

Three New Species of the Ant Genus *Myopias* (Hymenoptera: Formicidae) From China with a Key to the Known Chinese Species

by

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ABSTRACT

Three new species of the ant genus *Myopias* Roger collected in China are described, i.e., *M. luoba* sp. nov., *M. menba* sp. nov., and *M. hania* sp. nov. New supplemental data for *M. conicara* Xu is provided based on recently collected specimens. A key to the 5 known Chinese species is provided based on the worker caste.

Key words: Hymenoptera, Formicidae, *Myopias*, Taxonomy, New species, China.

INTRODUCTION

The ant genus *Myopias* Roger, 1861 is distributed in the Oriental, Indo-Australian, and Australasian regions. Thirty-four species of the genus are recorded in the world (Bolton 1995; Xu 1998). Of these, 16 species were described from New Guinea (Emery 1897, 1900, 1901; Viehmeyer 1914; Donisthorpe 1938, 1949; Willey & Brown 1983), 10 species were described from Indonesia (Smith 1861; Emery 1900; Forel 1901, 1902, 1913; Wheeler 1919; Crawley 1924), the other 8 species were respectively described from Australia (2 species, Willey & Brown 1983), Tasmania (1 species, Wheeler 1923), Philippines (2 species, Menozzi, 1925; Willey & Brown 1983), Sri Lanka (1 species, Roger 1861), and China (2 species, Willey & Brown 1983; Xu 1998). It is obvious that the Indo-Australian region is the distribution center of the genus, although some species have spread into the Oriental and Australasian regions. Donisthorpe (1941), Brown (1953), Willey & Brown (1983), and Bolton (1995) reviewed part of the species, but no significant revision of the genus has been carried out as of this date.

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In the ant species-diversity investigations of the past 13 years, 3 new species of the genus *Myopias* Roger were collected by our team from Tibet and Yunnan Province of China, and more specimens of the previously described species, *M. conicara* Xu, were also obtained. The 3 new species are described in this paper, and new supplemental data is provided for *M. conicara* Xu.

MATERIALS AND METHODS

The worker and queen castes of the new species and *M. conicara* were collected by the search-collecting method and sample-plot method. Descriptions and measurements were made under a XTB-1 stereo microscope with a micrometer. Illustrations were made under a Motic-700Z stereo microscope with illustrative equipment.

Standard measurements and indices are as defined in Bolton (1975), in addition, ML, ED, and AL are included:

TL-Total Length: The total outstretched length of the individual, from the mandibular apex to the gastral apex.

HL-Head Length: The straight-line length of the head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the mid-point of the occipital margin. In species where one or both of these margins are concave, the measurement is taken from the mid-point of a transverse line that spans the apices of the projecting portions.

HW-Head Width: The maximum width of the head in full face view, excluding the eyes.

CI-Cephalic Index = $HW \times 100 / HL$.

SL-Scape Length: The straight-line length of the antennal scape, excluding the basal constriction or neck.

SI-Scape Index = $SL \times 100 / HW$.

ML-Mandible Length: The straight-line length of the mandible measured from apex to the lateral base.

ED-Eye Diameter: The maximum diameter of the eye.

PW-Pronotal Width: The maximum width of the pronotum measured in dorsal view.

AL-Alitrunk Length: The diagonal length of the alitrunk in profile view, measured from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron.

PL-Petiole Length: The length of the petiole measured in profile from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation.

PH-Petiole Height: The height of the petiole measured in profile from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsalmost point of the node.

DPW-Dorsal Petiole Width: The maximum width of the petiole in dorsal view.

LPI-Lateral Petiole Index = $PH \times 100 / PL$.

DPI-Dorsal Petiole Index = $DPW \times 100 / PL$.

All measurements are expressed in millimeters.

The type specimens are deposited in the Insect Collection, Southwest Forestry University (SWFU), Kunming, Yunnan Province, China.

KEY TO KNOWN CHINESE SPECIES OF *MYOPLAS* BASED ON THE WORKER CASTE

1. In profile view, anteroventral corner of head without cone-like or bluntly angled process. Subpetiolar process simple, triangular or cuneiform, without posteriorly pointed tooth2
- In profile view, anteroventral corner of head with a cone-like or bluntly angled process. Subpetiolar process complex, anteroventral corner with a ventrally pointed tooth, posteroventral corner with a posteriorly pointed tooth4
2. In profile view, eyes relatively developed, with 6 facets in the maximum diameter. Petiolar node nearly rectangular, posterodorsal corner as high as anterodorsal corner (Figs. 1-4)(China: Tibet)..... *M. luoba* sp. nov.
- In profile view, eyes reduced, with 2 facets or absent. Petiolar node nearly trapezoid, posterodorsal corner distinctly lower than anterodorsal corner.....3
3. Eyes absent. Apices of antennal scapes just reach to occipital corners. In profile view, posterodorsal corner of petiolar node roundly prominent. In dorsal view, petiolar node more broad than long (Figs. 5-7)(China: Taiwan Province)..... *M. nops* Willey & Brown
- Eyes present, each with only 2 facets. Apices of antennal scapes only reach to 4/5 of the distance from antennal sockets to occipital corners. In profile

