

Taxonomic review of the ponerine ant genus *Leptogenys* ROGER, 1861 (Hymenoptera: Formicidae) with a key to the Oriental species

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Abstract

The ponerine ant genus *Leptogenys* ROGER, 1861 in the Oriental region is reviewed, forty species are recognized. Four new synonyms are proposed: *L. huangdii* XU, 2000 is a junior synonym of *L. lucidula* EMERY, 1895; *L. hodgsoni* FOREL, 1900 is a junior synonym of *L. diminuta* (F. SMITH, 1857); *L. minchinii* FOREL, 1900 and *L. watsoni* FOREL, 1900 are junior synonyms of *L. peuqueti* (ANDRE, 1887). Two new species of the genus, *L. yandii* sp.n. and *L. sunzii* sp.n., are described from China. *Leptogenys kraepelini* FOREL, 1905 and *L. davydovi* KARAVAIEV, 1935 are recorded in China for the first time. *Leptogenys yerburyi* FOREL, 1900 is excluded from the fauna of China. A key based on the worker caste is provided for the known Oriental species.

Key words: Formicidae, *Leptogenys*, new synonyms, new species, key, Oriental region.

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Introduction

The ponerine ant genus *Leptogenys* ROGER, 1861 is distributed throughout the tropics (BOLTON 1995) and subtropics. Up to date, 265 valid extant species are recorded in the world (BOLTON 2014). BOLTON (1975) revised the Ethiopian species of the genus with a review of the Malagasy fauna. LATTKE (2011) revised the New World species. The rest of the world's fauna is still waiting for revision.

The Oriental region consists of Pakistan, Sri Lanka, the whole Indian subcontinent to the Himalayas, south China, and the countries of Myanmar, Thailand, Cambodia, Laos, and Vietnam (BOLTON 1994). Before this study, 42 valid extant species of *Leptogenys* known from the worker caste were recorded in the Oriental region (BOLTON 1995, 2014). Fifteen species of the genus were originally described from India, eight species from Myanmar, six species from Sri Lanka, five species from Vietnam, one species from Laos, and thirteen species from China. Detailed authorship information is provided in the species list.

Distribution data for the Oriental species of *Leptogenys* can be found in the following publications. BINGHAM (1903) recorded 29 species in India, Sri Lanka, and Myanmar. CHAPMAN & CAPCO (1951) reported 50 species in Asia. Data on the occurrence of the genus in China have been published by WHEELER (1930, 5 species), WU & WANG (1995, 3 species), TANG & al. (1995, 5 species), WANG & al. (2009, 2 species), ZHOU & RAN (2010, 20 species), GUENARD & DUNN (2012, 20 species), and TERAYAMA (2009, 3 species from Taiwan, China).

Although EMERY (1895, 1911) revised part of the Oriental species of *Leptogenys*, a systematic revision of the

regional species is still needed. In this study, we review another part of the Oriental species of *Leptogenys* and propose four new synonyms. Two new species are described from China. *Leptogenys kraepelini* FOREL, 1905 and *L. davydovi* KARAVAIEV, 1935 are recorded in China for the first time. Considering the Chinese fauna, *L. mengzii* XU, 2000 is recorded in Tibet and *L. rufida* ZHOU & al., 2012 is recorded in Yunnan for the first time. *Leptogenys yerburyi* FOREL, 1900 is excluded from the fauna of China and *L. chinensis* (MAYR, 1870) is excluded from the fauna of Yunnan. Up to now, forty extant species of the genus known from worker caste are recognized in the Oriental region. A key based on the worker caste is provided for the Oriental species.

Materials and methods

Oriental species of *Leptogenys* are reviewed based on specimens from southwestern China and type and non-type specimen images available on AntWeb (<http://www.antweb.org>) and AntBase (<http://www.antbase.net>). Ant specimens from southwestern China were collected through sample-plot and search-collecting methods (XU 2002, XU & al. 2011) and observed under a Jiangnan XTB-1 stereo microscope with a micrometer. The specimens examined include the type series of *L. huangdii* XU, 2000, *L. laozii* XU, 2000, *L. mengzii* XU, 2000, *L. pangui* XU, 2000, *L. zhuangzii* XU, 2000, *L. sunzii* sp.n., and *L. yandii* sp.n., and the non-type series of *L. binghamii* FOREL, 1900, *L. birmana* FOREL, 1900, *L. crassicornis* EMERY, 1895, *L. davydovi* KARAVAIEV, 1935, *L. diminuta* (F. SMITH, 1895), *L. kitteli*

(MAYR, 1870), *L. kraepelini* FOREL, 1905, *L. lucidula* EMERY, 1895, *L. peuqueti* (ANDRÉ, 1887), and *L. rufida* ZHOU & al., 2012. All specimens were deposited in the Insect Collection, Southwest Forestry University, Kunming, Yunnan Province, China. Illustrations of the new species and species representing new records were drawn using a Motic-700Z stereo microscope with illustration accessories. Images of the new species were produced using a Zeiss Discovery V20 stereo microscope with Zeiss AxioCam HRc CCD and Axio Vision Release 4.8.2 software. The key was prepared using the examined specimens, available AntWeb and AntBase images, and original descriptions of the species.

Standard measurements and indices are as defined in BOLTON (1975), with addition of ML, ED and MSL as outlined below:

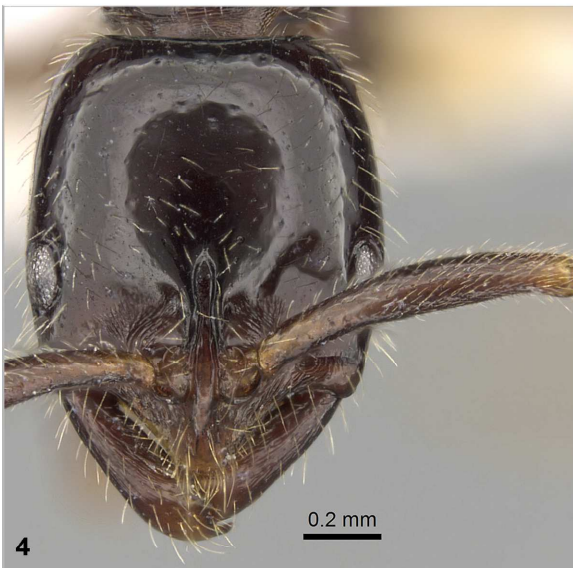
- CI Cephalic Index = $HW \times 100 / HL$.
 DPI Dorsal Petiole Index = $DPW \times 100 / PL$.
 DPW Dorsal Petiole Width: maximum width of petiole in dorsal view.
 ED Eye Diameter: maximum diameter of eye.
 HL Head Length: straight-line length of head in perfect full-face view, measured from the mid-point of the anterior clypeal margin to the midpoint of the posterior 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: maximum width of head in full-face view, excluding the eyes.
 LPI Lateral Petiole Index = $PH \times 100 / PL$.
 ML Mandible Length: straight-line length of mandible measured from apex to the lateral base.
 MSL Mesosoma Length (= alitrunk length): diagonal length of the mesosoma in lateral view, measured from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron.
 PH Petiole Height: height of petiole measured in lateral view from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsalmost point of the node.
 PL Petiole Length: length of petiole measured in lateral view from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation.
 PW Pronotal Width: maximum width of pronotum measured in dorsal view.
 SI Scape Index = $SL \times 100 / HW$.
 SL Scape Length: straight-line length of the antennal scape, excluding the basal constriction or neck.
 TL Total Length: total outstretched length of the individual, from the mandibular apex to the gastral apex.
 All measurements are expressed in millimeters.

List of extant Oriental species known from worker caste

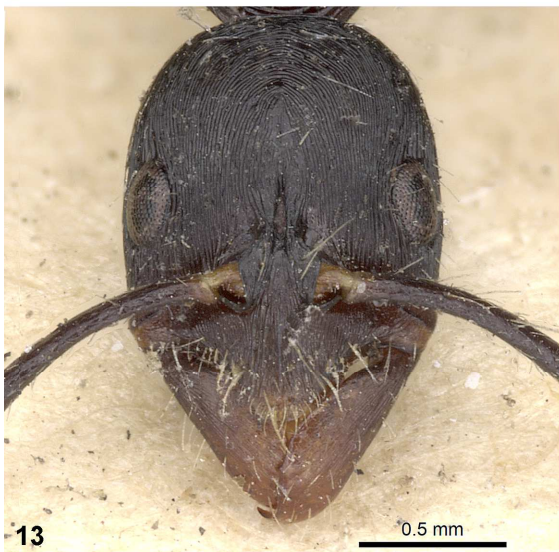
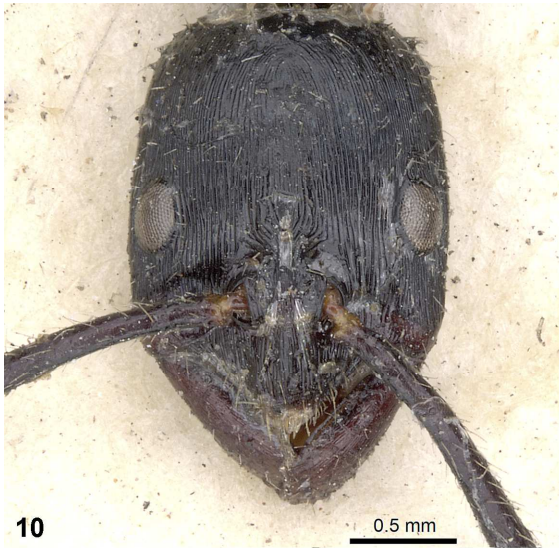
After the four new synonyms and description of the two new species, forty extant species of *Leptogenys* known from worker caste are recorded in the Oriental region.

1. ***Leptogenys aspera* (ANDRÉ, 1889)**
Lobopelta aspera ANDRÉ, 1889: 222 (w.) Vietnam.
Leptogenys aspera (ANDRÉ, 1889): FOREL 1900: 310.
2. ***Leptogenys assamensis* FOREL, 1900**
Leptogenys (Lobopelta) assamensis FOREL, 1900: 313 (w.) India.

