

摘要 记述中国塔蚁属 *Pyramica* Roger 昆虫 26 种, 其中描述 3 新种, 提出 1 个新组合 *Pyramica dayui* (Xu)。提供了各个种的地理分布, 编制了 25 种工蚁分种检索表, 台湾塔蚁 *P. formosa* (Terayama, Lin & Wu) 仅知蚁后。26 个中国已知种是: 多氏塔蚁 *P. doherti* (Emery), 平岛塔蚁 *P. hirashimai* (Ogata), 命运塔蚁 *P. lachesis* Bolton, 王氏塔蚁 *P. emeswangi* Bolton, 节膜塔蚁 *P. membranifera* (Emery), 高作塔蚁 *P. takasago* (Terayama, Lin & Wu), 弄巴塔蚁 *P. nongba* sp. nov., 威氏塔蚁 *P. wilsoni* Wang, 日本塔蚁 *P. japonica* (Ito), 山地塔蚁 *P. formosimonticola* (Terayama, Lin & Wu), 典剑塔

蚁 *P. benten* (Terayama, Lin & Wu), 细毛塔蚁 *P. leptothrix* (Wheeler), 高雅塔蚁 *P. elegantula* (Terayama & Kubota), 哀牢山塔蚁 *P. ailaoshana* sp. nov., 玛祖塔蚁 *P. mazu* (Terayama, Lin & Wu), 吉上塔蚁 *P. kichijo* (Terayama, Lin & Wu), 杨氏塔蚁 *P. yangi* sp. nov., 中华塔蚁 *P. sinensis* Wang, 六节塔蚁 *P. hexamera* (Brown), 提西塔蚁 *P. tisiPHONE* Bolton, 大禹塔蚁 *P. dayui* (Xu), 犬齿塔蚁 *P. canina* (Brown & Boisvert), 邵氏塔蚁 *P. sauteri* (Forel), 温和塔蚁 *P. mitis* Brown, 截头塔蚁 *P. mutica* (Brown), 台湾塔蚁 *P. formosa* (Terayama, Lin & Wu)。

关键词 膜翅目, 蚁科, 塔蚁属, 系统分类, 中国.

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