- view, posterodorsal corner of petiolar node rounded. In dorsal view, petiolar node about as broad as long (Figs. 8-11)(China: Tibet)
 *M. menba* sp. nov.
4. In full face view, apices of antennal scapes not reaching to occipital corners. In profile view, petiolar node higher than long, ventral face of subpetiolar process evenly convex behind anteroventral tooth. In dorsal view, petiolar node broader than long (Figs. 12-15)(China: Yunnan Province)
 *M. hania* sp. nov.
- In full face view, apices of antennal scapes reach to or slightly surpass occipital corners. In profile view, petiolar node about as high as long, ventral face of subpetiolar process nearly straight behind anteroventral tooth. In dorsal view, petiolar node about as broad as long (Figs. 16-23)(China: Yunnan Province) *M. conicara* Xu

DESCRIPTIONS OF NEW SPECIES AND SUPPLEMENTS
 TO *M. CONICARA*

Myopias luoba sp. nov.

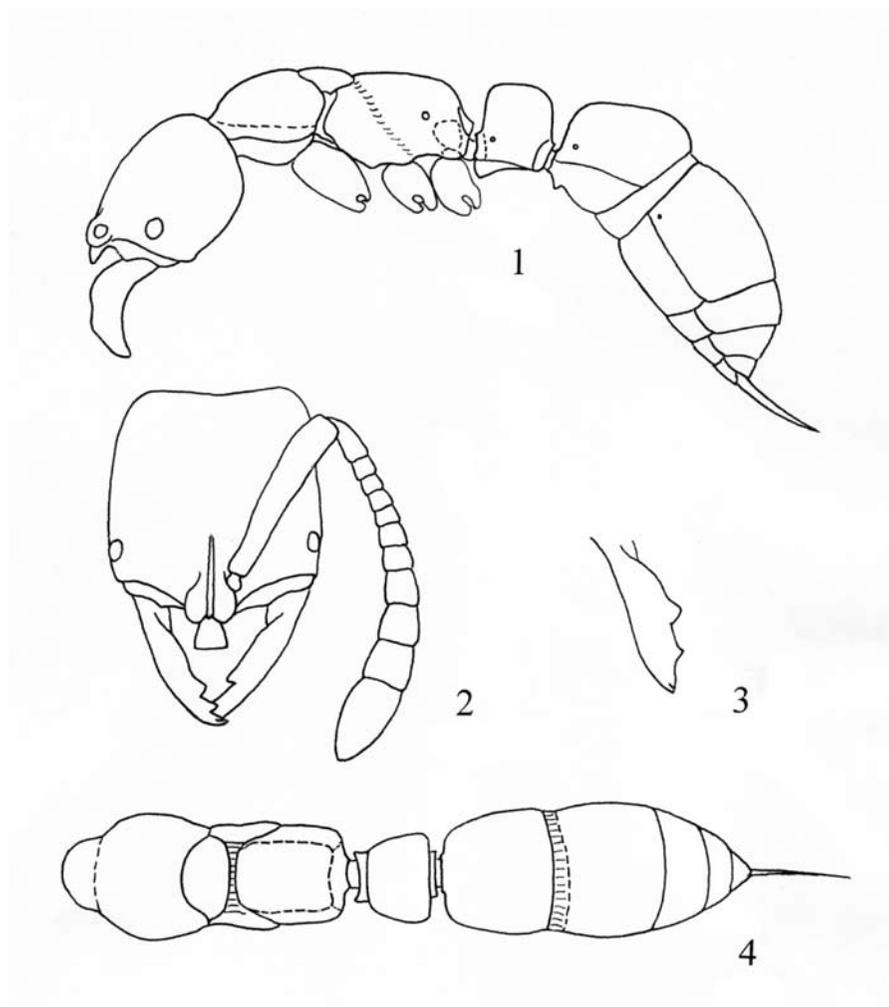
(Figs. 1-4)

Holotype worker: TL 3.8, HL 0.80, HW 0.65, CI 81, SL 0.58, SI 88, ML 0.53, ED 0.09, PW 0.50, AL 1.08, PL 0.36, PH 0.45, DPW 0.36, LPI 124, DPI 100.

Head nearly rectangular, longer than broad, weakly widened forward. Occipital margin slightly concave, occipital corners roundly prominent, lateral sides slightly convex. Mandibles elongate triangular, inner margin weakly convex, about as long as masticatory margin. Masticatory margin with 4 teeth, including 1 basal tooth, 1 middle tooth, and 2 minute apical denticles. Median lobe of clypeus protruding forward, nearly triangular, widened forward, length : width = 4:5, anterior margin straight. Antennae 12-segmented, apices of scapes almost reach to occipital corners, antennal clubs 4-segmented. Longitudinal furrow between frontal lobes distinct. Eyes small, with 6 facets in the maximum diameter.