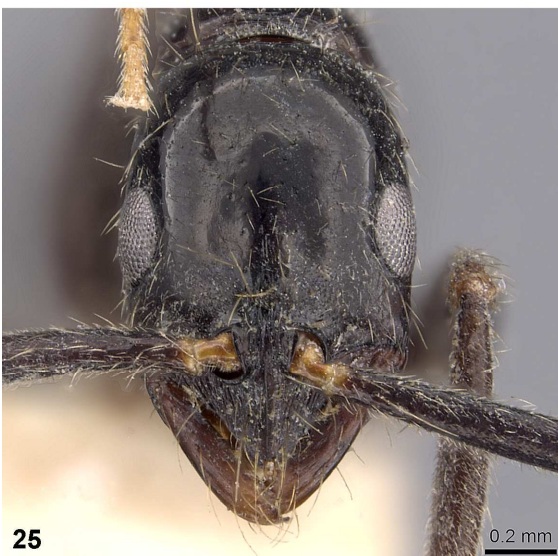
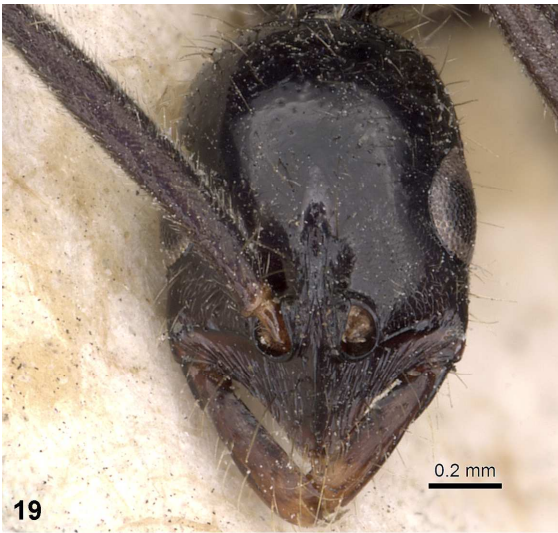
3. ***Leptogenys binghamii* FOREL, 1900**
Leptogenys (Lobopelta) binghamii FOREL, 1900: 310 (w.) Myanmar.
4. ***Leptogenys birmana* FOREL, 1900**
Leptogenys (Lobopelta) birmana FOREL, 1900: 310 (w.) Myanmar.
5. ***Leptogenys chinensis* (MAYR, 1870)**
Lobopelta chinensis MAYR, 1870: 965 (w.) China.
Leptogenys chinensis (MAYR, 1870): FOREL 1900: 313.
6. ***Leptogenys confucii* FOREL, 1912**
Leptogenys (Lobopelta) confucii FOREL, 1912: 48 (w.) Taiwan.
7. ***Leptogenys crassicornis* EMERY, 1895**
Leptogenys crassicornis EMERY, 1895: 462 (w.) Myanmar.
8. ***Leptogenys dalyi* FOREL, 1900**
Leptogenys (Lobopelta) dalyi FOREL, 1900: 311 (w.) India.
9. ***Leptogenys davydovi* KARAVAIEV, 1935**
Leptogenys (Lobopelta) davydovi KARAVAIEV, 1935: 74, fig. 7 (w.) Vietnam.
10. ***Leptogenys dentilobis* FOREL, 1900**
Leptogenys (Lobopelta) dentilobis FOREL, 1900: 305 (diagnosis in key) (w.) India.
11. ***Leptogenys diminuta* (F. SMITH, 1857)**
Ponera diminuta F. SMITH, 1857: 69 (w.) Borneo.
Lobopelta diminuta (F. SMITH, 1857): MAYR 1862: 734.
Leptogenys diminuta (F. SMITH, 1857): EMERY 1895: 461.
Leptogenys (Lobopelta) diminuta r. *deceptrix* FOREL, 1901: 46 (w.) India.
Leptogenys diminuta deceptrix FOREL, 1901: BOLTON 1995: 231.
Leptogenys (Lobopelta) diminuta var. *diminutolaeviceps* FOREL, 1900: 312 (w.) India.
Leptogenys diminuta diminutolaeviceps FOREL, 1900: BOLTON 1995: 231.
Leptogenys (Lobopelta) diminuta r. *palliseri* FOREL, 1900: 307 (diagnosis in key) (w.) India.
Leptogenys diminuta palliseri FOREL, 1900: EMERY 1911: 103.
Leptogenys (Lobopelta) diminuta var. *sarasinorum* FOREL, 1900: 307 (diagnosis in key) (w.) Sri Lanka.
Leptogenys diminuta sarasinorum FOREL, 1900: EMERY, 1911: 103.
Leptogenys striatula EMERY, 1895: 461 (w.) Myanmar.
Leptogenys diminuta striatula EMERY, 1895: EMERY 1911: 103.
Lobopelta woodmasoni FOREL, 1886: 246 (w.) India.
Leptogenys woodmasoni (FOREL, 1886): FOREL 1900: 313.
Leptogenys diminuta woodmasoni (FOREL, 1886): EMERY 1911: 103.
Leptogenys (Lobopelta) diminuta r. *hodgsoni* FOREL, 1900: 308 (diagnosis in key) (w.) Myanmar. **Syn.n.**
Leptogenys hodgsoni FOREL, 1900: BINGHAM 1903: 62.
12. ***Leptogenys emiliae* FOREL, 1902**
Leptogenys (Lobopelta) emiliae FOREL, 1902: 294 (w.) India.
13. ***Leptogenys falcigera* ROGER, 1861**
Leptogenys falcigera ROGER, 1861: 42 (w.) Sri Lanka.
14. ***Leptogenys hezhouensis* ZHOU, 2001**
Leptogenys hezhouensis ZHOU, 2001: 41, 230, figs. 43, 44 (w.) China.
15. ***Leptogenys huapingensis* ZHOU, 2001**
Leptogenys huapingensis ZHOU, 2001: 40, 230, figs. 41, 42 (w.) China.
16. ***Leptogenys hysterica* FOREL, 1900**
Leptogenys (Lobopelta) hysterica FOREL, 1900: 311 (w.) Sri Lanka.
17. ***Leptogenys jeanettei* MATHEW & TIWARI, 2000**
Leptogenys jeanettei MATHEW & TIWARI, 2000: 280, figs. 25 - 27 (w.) India.



Figs. 1 - 9: (1 - 3) *Leptogenys lucidula*, type worker (from ANTWEB 2014, CASENT0903951, photos by Will Ericson); (4 - 6) *L. lucidula*, non-type worker (from ANTWEB 2014, CASENT0281926, photos by Shannon Hartman); (7 - 9) *L. huangdii*, paratype worker (from ANTWEB 2014, CASENT0235337, photos by Estella Ortega). (1, 4, 7) Head in full-face view; (2, 5, 8) body in lateral view; (3, 6, 9) body in dorsal view.

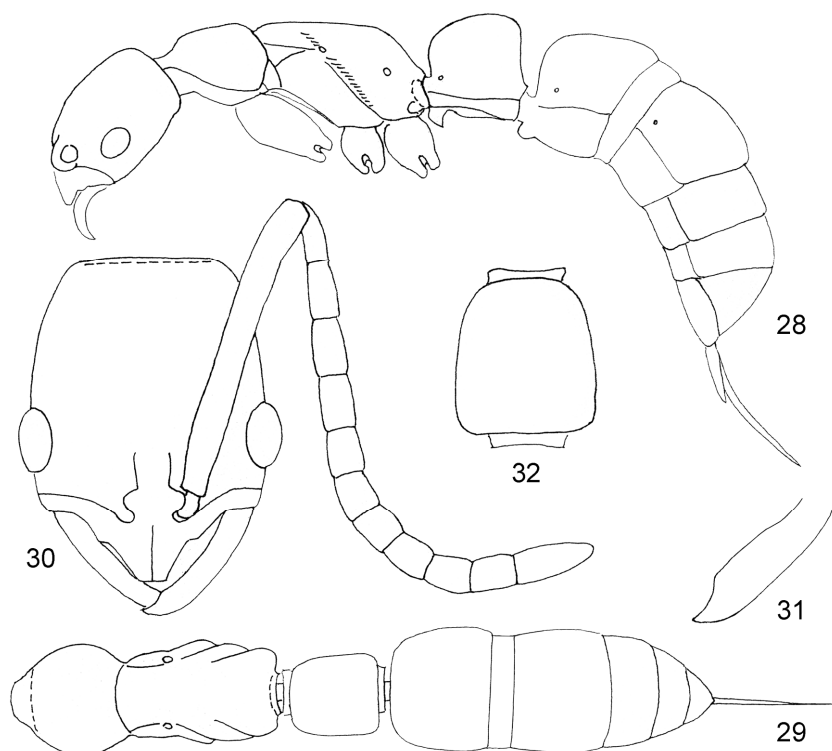


Figs. 10 - 18: (10 - 12) *Leptogenys diminuta*, holotype worker (from ANTWEB 2014, CASENT0901352, photos by Will Ericson); (13 - 15) *L. diminuta*, syntype worker (from ANTWEB 2014, CASENT0901353, photos by Will Ericson); (16 - 18) *L. hodgsoni*, type worker (from ANTWEB 2014, CASENT0907367, photos by Zach Lieberman). (10, 13, 16) Head in full-face view; (11, 14, 17) body in lateral view; (12, 15, 18) body in dorsal view.



Figs. 19 - 27: (19 - 21) *Leptogenys peuqueti*, cotype worker (from ANTWEB 2014, CASENT0907380, photos by Will Ericson); (22 - 24) *L. minchinii*, type worker (from ANTWEB 2014, CASENT0907379, photos by Will Ericson); (25 - 27) *L. watsoni*, type worker (from ANTWEB 2014, CASENT0907381, photos by Will Ericson). (19, 22, 25) Head in full-face view; (20, 23, 26) body in lateral view; (21, 24, 27) body in dorsal view.

Figs. 28 - 32: *Leptogenys yandii* sp.n., holotype worker. (28) Body in lateral view; (29) body in dorsal view; (30) head in full-face view; (31) mandible in dorsal view; (32) petiole in dorsal view. Illustrated by Zheng-Hui Xu.



18. *Leptogenys khammouanensis* RONCIN & DEHARVENG, 2003

Leptogenys khammouanensis RONCIN & DEHARVENG, 2003: 920, fig. 1 (w.) Laos.

19. *Leptogenys kitteli* (MAYR, 1870)

Lobopelta kitteli MAYR, 1870: 966 (w.) India.
Leptogenys kitteli (MAYR, 1870): EMERY 1895: 461.
Leptogenys (Lobopelta) kitteli r. *altisquamis* FOREL, 1900: 306 (diagnosis in key) (w.) Myanmar.
Leptogenys altisquamis FOREL, 1900d: BINGHAM 1903: 61.
Leptogenys kitteli altisquamis FOREL, 1900: EMERY 1911: 104.
Leptogenys (Lobopelta) kitteli var. *minor* FOREL, 1900: 307 (diagnosis in key) (w.) India.
Leptogenys kitteli minor FOREL, 1900: BOLTON 1995: 232.
Leptogenys (Lobopelta) kitteli subsp. *siemsseni* VIEHMEYER, 1922: 203, fig. 1 (w.) China.
Leptogenys kitteli siemsseni VIEHMEYER, 1922: BOLTON 1995: 232.

20. *Leptogenys kraepelini* FOREL, 1905

Leptogenys (Lobopelta) kraepelini FOREL, 1905: 5 (w.) Indonesia (Java).
Leptogenys (Lobopelta) kraepelini st. *baccha* SANTSCHI, 1919: 336 (w.) Vietnam.
Leptogenys kraepelini baccha SANTSCHI, 1919: BOLTON 1995: 232.

21. *Leptogenys laeviterga* ZHOU, CHEN, CHEN, ZHOU, BAN & HUANG, 2012

Leptogenys laeviterga ZHOU, CHEN, CHEN, ZHOU, BAN & HUANG, 2012: 888, figs. 1 - 3 (w.) China.

22. *Leptogenys laozii* XU, 2000

Leptogenys laozii XU, 2000: 123, figs. 41 - 44 (w.) China.

23. *Leptogenys latkei* BHARTI & WACHKOO, 2013

Leptogenys latkei BHARTI & WACHKOO, 2013: 12, figs. 1 - 3 (w.) India.

24. *Leptogenys lucidula* EMERY, 1895

Leptogenys lucidula EMERY, 1895: 462 (w.) Myanmar.
Leptogenys huangdii XU, 2000: 119, figs. 5 - 8 (w.) China.
Syn.n.

25. *Leptogenys mengzii* XU, 2000

Leptogenys mengzii XU, 2000: 124, figs. 45 - 52 (w.q.) China.

26. *Leptogenys moelleri* (BINGHAM, 1903)

Lobopelta moelleri BINGHAM, 1903: 67 (w.) India.
Leptogenys moelleri (BINGHAM, 1903): EMERY 1911: 104.

27. *Leptogenys pangui* XU, 2000

Leptogenys pangui XU, 2000: 120, figs. 13 - 16 (w.) China.

28. *Leptogenys peuqueti* (ANDRÉ, 1887)

Lobopelta peuqueti ANDRÉ, 1887: 292 (w.) Vietnam.
Leptogenys peuqueti (ANDRÉ, 1887): EMERY 1895: 461.
Leptogenys (Lobopelta) minchinii FOREL, 1900: 308 (diagnosis in key) (w.) India. **Syn.n.**
Leptogenys peuqueti r. *watsoni* FOREL, 1900: 309 (diagnosis in key) (w.) Myanmar. **Syn.n.**
Leptogenys watsoni FOREL, 1900: BINGHAM 1903: 72.

29. *Leptogenys processionalis* (JERDON, 1851)

Ponera processionalis JERDON, 1851: 118 (w.) India.
Leptogenys processionalis (JERDON, 1851): EMERY 1911: 105.
Ponera ocellifera ROGER, 1861: 13 (w.) Sri Lanka.
Lobopelta ocellifera (ROGER, 1861): ROGER 1863: 19.
Leptogenys ocellifera (ROGER, 1861): EMERY 1895: 461.
Leptogenys ocellifera (ROGER, 1861). Junior synonym of *processionalis*: EMERY 1911: 105.
Lobopelta distinguenda var. *andrei* EMERY, 1887: 431 (w.) Vietnam. Junior synonym of *ocellifera*: EMERY, 1895: 461 (footnote).

30. *Leptogenys pruinosa* FOREL, 1900

Leptogenys (Lobopelta) pruinosa FOREL, 1900: 304 (diagnosis in key) (w.) Sri Lanka.

31. *Leptogenys punctiventris* (MAYR, 1879)

Lobopelta punctiventris MAYR, 1879: 666 (w.) India.

Leptogenys punctiventris (MAYR, 1879): FOREL 1900: 311.