In profile view, promesonotum evenly convex, promesonotal suture distinct but not depressed, metanotal groove slightly depressed. Propodeal dorsum slightly convex, about 2 times as long as declivity, posterodorsal corner rounded.

Petiolar node nearly square, anterior face straight, dorsal and posterior faces weakly convex, anterodorsal corner blunt, about as high as posterodorsal corner, the latter roundly prominent. Subpetiolar process large, triangular, anteroventral corner blunt. In dorsal view, petiolar node trapezoid, widened backward, length : width = 1:1.3, anterior and lateral margins weakly convex, anterolateral corners rounded, posterior margin nearly straight. Constriction



Figs. 1-4. Worker of *Myopias luoba* sp. nov.; 1. Head and body in profile view; 2. Head in full face view; 3. Mandible in dorsal view; 4. Alitrunk, petiole, and gaster in dorsal view. (Pilosity omitted)

between the two basal gastral segments distinct. Sting developed and laterally compressed.

Mandibles smooth and shining, with sparse fine punctures. Head densely finely punctured, interfaces smooth. Alitrunk, petiole, and gaster smooth and shining, with sparse fine punctures. Lateral sides of metathorax below propodeal spiracles finely longitudinally striate. Dorsa of head and body with sparse suberect hairs and abundant decumbent pubescence,

pubescence on the head dense. Scapes and tibiae with sparse subdecumbent hairs and dense decumbent pubescence. Color blackish brown. Head almost black. Mandibles, clypeus, antennae, legs, and gastral apex brownish yellow.

Holotype: worker, CHINA: Tibet, Medog County, Medog Town, Yarang, 820m, forages on the ground in the secondary rain forest, 2008.V.20, Zheng-Hui Xu leg., No. A08-875.

Etymology: The new species is named after the Chinese minority nationality Luoba who mainly live in southeastern Tibet.

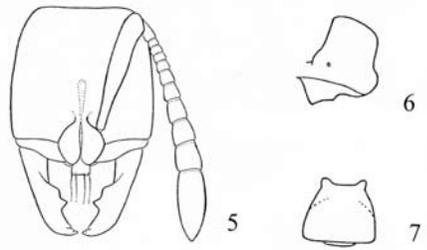
Comparison: This new species is close to *M. amblyops* Roger, but differs from it by the anterior margin of clypeus with distinct protruding triangular median lobe; in profile view petiole with large triangular subpetiolar process.

Myopias menba sp. nov.

(Figs. 8-11)

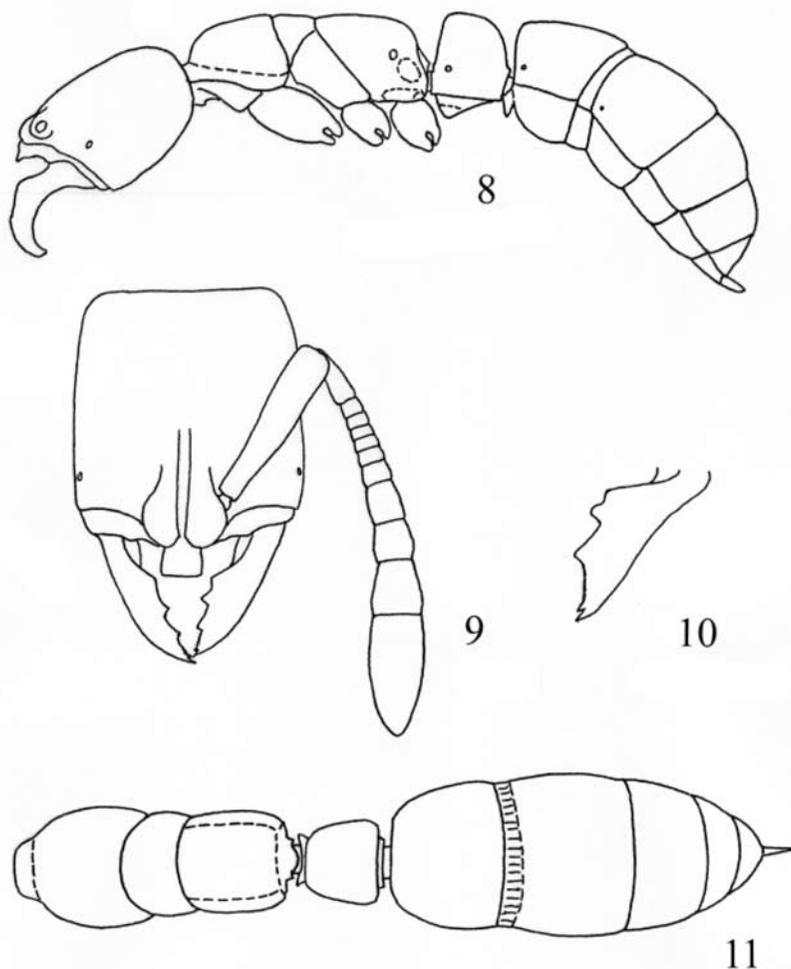
Holotype worker: TL 3.3, HL 0.73, HW 0.58, CI 79, SL 0.45, SI 78, ML 0.45, ED 0.03, PW 0.41, AL 0.95, PL 0.30, PH 0.40, DPW 0.30, LPI 133, DPI 100.

Head nearly rectangular, longer than broad, lateral sides nearly parallel. Occipital margin straight, occipital corners bluntly prominent. Mandibles elongate, triangular, inner margin very short, about 1/3 length of masticatory margin. Masticatory margin with 4 teeth, including 1 basal tooth, 1 middle tooth, and 2 minute apical denticles beside the basal corner. Median lobe of

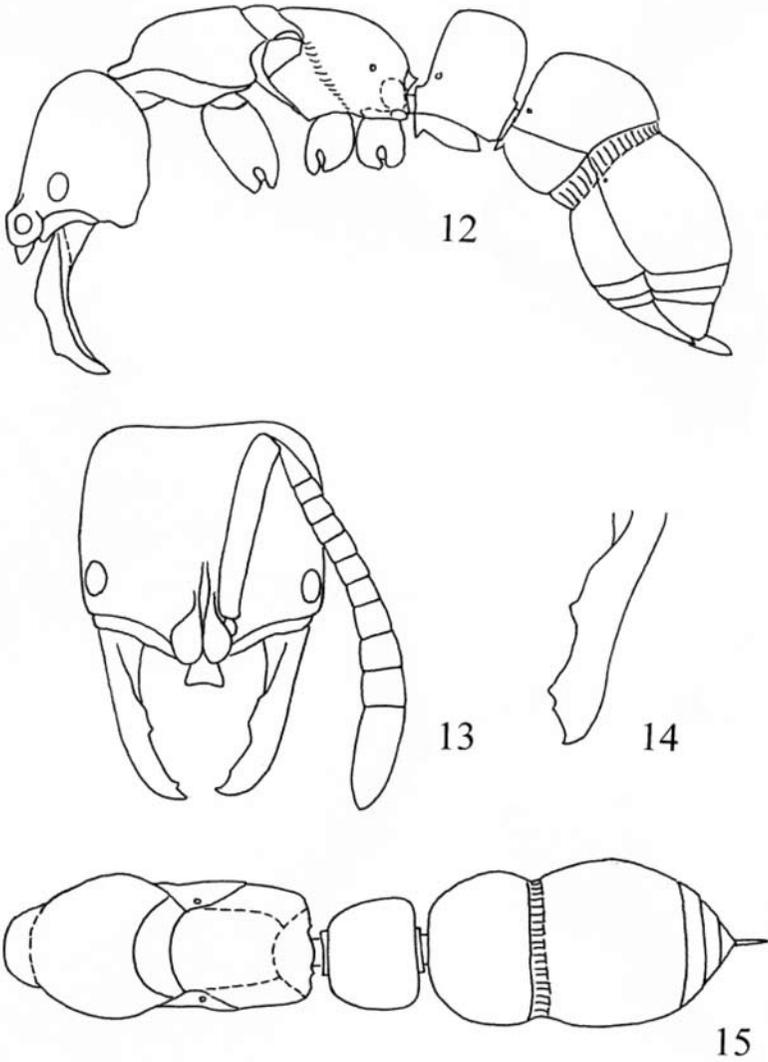


Figs. 5-7. Worker of *Myopias nops* Willey & Brown; 5. Head in full face view; 6. Petiole in profile view; 7. Petiole in dorsal view; 5-7. Cited from Willey & Brown (1983) (Pilosity omitted).

clypeus protruding forward, nearly square, length : width = 3:4, lateral sides parallel, anterior margin straight. Longitudinal furrow between frontal lobes distinct. Antennae short, 12-segmented, apices of scapes reached to $\frac{4}{5}$ of the distance from antennal sockets to occipital corners, antennal clubs 4-segmented. Eyes minute, with only 2 facets.



Figs. 8-11. Worker of *Myopias menba* sp. nov.; 8. Head and body in profile view; 9. Head in full face view; 10. Mandible in dorsal view; 11. Alitrunk, petiole, and gaster in dorsal view (Pilosity omitted).



Figs. 12-15. Worker of *Myopias hania* sp. nov.; 12. Head and body in profile view; 13. Head in full face view; 14. Mandible in dorsal view; 15. Alitrunk, petiole, and gaster in dorsal view (Pilosity omitted).