32. *Leptogenys rufida* ZHOU, CHEN, CHEN, ZHOU, BAN & HUANG, 2012

Leptogenys rufida ZHOU, CHEN, CHEN, ZHOU, BAN & HUANG, 2012: 891, figs. 4 - 6 (w.) China.

33. *Leptogenys roberti* FOREL, 1900

Leptogenys (Lobopelta) roberti FOREL, 1900: 311 (w.) India.

Leptogenys (Lobopelta) roberti r. *coonoorensis* FOREL, 1900: 306 (diagnosis in key) (w.) India.

Leptogenys coonoorensis FOREL, 1900: BINGHAM 1903: 68.

Leptogenys roberti coonoorensis FOREL, 1900: EMERY 1911: 105.

34. *Leptogenys stenocheilos* (JERDON, 1851)

Ponera stenocheilos JERDON, 1851: 118 (w.) India.

Leptogenys stenocheilos (JERDON, 1851): EMERY 1911: 106; BOLTON 1995: 233.

35. *Leptogenys strenna* ZHOU, 2001

Leptogenys strenna ZHOU, 2001: 40, 229, figs. 39, 40 (w.) China.

36. *Leptogenys sunzii* sp.n.

37. *Leptogenys transitionis* BHARTI & WACHKOO, 2013

Leptogenys transitionis BHARTI & WACHKOO, 2013: 14, figs. 4 - 9 (w. q.) India.

38. *Leptogenys yandii* sp.n.

39. *Leptogenys yerburyi* FOREL, 1900

Leptogenys (Lobopelta) yerburyi FOREL, 1900: 311 (w.) Sri Lanka.

40. *Leptogenys zhuangzii* XU, 2000

Leptogenys zhuangzii XU, 2000: 122, figs. 37 - 40 (w.) China.

Treatments of new synonyms

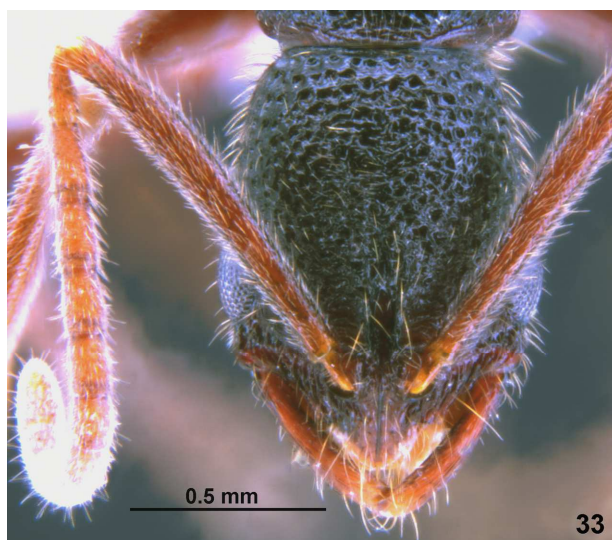
***Leptogenys lucidula* EMERY, 1895 (Figs. 1 - 9)**

Leptogenys lucidula EMERY, 1895: 462 (w.) Myanmar. Type worker images and non-type worker images examined.

Leptogenys huangdii XU, 2000: 119, figs. 5 - 8 (w.) China. Holotype, paratypes, and paratype worker images examined. **Syn.n.**

In full-face view, the paratype worker of *Leptogenys huangdii* (Fig. 7) has a similarly shaped head capsule, mandibles, clypeus, antennae, and eyes to the type worker (Fig. 1) and non-type worker (Fig. 4) of *L. lucidula*. The head is subquadrate and slightly widens anteriorly with a slightly concave posterior margin. Mandible elongate and triangular with 7 - 8 unequal teeth on masticatory margin. Clypeus triangular with developed central carina and strongly convex apex. Antennae relatively short with scape almost reaching to posterior head corner. Eye small and located before midpoint of lateral margin of head.

In lateral view, the paratype worker of *Leptogenys huangdii* (Fig. 8) also has a similarly shaped mesosoma and petiole to the type worker (Fig. 2) and non-type worker (Fig. 5) of *L. lucidula*. The dorsal outline of the mesosoma has a weakly convex promesonotum and moderately impressed metanotal groove. Dorsum of propodeum slightly longer than declivity with a rounded posterodorsal corner. Petiolar node is thickened and roughly trapezoidal with a short convex dorsal margin. Subpetiolar process is triangular and ventrally pointed. Although petiolar node of the non-type worker (Fig. 5) of *L. lucidula* has a relatively lower and more rounded anterodorsal corner, the situation is within the population variation.

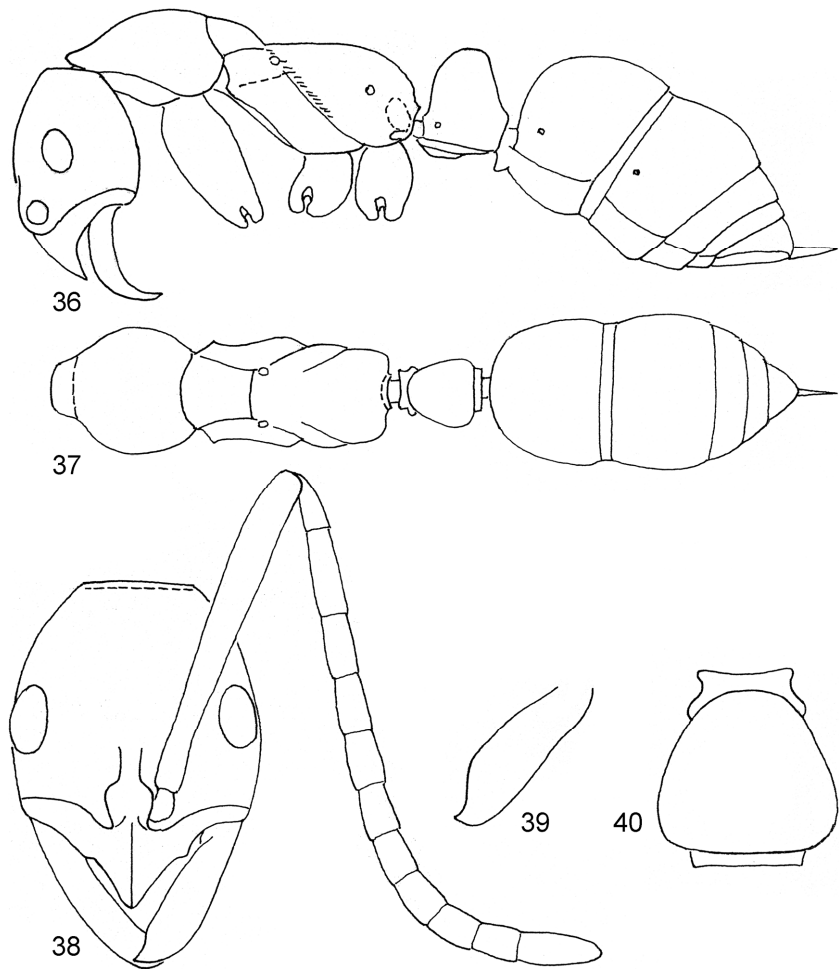


Figs. 33 - 35: *Leptogenys yandii* sp.n., holotype worker. (33) Head in fullface view; (34) body in lateral view; (35) body in dorsal view. Photos by Zheng-Hui Xu & Xin-Min Zhang.

In dorsal view, the paratype worker of *Leptogenys huangdii* (Fig. 9) shows similar shape in mesosoma and petiole to the type worker (Fig. 3) and non-type worker (Fig. 6) of *L. lucidula*. Pronotum has weakly rounded sides. Mesonotum narrows posteriorly. Propodeum widens posteriorly. Promesonotal suture and metanotal groove are distinct. Petiolar node is roughly semicircular and wider than long.

The paratype worker of *Leptogenys huangdii* (Fig. 7 - 9) shows similar characters in body surface sculpture, pilosity, color and total length to the type worker (Fig. 1 - 3) and non-type worker (Fig. 4 - 6) of *L. lucidula*. The whole body surface is smooth and shiny, except for the anterior areas of the head around the antennal sockets, clypeus and mandibles, which are striate or rugulose. Body dorsum has abundant suberect short hairs. Body color is black with brown antennae and legs. Total length ranges between 4.5 mm to 5.3 mm.

After the above comparison, we could not find significant difference between the two species and therefore consider *L. huangdii* as a junior synonym of *L. lucidula*.



Figs. 36 - 40: *Leptogenys sunzii* sp.n., holotype worker. (36) Body in lateral view; (37) body in dorsal view; (38) head in full-face view; (39) mandible in dorsal view; (40) petiole in dorsal view. Illustrated by Zheng-Hui Xu.

***Leptogenys diminuta* (F. SMITH, 1857)** (Figs. 10 - 18)

Ponera diminuta F. SMITH, 1857: 69 (w.) Borneo. Holotype worker images and syntype worker images examined.

Leptogenys diminuta (F. SMITH, 1857): EMERY 1895: 461.

Leptogenys (Lobopelta) diminuta r. *hodgsoni* FOREL, 1900: 308 (diagnosis in key) (w.) Myanmar. Type worker images examined.

Leptogenys hodgsoni FOREL, 1900: BINGHAM 1903: 62. **Syn.n.**

In the original description, *Leptogenys hodgsoni* was treated as a race of *L. diminuta* by FOREL (1900). Although BINGHAM (1903) raised *L. hodgsoni* to species rank, the main difference between the two species is that the head of *L. hodgsoni* is "strongly constricted posteriorly, distinctly narrower across the occiput than in front".

In full-face view, the type worker of *Leptogenys hodgsoni* (Fig. 16) has a different head shape compared to the holotype worker of *L. diminuta* (Fig. 10), in that the latter has distinct narrowly rounded posterior corners. However, the syntype worker of *L. diminuta* (Fig. 13) has a similar head shape to *L. hodgsoni*, where both have indistinctly rounded posterior head corners. After analyzing *L. diminuta* specimens from China and AntWeb images we noticed that *L. diminuta* is a widely distributed species in China and southeast Asia with great morphological variation including head shape. Considering the head shape, *L. hodgsoni* seems to be a variant of *L. diminuta*. Additionally, *L. hodgsoni* has similarly shaped mandibles, clypeus, antennae, and eyes.

In lateral view, the type worker of *Leptogenys hodgsoni* (Fig. 17) has a similarly shaped mesosoma and petiole to the holotype worker (Fig. 11) and syntype worker (Fig. 14) of *L. diminuta*. Promesonotum is roundly convex. Metanotal groove is broad and deeply impressed. Dorsum of propodeum widely rounding into declivity and about equal in length to the latter. Petiolar node is subquadrate and slightly narrowing dorsally.

In dorsal view, the type worker of *Leptogenys hodgsoni* (Fig. 18) also has similar shape in mesosoma and petiole to the holotype worker (Fig. 12) and syntype worker (Fig. 15) of *L. diminuta*. Pronotum has roundly convex sides. Mesonotum is short and narrow. Propodeum is long and slightly widening posteriorly. Promesonotal suture and metanotal groove are distinct. Petiolar node is roughly trapezoidal and widening posteriorly, about as wide as long, and ranges from slightly wider than long to slightly longer than wide. The relatively long petiolar node of *L. hodgsoni* is within the range of *L. diminuta*.

The type worker of *L. hodgsoni* (Fig. 16 - 18) shows similar characters in body surface sculpture, pilosity, color and total length to the holotype worker (Fig. 10 - 12) and syntype worker (Fig. 13 - 15) of *L. diminuta*. Head dorsum is densely longitudinally striate with striations curved on the posterior part. Mesosoma is sparsely longitudinally rugose with sides of pronotum relatively smooth. Petiole is relatively smooth, sometimes weakly rugulose. Gaster is smooth and shiny. Body dorsum has sparse to abundant suberect hairs. Body color is black with blackish

brown appendages. Total length ranges between 6.5 mm to 7.5 mm.

We conclude *L. diminuta* is a widely distributed species in southeast Asia and rich in morphological variation including head shape, body surface sculpture and pilosity. The characters of *L. hodgsoni* are well inside the range of *L. diminuta* so we consider *L. hodgsoni* as a junior synonym of *L. diminuta*.

***Leptogenys peuqueti* (ANDRE, 1887) (Figs. 19 - 27)**

Lobopelta peuqueti ANDRE, 1887: 292 (w.) Vietnam. Cotype worker images examined.

Leptogenys peuqueti (ANDRE, 1887): EMERY 1895: 461.