In profile view, promesonotum weakly convex, promesonotal suture and metanotal groove slightly depressed. Propodeal dorsum straight, about 2 times as long as declivity, posterodorsal corner rounded. Petiolar node very thick, roughly trapezoid, anterior face straight, dorsal face rounded into posterior face, anterodorsal corner bluntly prominent, posterodorsal corner indistinct. Subpetiolar process large, triangular, anteroventral corner bluntly prominent. Anterior and posteroventral faces nearly straight. In dorsal view, petiolar node trapezoid, widened backward, length : width = 1:1.1, anterior and lateral margins weakly convex, posterior margin weakly concave. Constriction between the two basal gastral segments distinct. Sting laterally compressed, apex relatively blunt.

Mandibles smooth and shining, with sparse fine punctures. Head, alitrunk, and petiole densely punctured, lateral sides of alitrunk finely longitudinally rugose, dorsal and posterior faces of petiolar node smooth. Gaster smooth and shining, dorsa of the two basal segments abundantly punctured, the rest segments sparsely punctured. Dorsa of head and body with sparse suberect short hairs and dense decumbent pubescence, gastral apex with abundant longer hairs. Scapes and tibiae with sparse suberect hairs and dense decumbent pubescence. Color brownish yellow, eyes black.

Holotype: worker, CHINA: Tibet, Medog County, Medog Town, Yarang, 720m, forage on the ground in the secondary rain forest, 2008.V.20, Zheng-Hui Xu leg., No. A08-838.

Etymology: The new species is named after the Chinese minority nationality Menba who mainly lives in southeastern Tibet.

Comparison: This new species is close to *M. nops* Willey & Brown, but eyes present and each with 2 facets; apices of scapes failed to reach occipital corners; in profile view posterodorsal corner of petiolar node rounded, in dorsal view petiolar node about as broad as long.

Myopias hania sp. nov.

(Figs. 12-15)

Holotype worker: TL 5.9, HL 1.25, HW 1.15, CI 92, SL 0.93, SI 80, ML 1.00, ED 0.18, PW 0.88, AL 1.83, PL 0.60, PH 0.83, DPW 0.68, LPI 138, DPI 113.

Head nearly square, slightly longer than broad, weakly narrowed forward. In full face view, occipital margin slightly concave, occipital corners rounded, lateral sides weakly convex. Mandibles slender and linear, inner margin weakly convex, masticatory margin about 1.3 times as long as inner margin, basal tooth blunt. The basal 1/2 of masticatory margin concave, the apical 1/2 obliquely truncated. Median lobe of clypeus protruding and widened forward, trapezoidal, without longitudinal central carina, length : width = 1:1.8, anterior margin weakly concave. Longitudinal furrow between frontal lobes distinct. Antennae 12-segmented, apices of scapes reached to 9/10 of the distance from antennal sockets to occipital corners, antennal clubs 4-segmented. Eyes relatively large, with 11-12 facets in the maximum diameter. In profile view, anterior 1/2 ventral face of head longitudinally convex, anteroventral corner bluntly angled.

In profile view, dorsum of alitrunk weakly convex, promesonotal suture and metanotal groove weakly depressed. Dorsum of propodeum about as long as declivity, posterodorsal corner rounded, declivity weakly longitudinally depressed. Petiolar node nearly square, anterior face straight, dorsal and posterior faces slightly convex, anterodorsal corner bluntly prominent, posterodorsal corner roundly prominent. Subpetiolar process complex, roughly cuneiform, anteroventral corner acutely toothed, ventral face evenly convex behind the tooth, posteroventral corner toothed. In dorsal view, petiolar node trapezoid and widened backward, length : width = 1:1.3, anterior and lateral margins weakly convex, anterolateral corners rounded, posterior margin straight. Constriction between the two basal gastral segments distinct. Sting laterally compressed, apex relatively blunt.

Mandibles smooth, with sparse punctures. Head smooth, dorsum with abundant punctures, vertex, occiput, and ventral face with sparse punctures. Alitrunk smooth, with sparse large punctures, lateral sides of mesothorax, metathorax, and propodeum with fine longitudinal striations. Propodeal declivity smooth, the lower portion transversely striate. Petiole smooth, with sparse large punctures, lateral sides finely longitudinally rugose. Gaster smooth, first segment and basal portion of second segment with abundant large punctures.

Dorsum of head with sparse suberect hairs and dense decumbent pubescence. Dorsum of body with abundant suberect hairs and abundant decum-

bent pubescence. Anterior face of petiolar node with dense pubescence. Scapes and tibiae with sparse subdecumbent hairs and dense decumbent pubescence. Color brownish black. Mandibles, antennae, legs, and gastral apex reddish brown.

Paratype worker: TL 6.1, HL 1.30, HW 1.20, CI 92, SL 0.93, SI 77, ML 1.05, ED 0.20, PW 0.88, AL 1.80, PL 0.63, PH 0.88, DPW 0.73, LPI 140, DPI 116 (1 individual observed). As holotype.