Leptogenys (Lobopelta) minchinii FOREL, 1900: 308 (diagnosis in key) (w.) India. Type worker images examined. **Syn.n.**

Leptogenys peuqueti r. *watsoni* FOREL, 1900: 309 (diagnosis in key) (w.) Myanmar. Type worker images examined. **Syn.n.**

Lobopelta watsoni (FOREL): BINGHAM 1903: 72.

Leptogenys watsoni FOREL: BOLTON 1995: 234.

In full-face view, the type worker of *Leptogenys minchinii* (Fig. 22) and type worker of *L. watsoni* (Fig. 25) have similarly shaped head capsule, mandibles, clypeus, antennae, and eyes to the cotype worker of *L. peuqueti* (Fig. 19). Head longer than broad and slightly widening anteriorly, with convex posterior margin and rounding posterior corners. Mandibles are elongate and triangular with edentate masticatory margin. Clypeus has sharp central carina and narrow convex apex. Antennae are long and well surpassing posterior head corners. Eyes are large and locate at midpoints of lateral margin of head.

In lateral view, the type worker of *Leptogenys minchinii* (Fig. 23) and type worker of *L. watsoni* (Fig. 26) have a similarly shaped mesosoma and petiole to the cotype worker of *L. peuqueti* (Fig. 20). Promesonotum is moderately convex. Metanotal groove is weakly impressed. Propodeum is very long and slightly convex, about three times as long as declivity. Petiolar node is roughly trapezoidal, slightly longer than high and with a very short anterior margin.

In dorsal view, the type worker of *Leptogenys minchinii* (Fig. 24) and type worker of *L. watsoni* (Fig. 27) have a similarly shaped mesosoma and petiole to the cotype worker of *L. peuqueti* (Fig. 21). Sides of pronotum are weakly convex. Mesonotum is very short and shorter than wide. Propodeum widens posteriorly. Promesonotal suture and metanotal groove are distinct. Petiolar node is strongly elongate and roughly triangular, much longer than wide.

The type worker of *Leptogenys minchinii* (Fig. 22 - 24) and type worker of *L. watsoni* (Fig. 25 - 27) show similar characters in body surface sculpture, pilosity, color, and total length to the cotype worker of *L. peuqueti* (Fig. 19 - 21). Head dorsum is smooth and shiny except for the anterior parts around antennal sockets and clypeus which are longitudinally striate. Mesosoma, petiole, and gaster are smooth and shiny except for the lower portions of mesopleura, metapleura and propodeal declivity, which are striate. Body dorsum has sparse suberect hairs. Body color is black with brownish appendages. Total length ranges between 5 mm to 7 mm. Although the mesopleura of *L. watsoni* (Fig. 26) has more longitudinal striation, this is not enough to support the specimens a separate species.

After the above comparison, we found it difficult to separate the three taxa so we consider *L. minchinii* and *L. watsoni* as junior synonyms of *L. peuqueti*.



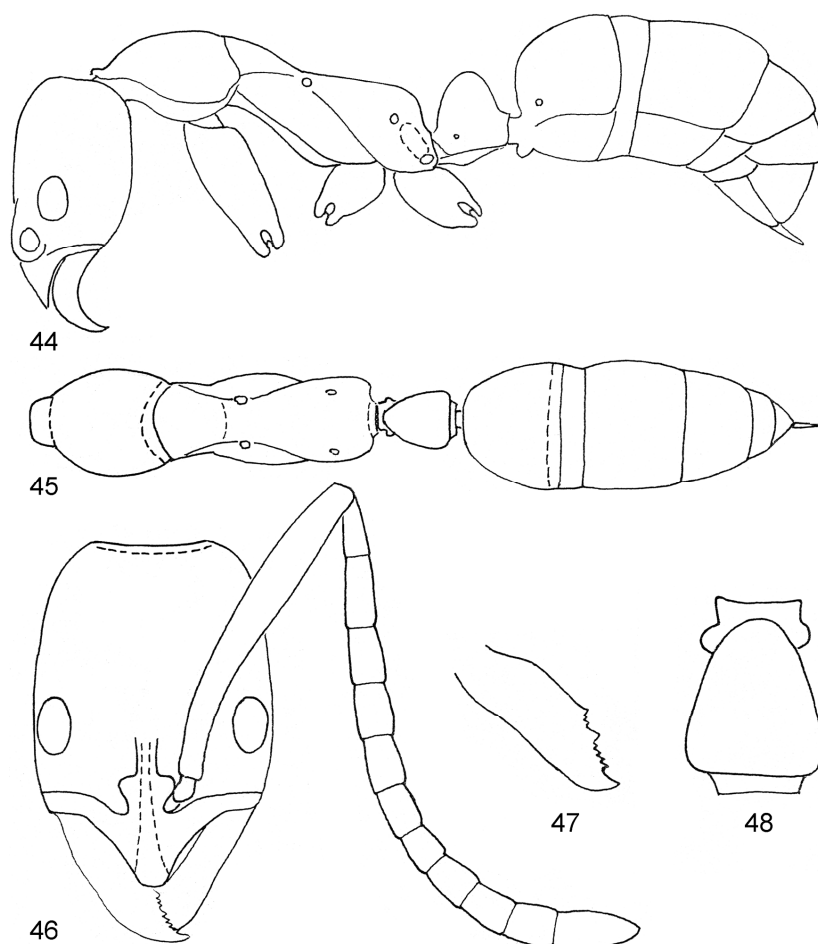
Figs. 41 - 43: *L. sunzii* sp.n., holotype worker. (41) Head in full-face view; (42) body in lateral view; (43) body in dorsal view. Photos by Zheng-Hui Xu & Xin-Min Zhang.

Descriptions of new species

***Leptogenys yandii* sp.n. (Figs. 28 - 35)**

Type material: Holotype worker: China, Tibet, Medog County, Medog Town, Yarang Village, 29° 17.760' N, 95° 16.599' E, 760 m, nest inside decayed wood in the valley rainforest, 21.V.2008, Zheng-Hui Xu leg., No. A08-1011. Paratypes: 6 workers, with same data as holotype; 1 worker, China: Tibet, Medog County, Beibeng Town, Beibeng Village, 29° 14.593' N, 95° 10.197' E, 730 m, foraging on the ground in the valley rainforest, 23.V.2008, Zheng-Hui Xu leg., No. A08-1113; 7 workers, China: Tibet, Medog County, Damu Town, Damu Village, 29° 29.298' N, 95° 26.659' E, 1200 m, nest in soil in the valley rainforest, 20.VII.2011, Xia Liu leg., No. A11-3852; 3 workers, with same data as No. A11-3852, but foraging on the ground, Nos. A11-3880 (1 worker) and A11-3896 (2 workers).

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



Figs. 44 - 48: *Leptogenys davydovi*, worker. (44) Body in lateral view; (45) body in dorsal view; (46) head in full-face view; (47) mandible in dorsal view; (48) petiole in dorsal view. Illustrated by Zheng-Hui Xu.

Description of holotype worker (Figs. 28 - 35): TL 5.4, HL 1.07, HW 0.73, CI 69, SL 1.07, SI 145, ML 0.53, ED 0.23, PW 0.70, MSL 1.67, PL 0.67, PH 0.70, DPW 0.50, LPI 105, DPI 75.

In full-face view head longer than broad, roughly trapezoidal and widened anteriorly, posterior margin straight and carinate, posterior corner narrowly rounded, lateral margin weakly convex. Mandible narrow and slender, masticatory margin edentate, basal corner bluntly angled. Clypeus acutely longitudinally carinate, weakly convex at apex, each side with blunt tooth. Antenna 12-segmented, scape surpassing posterior head corner by one fourth of its length, flagellar segments longer than broad, segments 3 and 4 about equal. Eye occupying one fourth of lateral cephalic margin, and located in front of midpoint of lateral margin.

In lateral view pronotum weakly convex. Promesonotal suture impressed. Dorsum of mesonotum and propodeum almost straight and slightly lower than pronotum, metanotal groove not impressed. Dorsum of propodeum about 1.5 times as long as declivity, posterodorsal corner blunt. Petiolar node trapezoidal, about 1.1 times higher than long, both anterior and posterior margins straight and vertical, dorsal margin weakly convex, anterodorsal corner narrowly rounded, posterodorsal corner blunt. Subpetiolar process short and slender, roughly triangular, posteroventrally pointed. Constriction between abdominal segments III and IV distinct. Sting extruding.

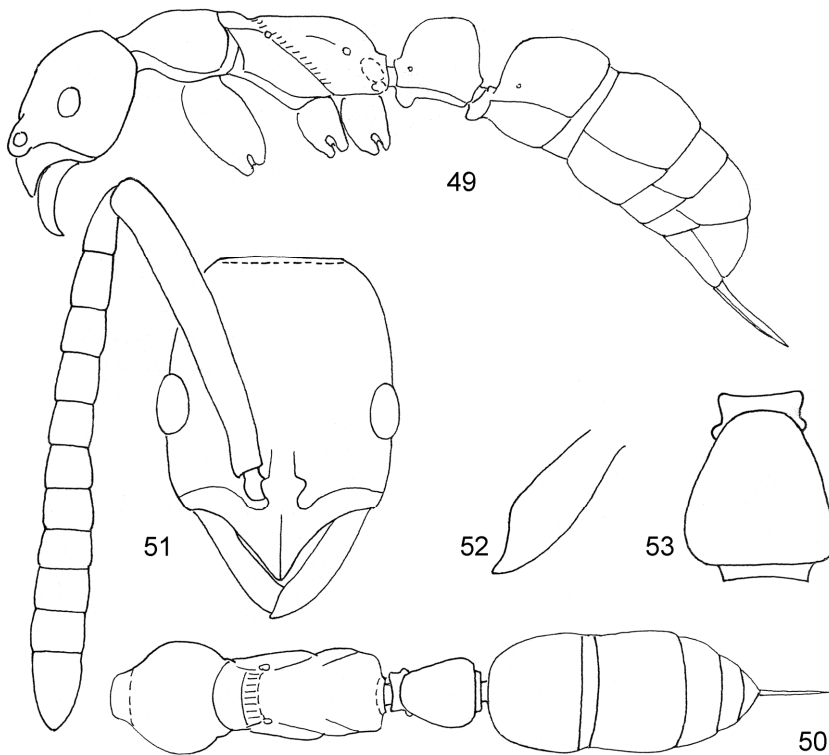
In dorsal view lateral margin of pronotum strongly convex, posterior margin concave. The rest of mesosoma weakly widened posteriorly. Metanotal groove narrow and visible. Petiolar node trapezoidal, weakly widened poste-

riorly, about 1.1 times as long as broad, anterior and lateral margins slightly convex, posterior margin straight, anterior corners rounded, posterior corners blunt.

Mandible finely longitudinally striate. Clypeus longitudinally rugose. Head dorsum largely densely punctate with interspace coarsely reticulate. Mesosoma, petiolar node and first gastral segment fully, largely and deeply punctate, surface smooth and shiny, as broad as or narrower than puncture diameter. Mesopleuron and metapleuron densely punctate with interspace coarsely reticulate. Declivity coarsely transversely striate. Second gastral segment finely sparsely punctate, the rest of gaster smooth and shiny. Head dorsum with abundant suberect hairs and subdecumbent pubescence. Dorsum of mesosoma, petiolar node and gaster with sparse suberect hairs and decumbent pubescence. Scape and tibia with sparse subdecumbent hairs and dense decumbent pubescence. Body color black. Mandible, clypeus, antenna, leg and gastral apex reddish brown. Eye grey.

Description of paratype workers: TL 5.2 - 5.7, HL 1.07 - 1.10, HW 0.73 - 0.77, CI 67 - 72, SL 1.03 - 1.10, SI 139 - 145, ML 0.50 - 0.57, ED 0.20 - 0.23, PW 0.67 - 0.73, MSL 1.60 - 1.80, PL 0.63 - 0.67, PH 0.70 - 0.73, DPW 0.47 - 0.53, LPI 105 - 119, DPI 70 - 84 (17 individuals measured). With similar morphological characters as holotype, but in some individuals, apex of clypeus roundly convex, punctures on mesopleuron, metapleuron and side of propodeum are relatively larger with interspace reticulate.

Comparative notes: This new species is similar to *L. punctiventris* (Figs. 105 - 107), but its eyes are smaller and occupy one fourth of the lateral cephalic margin; the an-



Figs. 49 - 53: *Leptogenys rufida*, worker. (49) Body in lateral view; (50) body in dorsal view; (51) head in full-face view; (52) mandible in dorsal view; (53) petiole in dorsal view. Illustrated by Zheng-Hui Xu.

tennae are shorter, only one fourth length of scape surpasses the posterior head corner, segments 3 and 4 about equal; anterior margin of petiolar node is straight and vertical, anterodorsal corner is narrowly rounded; head dorsum is largely densely punctate, mesosoma, petiolar node and first gastral segment are fully largely punctate, second gastral segment is finely punctate. In *L. punctiventris* the eyes are larger and occupy one third of the lateral cephalic margin; the antennae are longer, one third of scape length surpasses the posterior head corner, segment 3 longer than segment 4; anterior margin of petiolar node is weakly convex, anterodorsal corner is broadly rounded; head dorsum is finely densely punctate, sides of mesosoma and petiolar node are longitudinally rugose, sides of first gastral segment are mostly smooth and shiny, second gastral segment is smooth and shiny.

Etymology: The specific epithet refers to "Yandi (Yan Emperor, born about 6000 - 5500 years ago)", one of the two earliest Chinese emperors.

***Leptogenys sunzii* sp.n.** (Figs. 36 - 43)

Type material: Holotype worker: China, Yunnan Province, Jingdong County, Wenlong Town, Yichang Village, 24° 38.656' N, 100° 43.902' E, 1950 m, foraging on the ground in mixed conifer-broadleaf forest, 11.XI.2001, Zheng-Qiang Tong leg., No. A4575. Paratypes: 1 worker, with same data as holotype; 3 workers, with same data as holotype, but Xiao-Hong Ou leg., No. A4576; 9 workers, China, Yunnan Province, Simao District, Yixiang Town, Caiyanghe, 22° 35.868' N, 101° 06.549' E, 1600 m, nest in soil in monsoon evergreen broadleaf forest, 27.III.2008, Yan Duan leg., No. A08-82.

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

Description of holotype worker (Figs. 36 - 43): TL 8.2, HL 1.77, HW 1.27, CI 72, SL 1.90, SI 150, ML 1.00, ED 0.37, PW 1.00, MSL 2.93, PL 0.73, PH 0.90, DPW 0.57, LPI 123, DPI 77.

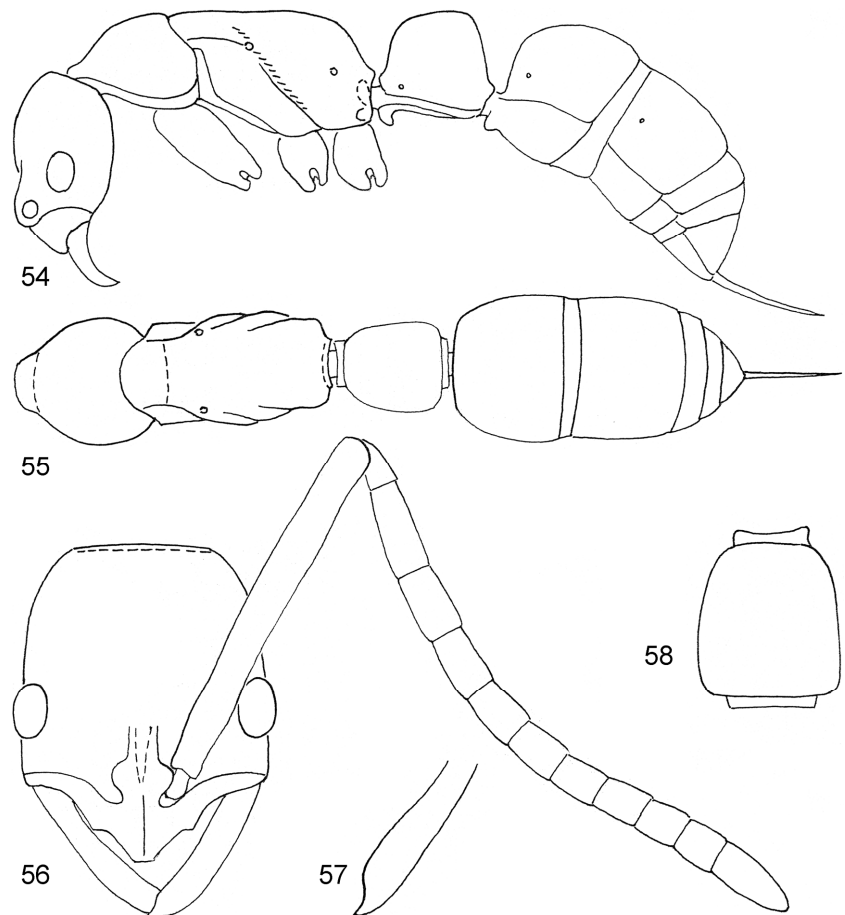
In full-face view head trapezoidal, longer than broad and weakly widened anteriorly, posterior margin straight and carinate, posterior corner rounded, lateral margin moderately convex. Mandible relatively broad, masticatory margin edentate, basal corner bluntly angled, inner margin weakly convex. Clypeus acutely longitudinally carinate, bluntly pointed at apex, each side with blunt prominence. Antenna long, two fifths of scape length surpasses posterior head corner, flagellar segments distinctly longer than broad, segment 3 longer than segment 4. Eye moderately large, occupying about one third of lateral cephalic margin, situated slightly in front of midpoint of lateral margin.

In lateral view promesonotum moderately convex and distinctly higher than propodeum, promesonotal suture obvious. Metanotal groove deeply angularly impressed. Dorsum of propodeum weakly convex, about 2.5 times as long as declivity, posterodorsal corner rounded. Petiolar node roughly trapezoidal, about 1.4 times higher than long, dorsal and anterior margin weakly convex, posterior margin straight, anterodorsal corner broadly rounded, posterodorsal corner prominent. Subpetiolar process long and narrow, roughly cuneiform. Constriction between abdominal segments III and IV distinct. Sting extruding.

In dorsal view mesosoma strongly constricted at mesothorax, distinctly widened posteriorly, sides of pronotum strongly convex. Petiolar node trapezoidal, as broad as long, strongly widened posteriorly, anterior and lateral margins weakly convex, posterior margin almost straight, anterior corner rounded, posterior corner blunt.

Mandible smooth and shiny. Clypeus finely longitudinally striate. Head, mesosoma, petiole and gaster smooth and shiny. Dorsal portion of mesopleuron, ventral portions of metapleuron and propodeum striate. Declivity trans-

Figs. 54 - 58: *Leptogenys binghamii*, worker. (54) Body in lateral view; (55) body in dorsal view; (56) head in full-face view; (57) mandible in dorsal view; (58) petiole in dorsal view. Illustrated by Zheng-Hui Xu.



versely striate. Head dorsum with abundant suberect hairs and decumbent pubescence. Dorsa of mesosoma, petiolar node and gaster with abundant suberect hairs and sparse decumbent pubescence. Scapes and tibiae with sparse subdecumbent hairs and dense decumbent pubescence. Body color black, with a bluish metallic reflection. Mandible, flagellum and leg reddish brown.

Description of paratype workers: TL 7.3 - 8.7, HL 1.50 - 1.80, HW 1.03 - 1.30, CI 67 - 75, SL 1.67 - 1.93, SI 141 - 166, ML 0.80 - 1.07, ED 0.27 - 0.40, PW 0.87 - 1.03, MSL 2.47 - 2.93, PL 0.67 - 0.73, PH 0.80 - 0.90, DPW 0.50 - 0.60, LPI 114 - 135, DPI 73 - 86 (13 individuals measured). With similar morphological characters as holotype, but paratype workers from Caiyanghe are relatively smaller, dorsum of head with very sparse tiny superficial piliferous punctures, metapleuron with more transverse striations.

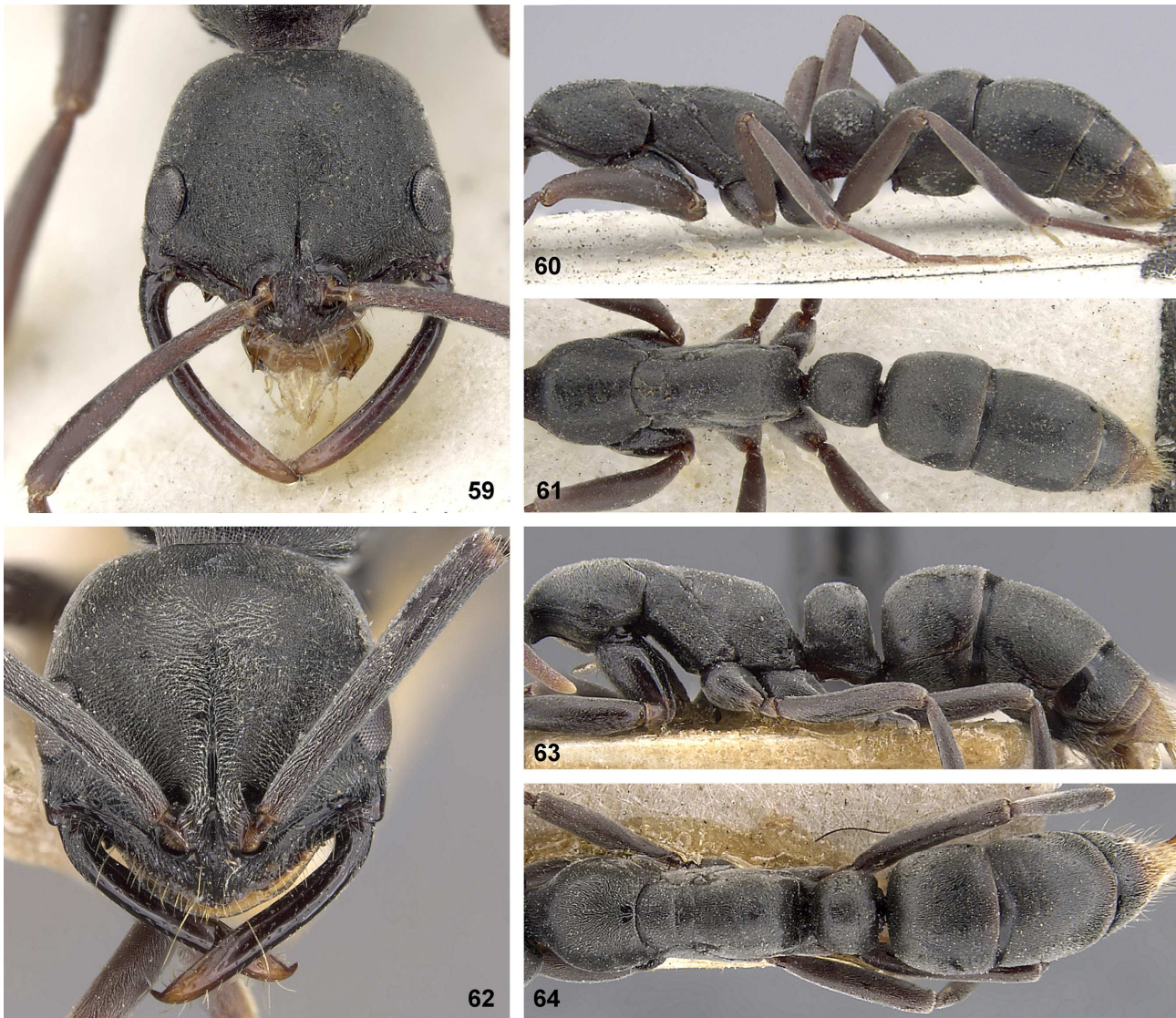
Comparative notes: This new species is similar to *L. laeviterga* (Figs. 144 - 146), but the clypeus is bluntly pointed at apex; eyes are larger and occupy one third of head side; petiolar node is relatively higher in lateral view, about 1.4 times as high as long, dorsal margin is as long as anterior margin, anterodorsal corner is broadly rounded, the node is as broad as long in dorsal view. In *L. laeviterga* the clypeus is truncated at apex; the eyes are relatively smaller and occupy one fourth side of head; petiolar node is relatively longer in lateral view, about 1.3 times as high as long, dorsal margin is distinctly longer than anterior margin, anterodorsal corner is narrowly rounded, the node is obviously longer than broad in dorsal view.

Etymology: The specific epithet refers to "Sunzi" (Wu Sun, 535 B.C. - ?), a famous ancient Chinese strategist.