Holotype: worker, CHINA: Yunnan Province, Hekou County, Nanxi Town, Laodoutian, 750m, collected from a soil sample in the monsoon forest, 2010.IV.5, Hui-Qin Zhu leg., No. A10-2557. Paratype: 1 worker, with same data as holotype.

Etymology: The new species is named after the Chinese minority nationality Hani who commonly lives in southern Yunnan Province.

Comparison: This new species is close to *M. conicara* Xu, but apices of scapes fail to reach occipital corners; posterolateral margins of petiolar node without an oblique furrow, in dorsal view petiolar node broader than long; in profile view subpetiolar process thick, ventral face distinctly convex after the anteroventral tooth.

Myopias conicara Xu

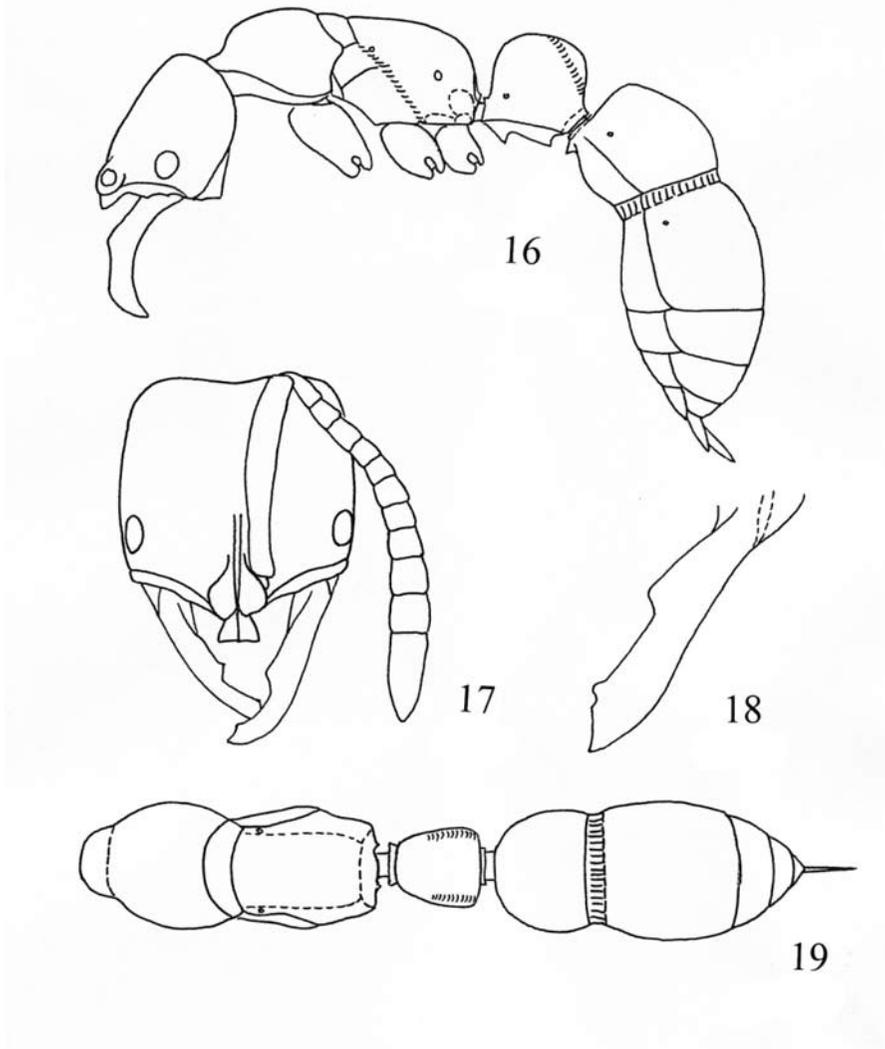
(Figs. 16-23)

Worker (Figs. 16-19): TL 7.2-8.3, HL 1.40-1.63, HW 1.27-1.50, CI 90-92, SL 1.17-1.30, SI 87-92, ML 1.17-1.33, ED 0.23-0.27, PW 0.97-1.13, AL 2.10-2.33, PL 0.80-0.90, PH 0.90-1.00, DPW 0.67-0.73, LPI 108-113, DPI 80-83 (3 individuals observed).

Conforms well to the original description. But a specimen from Ximeng County (No. A11-1496) features a longitudinal central carina on the median lobe of clypeus; posteroventral corner of subpetiolar process extruding into an acute tooth. Specimens from Gengma County (No. A11-17) and Baoshan City (No. A0062) with occipital margin weakly concave, occipital corners more rounded; antennal scapes relatively short, with apices just reached to occipital corners; median lobe of clypeus with a longitudinal central carina; and posteroventral corner of subpetiolar process extruding into an acute tooth.