Discussion

Among the 40 extant Oriental species known from the worker caste, the status of *Leptogenys stenocheilos* is uncertain. Since JERDON (1851) described *stenocheilos* from India and placed it in the genus *Ponera*, no detailed description of the species has been published. EMERY (1911) and BOLTON (1995) placed *stenocheilos* in *Leptogenys*. Following the brief original description, we agree to place *stenocheilos* in *Leptogenys*, and furthermore place it in the *L. chinensis* group due to its edentate masticatory margin of mandible, smooth body surface and metallic green cuticle. However, we lack sufficient information to ascertain its status. A final conclusion will be reached after observation of the type specimens or perhaps images of its type.

According to the AntWeb images of *Leptogenys chinensis* (Figs. 135 - 137) and *L. kraepelini* (Figs. 138 - 140), the two species seem closely related. The main differences include sculpture of the propodeal declivity and the area between its eyes and antennal sockets, relative length of petiolar node, and relative body length. It is interesting that all the specimens in our collection from Yunnan, China, a region relatively close to Myanmar, India, and Vietnam, belong to *L. kraepelini*, but no specimens of *L. chinensis* have been found. This leads us to wonder whether the original type-locality is China or India. Although MAYR (1870) gave the type-locality of *L. chinensis* as China, WHEELER (1930) thought it doubtful. To ascertain the iden-



Figs. 59 - 64: (59 - 61) *Leptogenys falcigera*, syntype worker (from ANTWEB 2014, CASENT0102272, photos by Shannon Hartman); (62 - 64) *L. pruinosa*, type worker (from ANTWEB 2014, CASENT0907337, photos by Will Ericson). (59, 62) Head in full-face view; (60, 63) body in lateral view; (61, 64) body in dorsal view.

tity of *L. chinensis*, we need to study the type specimens or their images, if they are available for examination. To clarify its geographical distribution, we need more complete collections. After a reexamination of the specimens, we decided to exclude *L. chinensis* from the fauna of Yunnan, China at the present time.

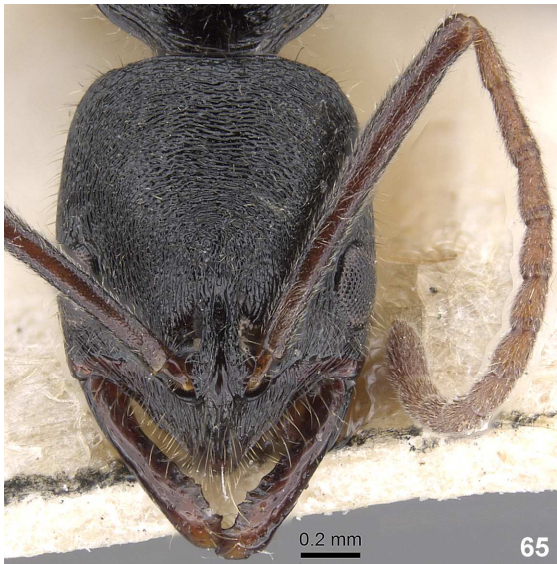
Due to the limited availability of specimens and type specimen images before the year of 2000, two mistakes existed in the reports of XU (1996, 2000). *Leptogenys chinensis*, reported in XU (1996), is corrected here as *L. pequeti*. *Leptogenys chinensis*, reported in XU (2000), is corrected here as *L. kraepelini*. *Leptogenys kraepelini* is thus confirmed as a new record for China. Before this study, CHAPMAN & CAPCO (1951) wrongly recorded *L. kraepelini baccha* in Tonkin, China. In fact, Tonkin belongs to Vietnam according to SANTSCHI (1919). Recently, ZHOU & RAN (2010) wrongly recorded *L. kraepelini baccha* in Tianjin, China, by misunderstanding Tonkin as Tianjin.

Leptogenys davydovi (Figs. 44 - 48) is recorded in China for the first time in this study. The specimens collected

from Yunnan Province conform well to the original description and illustrations of KARAVAIEV (1935) except for the edentate masticatory margin of the mandible in the illustration. However, the original description mentions the masticatory margin of the mandible has uneven fine denticles. So on this premise we identified our specimens as *L. davydovi*.

Leptogenys rufida was originally described from Guangxi and Zhejiang, China by ZHOU & al. (2012). In this study, a single worker of this species is recorded from Yunnan close to Guangxi (Figs. 49 - 53). Another species, *L. binghamii* was firstly recorded in China by XU (1998) based on specimens collected from Yunnan. Recently, the species was recorded in Guangxi, China by ZHOU & RAN (2010). We provide detailed illustrations for the species in this study (Figs. 54 - 58).

Leptogenys yerburyi was reported from Yunnan, China by ZHANG & al. (2000), ZHOU & RAN (2010) and GUENARD & DUNN (2012). After identification of all the *Leptogenys* specimens from Yunnan, China, no specimen of



Figs. 65 - 67: *Leptogenys aspera*, type worker (from ANTWEB 2014, CASENT0915462, photos by Will Ericson). (65) Head in full-face view; (66) body in lateral view; (67) body in dorsal view.

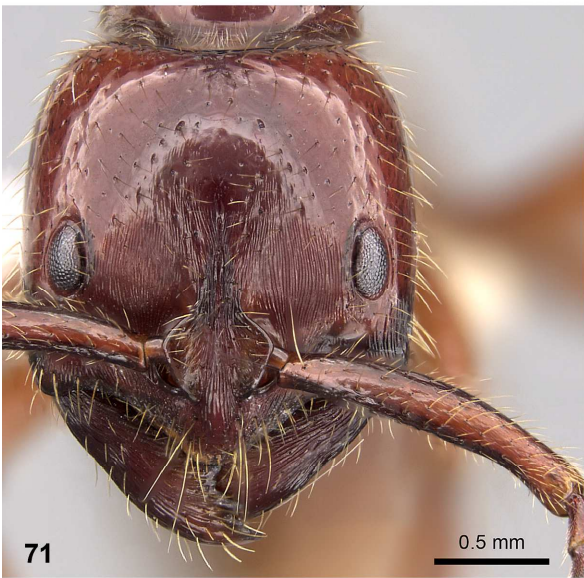
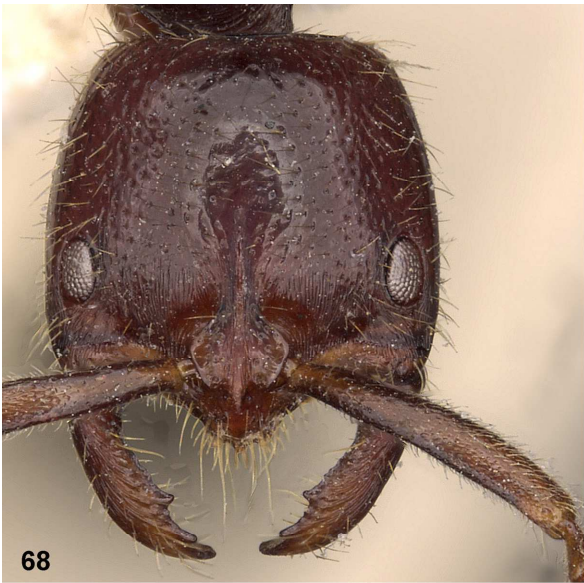
the species was found, so our conclusion is that the record of *L. yerburyi* in Yunnan, China is a mistake. The species is excluded from China in this study.

Preliminary key to the known extant Oriental species of *Leptogenys* based on worker caste

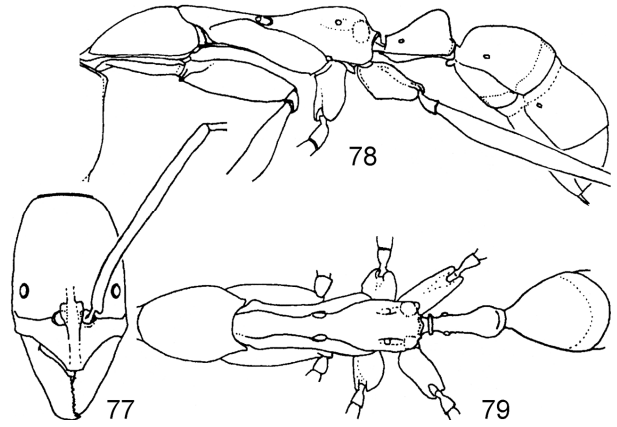
- 1 Mandibles long and narrow, arched and pointed, without distinct masticatory margin (Figs. 59, 62). ... 2
 - Mandibles long and narrow or short and broad, always with a distinct oblique masticatory margin (Figs. 65, 68, 71, 99, 102, 105). 3
- 2 Head, mesosoma and gaster finely punctate, not pruinose (Sri Lanka, Indonesia, Madagascar) (Figs. 59 - 61). *L. falcigera*
 - Head, mesosoma and gaster densely pruinose, not punctate (Sri Lanka) (Figs. 62 - 64). *L. pruinosa*
- 3 Masticatory margin of mandible with more than two teeth and denticles in addition to the apical one (Figs. 65, 68, 71, 74). 4
 - Masticatory margin of mandible usually edentate, at most with one tooth in addition to the apical one (Figs. 99, 102, 105). 17
- 4 Head dorsum rugose throughout. First gastral segment coarsely retirugose (Vietnam, Myanmar) (Figs. 65 - 67). *L. aspera*
 - Head dorsum punctate or mostly smooth and shiny, if anteriorly striate then at least posterior half smooth and shiny. First gastral segment smooth and shiny. 5
- 5 Head quadrate or subquadrate in full-face view, about as broad as long. Petiolar node longitudinally compressed and squamiform in lateral view, acute at summit, without distinct dorsal margin, the node above anterior and posterior articulations at least 2 times as broad as long in dorsal view (Figs. 68 - 76). 6

- Head rectangular in full-face view, distinctly longer than broad. Petiolar node longitudinally thickened or elongate, roughly triangular or cubical in lateral view, dorsal margin long or narrowly convex, always distinct, the node above anterior and posterior articulations at most 1.5 times as broad as long in dorsal view (Figs. 77 - 98). 8
- 6 Head dorsum sparsely punctate throughout. Posterior head margin straight in full-face view. Apex of clypeus acutely toothed (India) (Figs. 68 - 70). *L. dentilobis*
 - Head dorsum smooth and shiny. Posterior head margin weakly to strongly concave in full-face view. Apex of clypeus convex (Figs. 71 - 76). 7
- 7 Posterior head margin weakly concave, anterior half of head dorsum longitudinally striate, the striations reaching posterior eye margin. Antennal segments 4 - 6 about as broad as long. Subpetiolar process broad and triangular. Body color reddish brown (Myanmar, India; China: Yunnan, Hainan) (Figs. 71 - 73). *L. birmana*
 - Posterior head margin strongly concave, anterior third of head dorsum longitudinally striate, the striations not reaching posterior eye margin. Antennal segments 4 - 6 longer than broad. Subpetiolar process narrow and cuneiform. Body color brownish black (India, Sri Lanka, Vietnam) (Figs. 74 - 76). *L. processionalis*

Figs. 68 - 76: (68 - 70) *Leptogenys dentilobis*, type worker (from ANTWEB 2014, CASENT0907365, photos by Zach Lieberman); (71 - 73) *L. birmana*, worker (from ANTWEB 2014, CASENT0281921, photos by Shannon Hartman); (74 - 76) *L. processionalis*, worker (from ANTWEB 2014, CASENT0270567, photos by Estella Ortega). (68, 71, 74) Head in full-face view; (69, 72, 75) body in lateral view; (70, 73, 76) body in dorsal view. →

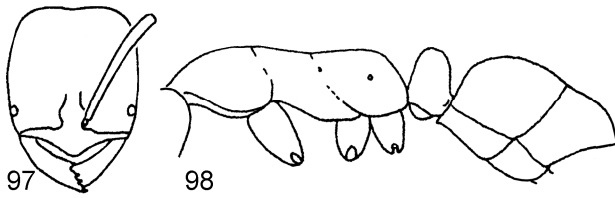


Figs. 77 - 87: (77 - 79) *Leptogenys khammouanensis*, worker (from RONCIN & DEHARVENG 2003); (80 - 82) *L. moelleri*, worker (from ANTWEB 2014, CASENT0281928, photos by Shannon Hartman); (83 - 85) *L. crassicornis*, worker (from ANTWEB 2014, CASENT0281924, photos by Shannon Hartman); (86 - 87) *L. emiliae*, type worker (from ANTWEB 2014, CASENT0907374, photos by Will Ericson). (77, 80, 83) Head in full-face view; (78, 81, 84, 86) body in lateral view; (79, 82, 85, 87) body in dorsal view.