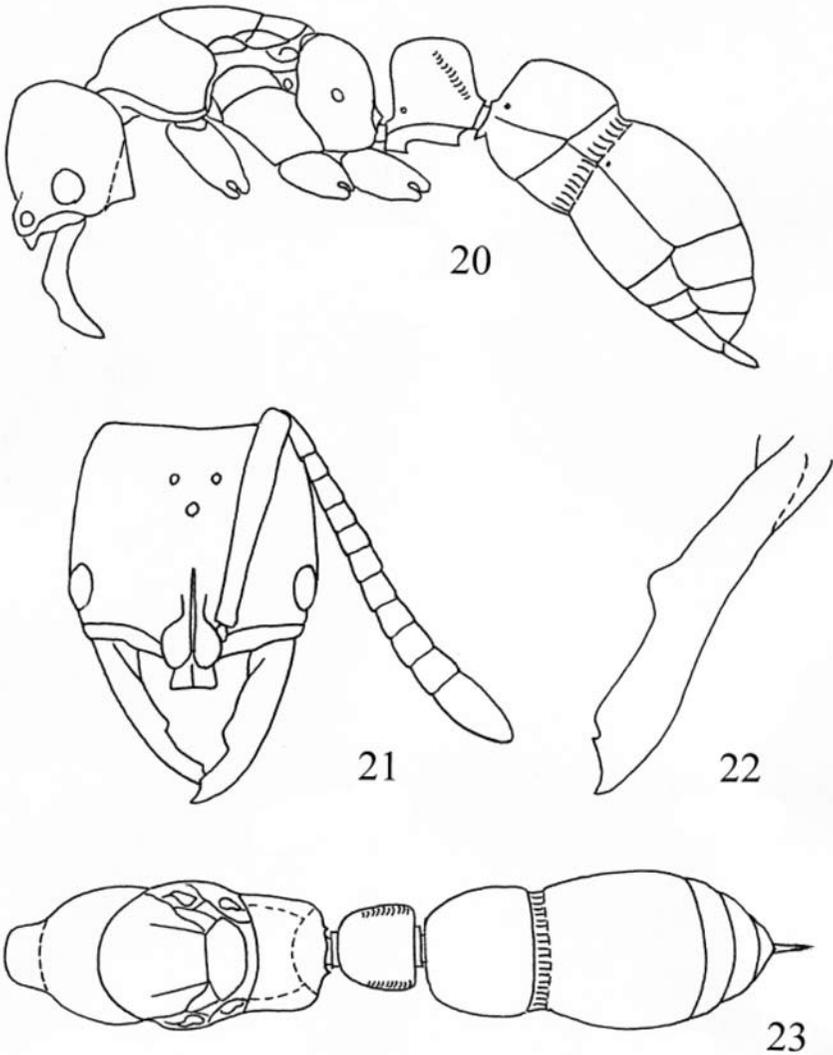
Queen (Figs. 20-23): TL 10.0, HL 1.77, HW 1.70, CI 96, SL 1.53, SI 90, ML 1.47, ED 0.37, PW 1.43, AL 3.07, PL 1.03, PH 1.20, DPW 0.90, LPI 116, DPI 87 (1 individual observed).

Conforms well to the original description. But body relatively large, median lobe of clypeus with a longitudinal central carina, vertex with 3 ocelli.



Figs. 16-19. Worker of *Myopias conicara* Xu; 16. Head and body in profile view; 17. Head in full face view; 18. Mandible in dorsal view; 19. Alitrunk, petiole, and gaster in dorsal view. (Pilosity omitted)

In profile view, the cone-like process on ventral face of head nearly right angled. Dorsum of alitrunk evenly convex, tegulae and hind tegulae present, mesopleura with an oblique furrow. Posterodorsal corner of propodeum



Figs. 20-23. Queen of *Myopias conicara* Xu; 20. Head and body in profile view; 21. Head in full face view; 22. Mandible in dorsal view; 23. Alitrunk, petiole, and gaster in dorsal view. (Pilosity omitted)

rounded, dorsal face shorter than declivity. In dorsal view, mesoscutum with a pair of oblique longitudinal furrows, about 1/2 length of mesoscutum. Mesoscutellum nearly hexagonal, anterior margin straight, posterior margin weakly convex. Metascutum narrow and transverse. In profile view, subpetiolar process more complex, anteroventral lobe truncated ventrally instead of a ventrally pointed tooth, ventral face weakly convex behind the lobe, posteroventral corner extruding into an acute tooth.

Specimens observed: 1 queen, CHINA: Yunnan Province, Mengla County, Shangyong Town, Manzhuang, 900 m, semi-evergreen monsoon forest, 1998.III.10, Tai-Yong Liu leg., No. A98-371; 1 worker, CHINA: Yunnan Province, Ximeng County, Mengka Town, Nankang, 1240 m, forage on the ground in the man-made conifer-broadleaf mixed forest, 2011.III.21, Zheng-Hui Xu leg., No. A11-1496; 1 worker, CHINA: Yunnan Province, Gengma County, Mengdin Town, Nantianmen, 1950 m, collected from a soil sample in the conifer-broadleaf mixed forest, 2011.III.10, Hai-Bin Li leg., No. A11-17; 1 worker, CHINA: Yunnan Province, Baoshan City, Mangkuan Town, Shangyizhai, 1525 m, monsoon evergreen broadleaf forest, 2000.III.27, Xing-Cheng Jiang leg., No. A0062.