Figs. 88 - 96: (88 - 90) *Leptogenys roberti*, type worker (from ANTWEB 2014, CASENT0907382, photos by Will Ericson); (91 - 93) *L. yerburyi*, type worker (from ANTWEB 2014, CASENT0907384, photos by Will Ericson); (94 - 96) *L. dalyi*, type worker (from ANTWEB 2014, CASENT0907364, photos by Zach Lieberman). (88, 91, 94) Head in full-face view; (89, 92, 95) body in lateral view; (90, 93, 96) body in dorsal view.

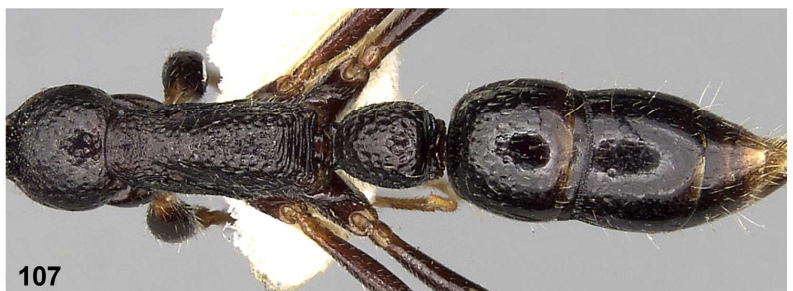


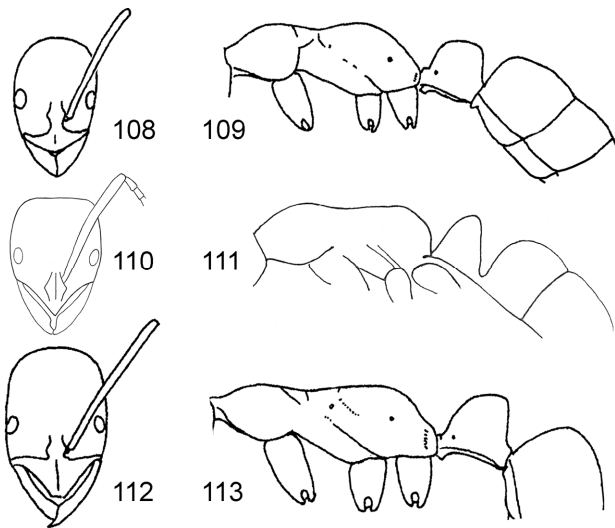
Figs. 97 - 98: *Leptogenys strenna*, worker (from ZHOU 2001). (97) Head in full-face view; (98) body in lateral view.

- 8 Petiolar node longitudinally elongate and horizontally triangular, distinctly longer than high in lateral view, about twice as long as broad in dorsal view. Masticatory margin of mandible with 14 irregular teeth and denticles (Laos) (Figs. 77 - 79). *L. khammouanensis*
- Petiolar node longitudinally thickened, erectly triangular or subcubical, about as high as long or distinctly higher than long in lateral view, about as broad as long or distinctly broader than long in dorsal view. Masticatory margin of mandible with less than 10 teeth and denticles. 9
- 9 Petiolar node erectly triangular in lateral view, dorsal and anterior margins form a single arch, the two margins not separated by a distinct blunt angle (Figs. 44 - 48, 80 - 82). 10
- Petiolar node subquadrate in lateral view, dorsal and anterior margins not forming a single arch, the two margins separated by a distinct blunt angle. .. 11
- 10 Head largely sparsely punctate and opaque. Posterior head margin weakly convex in full-face view. Metanotal groove not impressed in lateral view. Head, mesosoma and petiole black, gaster blackish brown (India) (Figs. 80 - 82). *L. moelleri*
- Head smooth and shiny. Posterior head margin weakly concave in full-face view. Metanotal groove distinctly impressed in lateral view. Body color reddish brown (Vietnam; China: Yunnan) (Figs. 44 - 48). *L. davydovi*
- 11 Petiolar node thickly trapezoidal in lateral view, dorsal margin as long as or longer than anterior margin. Body color brownish yellow (Figs. 83 - 87). 12
- Petiolar node thinly trapezoidal in lateral view, dorsal margin distinctly shorter than anterior margin. Body color reddish brown to black (Figs. 88 - 98). 13
- 12 Dorsal margin of petiolar node about as long as anterior margin in lateral view; the node relatively narrow in dorsal view, about 1.2 times as broad as long. Declivity of propodeum without transverse striation (Myanmar; China: Yunnan) (Figs. 83 - 85). *L. crassicornis*
- Dorsal margin of petiolar node longer than anterior margin in lateral view; the node relatively broad in dorsal view, about 1.4 times as broad as long. Declivity of propodeum with transverse striation (India) (Figs. 86 - 87). *L. emiliae*

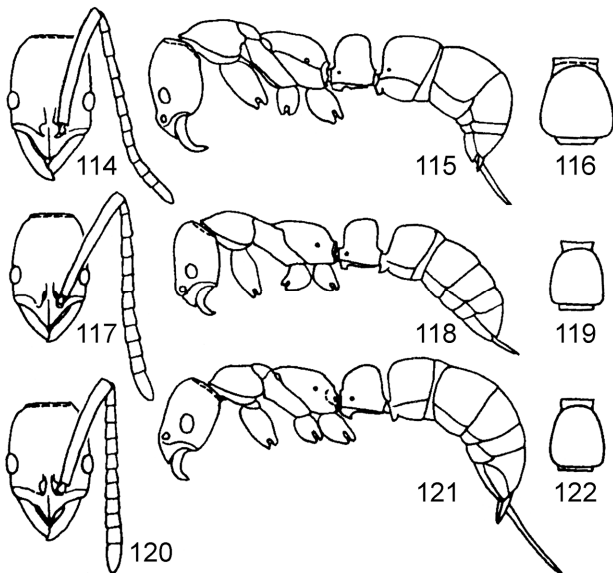
- 13 Head dorsum sparsely punctate throughout (Figs. 88 - 93). 14
- Head dorsum mostly smooth and shiny (Figs. 1 - 9, 94 - 98). 15
- 14 Head dorsum largely sparsely punctate. Antennae relatively shorter, scape surpassing posterior head corner by about one fifth of its length, antennal segments 3 - 6 about as broad as long. Metanotal groove not impressed in lateral view. Body color brownish black (India, Myanmar) (Figs. 88 - 90). *L. roberti*
- Head dorsum finely sparsely punctate. Antennae relatively longer, scape surpassing posterior head corner by about one third of its length, antennal segments 3 - 6 distinctly longer than broad. Metanotal groove distinctly impressed in lateral view. Body color black (Sri Lanka) (Figs. 91 - 93). *L. yerburyi*
- 15 Head distinctly longer than broad in full-face view, about 1.4 times as long as broad, posterior margin weakly convex. Inner margin of mandible distinctly denticulate (India) (Figs. 94 - 96). *L. dalyi*
- Head slightly longer than broad in full-face view, at most 1.2 times as long as broad, posterior margin straight or weakly concave. Inner margin of mandible edentate. 16
- 16 Mandible with 5 teeth on the masticatory margin. Subpetiolar process semicircular, rounded at apex. Body color reddish brown (China: Guangxi) (Figs. 97, 98). *L. strenna*
- Mandible with 7 - 8 teeth and denticles on the masticatory margin. Subpetiolar process triangular, angled at apex. Body color black (India, Myanmar; China: Yunnan) (Figs. 1 - 9). *L. lucidula*
- 17 Head dorsum striate throughout (Figs. 10 - 18, 99 - 101). 18
- Head dorsum punctate throughout or mostly smooth and shiny, at most punctate or rugose anterior to eyes (Figs. 102 - 107). 19
- 18 Clypeus with distinct longitudinal central carina. Sides of pronotum smooth, finely rugulose or finely reticulate; sides of mesothorax, metathorax and propodeum irregularly rugose (India, Sri Lanka, Myanmar, Philippines, Malaysia, Singapore, Indonesia, New Guinea, Solomons; China: Sichuan, Yunnan, Hunan, Fujian, Taiwan, Guangxi, Guangdong, Hainan, Hong Kong) (Figs. 10 - 18). *L. diminuta*

Figs. 99 - 107: (99 - 101) *Leptogenys kitteli*, worker (from ANTWEB 2014, CASENT0217530, photos by Shannon Hartman); (102 - 104) *L. hysterica*, type worker (from ANTWEB 2014, CASENT0915229, photos by Will Ericson); (105 - 107) *L. punctiventris*, worker (from ANTWEB 2014, CASENT0281939, photos by Shannon Hartman). (99, 102, 105) Head in full-face view; (100, 103, 106) body in lateral view; (101, 104, 107) body in dorsal view. ➔





Figs. 108 - 113: (108 - 109) *Leptogenys hezhouensis*, worker (from ZHOU 2001); (110 - 111) *L. jeanettei*, worker (from MATHEW & TIWARI 2000); (112 - 113) *L. huapingensis*, worker (from ZHOU 2001). (108, 110, 112) Head in full-face view; (109, 111, 113) body in lateral view.



Figs. 114 - 122: (114 - 116) *Leptogenys zhuangzii*, worker (from XU 2000); (117 - 119) *L. laozii*, worker (from XU 2000); (120 - 122) *L. mengzii*, worker (from XU 2000). (114, 117, 120) Head in full-face view; (115, 118, 121) body in lateral view; (116, 119, 122) petiole in dorsal view.

– Clypeus without longitudinal central carina. Mesosoma regularly longitudinally striate (India, Myanmar, Thailand, Vietnam, Malaysia, Indonesia, New Guinea; China: Sichuan, Yunnan, Guizhou, Hubei, Hunan, Jiangxi, Zhejiang, Fujian, Taiwan, Guangxi, Guangdong, Hainan, Hong Kong) (Figs. 99 - 101). *L. kitteli*

19 Head dorsum punctate throughout (Figs. 102 - 128). 20

– Head dorsum mostly smooth and shiny, at most punctate or rugose anterior to eyes (Figs. 129 - 140). 32

20 First gastral segment mostly punctate (Figs. 102 - 109). 21

– First gastral segment smooth and shiny (Figs. 110 - 128). 25

21 Head roughly rectangular in full-face view, not widening anteriorly, posterior margin roundly convex. Anterior apex of clypeus strongly convex (Figs. 102 - 104, 108, 109). 22

– Head roughly trapezoidal in full-face view, distinctly widening anteriorly, posterior margin nearly straight. Anterior apex of clypeus truncate or nearly truncate (Figs. 28 - 35, 54 - 58, 105 - 107). 23

22 Posterior head margin weakly convex in full-face view. Dorsum of promesonotum almost straight in lateral view, metanotal groove narrowly impressed. Petiolar node trapezoidal in dorsal view, anterolateral corners narrowly rounded. Head, mesosoma and petiole densely reticulate. Body color blackish brown. Total length 4 - 5 mm (India, Sri Lanka) (Figs. 102 - 104). *L. hysterica*

– Posterior head margin strongly convex in full-face view. Dorsum of promesonotum moderately convex in lateral view, metanotal groove widely impressed. Petiolar node nearly semicircular in dorsal view, anterolateral corners rounded. Head, mesosoma and petiole densely punctate. Body color blackish brown. Total length 7.9 - 8.5 mm (China: Guangxi) (Figs. 108, 109). ... *L. hezhouensis*

23 Antennae relatively shorter, only one fourth of length of scape surpassing posterior head corner, segments 3 and 4 about equal. Anterior margin of petiolar node straight and vertical, anterodorsal corner narrowly rounded. Total length 5.2 - 5.7 mm (China: Tibet) (Figs. 28 - 35). *L. yandii* sp.n.