Discussion: According to the known collecting data, the Oriental species *M. conicara* Xu is distributed in the hot tropical and subtropical regions of southern Yunnan Province, China. The species is rare, forages on the ground and in soil, and possibly nests in the soil. There are some variations in populations from different localities: e.g., the longitudinal central carina on the median clypeal lobe may be present or absent, the apices of antennal scapes may reach to or slightly surpass occipital corners, occipital margin may be straight or weakly concave, posteroventral corner of subpetiolar process may be weakly or strongly extruding. But the cone-like process on the ventral face of the head is always present and distinct.

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REFERENCES

- Bolton, B. 1975. A revision of the ant genus *Leptogenys* Roger in the Ethiopian region, with a review of the Malagasy species. *Bulletin of the British Museum (Natural History) (Entomology)* 31: 235-305.
- Bolton, B. 1995. *A New General Catalogue of the Ants of the World*. Harvard University Press, 504 pp. Cambridge, Massachusetts.
- Brown, W.L., Jr. 1953. An Australian *Trapeziopelta*. *Psyche* 60: 51.
- Clark, J. 1934. Ants from the Otway Ranges. *Memoirs of the National Museum, Victoria* 8: 48-73.
- Crawley, W.C. 1924. Ants from Sumatra. With biological notes by Edward Jacobson. *Annals and Magazine of Natural History* (9) 13: 380-409.
- Donisthorpe, H. 1938. New species and varieties of ants from New Guinea. *Annals and Magazine of Natural History* (11) 1: 593-599.
- Donisthorpe, H. 1941. Synonymical notes, etc., on Formicidae. *Entomologist's Monthly Magazine* 77: 237-240.
- Donisthorpe, H. 1949. A seventh instalment of the Ross Collection of ants from New Guinea. *Annals and Magazine of Natural History* (12) 2: 401-422.
- Emery, C. 1897. Viaggio di Lamberto Loria nella Papuasia orientale. 18. Formiche raccolte nella Nuova Guinea dal Dott. Lamberto Loria. *Annali del Museo Civico di Storia Naturale di Genova* (2) 18 [38]: 546-594.
- Emery, C. 1900. Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici, quas in Nova-Guinea, colonia germanica, collegit L. Biró. *Publicatio secunda. Termesztrajzi Füzetek* 23: 310-338.
- Emery, C. 1901. Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici, quas in Nova-Guinea, colonia germanica, collegit L. Biró. *Publicatio tertia. Termesztrajzi Füzetek* 25 (1902): 152-160.
- Forel, A. 1901. Nouvelles espèces de Ponerinae. (Avec un nouveau sous-genre et une espèce nouvelle d'*Eciton*.) *Revue Suisse de Zoologie* 9: 325-353.
- Forel, A. 1902. Quatre notices myrmécologiques. *Annales de la Société Entomologique de Belgique* 46: 170-182.
- Forel, A. 1913. *Wissenschaftliche Ergebnisse einer Forschungsreise nach Ostindien, ausgeführt im Auftrage der Kgl. Preuss. Akademie der Wissenschaften zu Berlin von H. v. Buttel-Reepen*. 2. Ameisen aus Sumatra, Java, Malacca und Ceylon. Gesammelt von Herrn Prof. Dr. v. Buttel-Reepen in den Jahren 1911-1912. *Zoologische Jahrbücher. Abteilung für Systematik, Geographie und Biologie der Tiere* 36: 1-148.

- Roger, J. 1861. Die *Ponera*-artigen Ameisen. (Schluss.) Berliner Entomologische Zeitschrift 5: 1-54.
- Menozzi, C. 1925. Nouvelles fourmis des Philippines. Philippine Journal of Science 28: 439-449.
- Smith, F. 1861. Catalogue of hymenopterous insects collected by Mr. A.R. Wallace in the Islands of Ceram, Celebes, Ternate, and Gilolo. Journal of the Proceedings of the Linnean Society, Zoology 6: 36-48.
- Viehmeyer, H. 1914. Papuanische Ameisen. Deutsche Entomologische Zeitschrift 1914: 515-535.
- Wheeler, W.M. 1919. The ants of Borneo. Bulletin of the Museum of Comparative Zoology at Harvard College 63: 43-147.
- Wheeler, W.M. 1923. Ants of the genera *Myopias* and *Acanthoponera*. Psyche 30: 175-192.
- Willey, R.B. & Brown, W.L., Jr. 1983. New species of the ant genus *Myopias*. Psyche 90: 249-285.
- Xu, Z. 1998. Two new record genera and three new species of Formicidae from China. Entomologica Sinica 5: 121-127.