– Antennae relatively longer, one third or half of length of scape surpassing posterior head corner, segment 3 distinctly longer than segment 4. Anterior margin of petiolar node weakly convex and slope, anterodorsal corner broadly rounded (Figs. 54 - 58, 105 - 107). 24

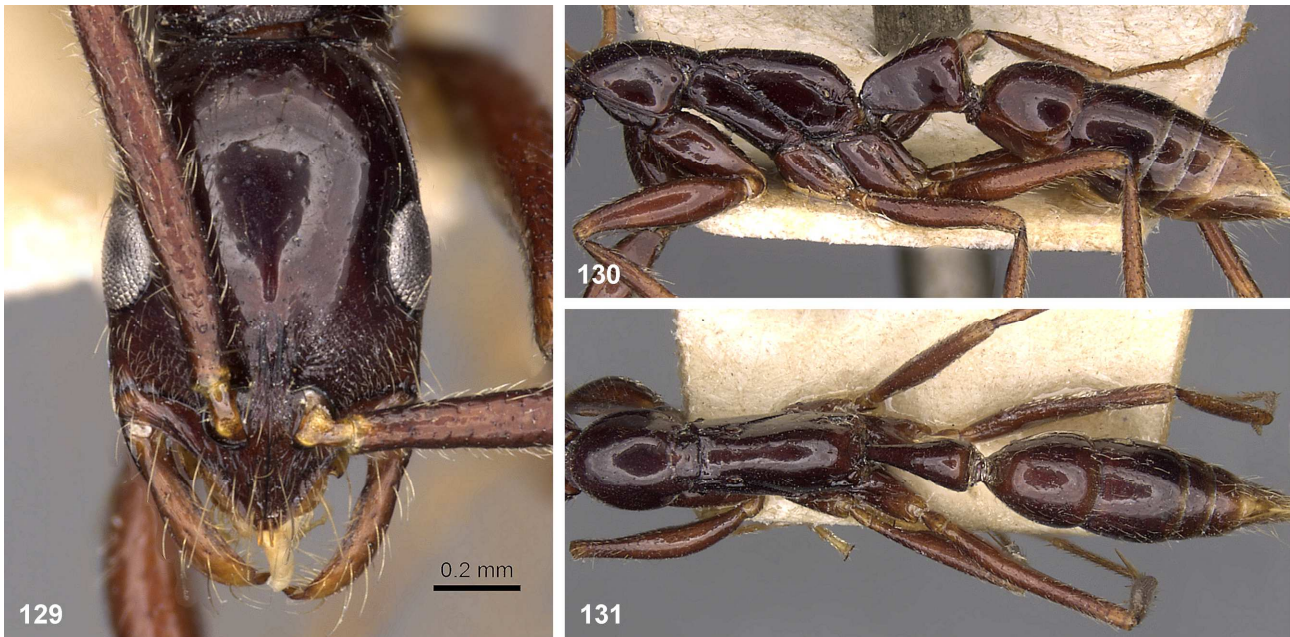
24 Eyes larger and occupying one third of head side. Antennae shorter, about one third of scape length surpassing posterior head corner. Head dorsum finely densely punctate. Dorsum of mesosoma, petiole and first gastral segment sparsely punctate with interspaces relatively shiny; sides of mesosoma and petiolar node longitudinally rugose, posterior two thirds of side of first gastral segment smooth and shiny, second gastral segment smooth and shiny. Total length 5 - 6 mm (India, Philippines) (Figs. 105 - 107). *L. punctiventris*

– Eyes smaller and occupying one fourth of head side. Antennae longer, nearly half of scape length surpassing posterior head corner. Head, mesosoma, petiole and first gastral segment densely punctate with interspaces coarsely reticulate and dull, second gastral segment sparsely punctate. Total length 9 - 10 mm (Myanmar, India; China: Yunnan, Guangxi, Hong Kong) (Figs. 54 - 58). *L. binghamii*



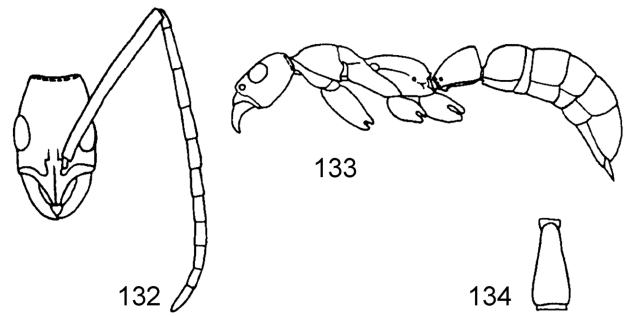
Figs. 123 - 128: (123 - 125) *Leptogenys lattkei*, holotype worker (from ANTWEB 2014, CASENT1008007, photos by Bharti & Wachkoo); (126 - 128) *L. transitionis*, holotype worker (from ANTWEB 2014, CASENT1008005, photos by Bharti & Wachkoo). (123, 126) Head in full-face view; (124, 127) body in lateral view; (125, 128) body in dorsal view.

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| <p>25 Petiolar node roughly conical in lateral view, without distinct dorsal margin, broader than long in dorsal view (India) (Figs. 110, 111). <i>L. jeanettei</i></p> <p>– Petiolar node roughly trapezoidal in lateral view, dorsal margin long and slope down anteriorly, as broad as long or longer than broad in dorsal view (Figs. 112 - 128). 26</p> <p>26 Clypeus truncate at apex (China: Guangxi) (Figs. 112, 113). <i>L. huapingensis</i></p> <p>– Clypeus convex at apex, not truncate (Figs. 114 - 128). 27</p> | <p>27 Dorsal faces of head, mesosoma and petiolar node densely punctate and opaque (Figs. 114 - 119). 28</p> <p>– Dorsal face of head loosely punctate with interspaces relatively shiny, dorsal faces of mesosoma and petiolar node smooth and shiny (Figs. 49 - 53, 120 - 128). 29</p> <p>28 Inner margin of mandible roundly convex, basal corner bluntly angled. Pronotum densely punctate with sides longitudinally striate. Anterodorsal corner of petiolar node broadly rounded in lateral view. Body color black. Robust species with total</p> |
|---|---|



Figs. 129 - 131: *Leptogenys assamensis*, type worker (from ANTWEB 2014, CASENT0907363, photos by Zach Lieberman). (129) Head in full-face view; (130) body in lateral view; (131) body in dorsal view.

- length 7.1 - 7.8 mm (China: Yunnan) (Figs. 114 - 116). *L. zhuangzui*
- Inner margin of mandible nearly straight, basal corner rounded without clear angle. Pronotum finely rugulose with sides smooth and shiny. Anterodorsal corner of petiolar node narrowly rounded in lateral view. Body color blackish brown. Slender species with total length 4.5 - 5.0 mm (China: Yunnan) (Figs. 117 - 119). *L. laozui*
- 29 Antennal segments relatively shorter, segment 3 about 1.5 times as long as broad, about as long as segment 4 (Figs. 49 - 53, 120 - 122). 30
- Antennal segments relatively longer, segment 3 about 2.4 - 2.9 times as long as broad, distinctly longer than segment 4 (Figs. 123 - 128). 31
- 30 Petiolar node higher than long in lateral view, with anterodorsal corner narrowly rounded. Mesopleuron and metapleuron mostly smooth and shiny. Body color black to blackish brown. Total length 4.5 - 5.2 mm (China: Yunnan, Tibet) (Figs. 120 - 122). *L. mengzui*
- Petiolar node as high as long in lateral view, with anterodorsal corner broadly rounded. Mesopleuron and metapleuron mostly densely rugose and opaque. Body color reddish brown. Total length 5.6 - 6.4 mm (China: Guangxi, Zhejiang, Yunnan) (Figs. 49 - 53). *L. rufida*
- 31 Basal corner of mandible bluntly angled. Anterodorsal corner of petiolar node narrowly rounded. Body color black. Relatively smaller species with total length 5.5 - 5.7 mm (India) (Figs. 123 - 125). *L. lattkei*
- Basal corner of mandible rounded without clear angle. Anterodorsal corner of petiolar node broadly rounded. Body color blackish brown. Relatively



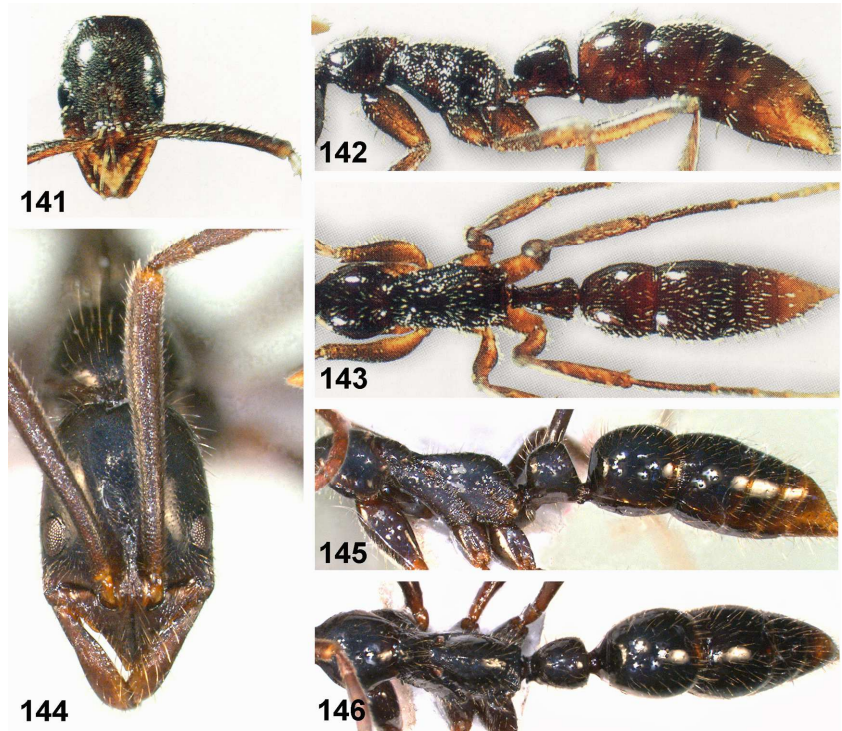
Figs. 132 - 134: *Leptogenys pangui*, worker (from XU 2000). (132) Head in full-face view; (133) body in lateral view; (134) petiole in dorsal view.

- larger species with total length 6.4 - 6.7 mm (India) (Figs. 126 - 128). *L. transitionis*
- 32 Body color blackish brown, with metallic green iridescence. Total length 6.7 mm (India)..... *L. stenocheilos*
- Body color reddish brown to black, without metallic green iridescence (Figs. 19 - 27, 129 - 146). 33
- 33 Petiolar node strongly elongate in lateral view, about 1.5 times as long as high (Figs. 129 - 134). ... 34
- Petiolar node moderately to weakly elongate in lateral view, less than 1.2 times as long as high (Figs. 19 - 27, 135 - 146). 35
- 34 Antennal scape relatively shorter, surpassing posterior head corner by about two fifths of its length. Petiolar node elongate trapezoidal in lateral view, with very short but distinct anterior margin. Body color reddish brown. Relatively smaller species with total length 6.5 - 7 mm (India) (Figs. 129 - 131). *L. assamensis*



Figs. 135 - 140: (135 - 137) *Leptogenys chinensis*, worker (from ANTWEB 2014, CASENT0270544, photos by Estella Ortega); (138 - 140) *L. kraepelini*, worker (from ANTWEB 2014, CASENT0281936, photos by Shannon Hartman). (135, 138) Head in full-face view; (136, 139) body in lateral view; (137, 140) body in dorsal view.

- Antennal scape very long, surpassing posterior head corner by half of its length. Petiolar node triangular in lateral view, without anterior margin. Body color black. Large species with total length 13 - 13.5 mm (China: Yunnan) (Figs. 132 - 134). *L. pangui*
- 35 Petiolar node moderately elongate, as long as high or distinctly longer than high in lateral view (Figs. 19 - 27, 135 - 143). 36
- Petiolar node weakly elongate, distinctly higher than long in lateral view, about 1.3 - 1.4 times as high as long (Figs. 36 - 43, 144 - 146). 39
- 36 Clypeus truncated at apex. Larger species with total length 8 - 11 mm (Figs. 135 - 140). 37
- Clypeus convex at apex. Smaller species with total length 4.5 - 7 mm (Figs. 19 - 27, 141 - 143). 38
- 37 Dorsal faces between eyes and antennal sockets smooth and shiny, without longitudinal rugae. Propodeal declivity transversely striate, not smooth. Petiolar node relatively broader in dorsal view, about 1.3 times as long as broad. Relatively smaller species with total length 8 - 10 mm (India, Sri Lanka, Philippines; China: Guizhou, Fujian, Taiwan, Guangxi, Guangdong) (Figs. 135 - 137). *L. chinensis*
- Dorsal faces between eyes and antennal sockets longitudinal rugose and opaque. Propodeal declivity smooth and shiny, without transverse stri-



Figs. 141 - 146: (141 - 143) *Leptogenys confucii*, worker (from JAPANESE ANT DATABASE GROUP 2003); (144 - 146) *L. laeviterga*, worker (from ZHOU & al. 2012). (141, 144) Head in full-face view; (142, 145) body in lateral view; (143, 146) body in dorsal view.

- ations. Petiolar node relatively narrower in dorsal view, about twice as long as broad. Relatively larger species with total length 9 - 11 mm (Indonesia, Vietnam; China: Yunnan) (Figs. 138 - 140). *L. kraepelini*
- 38 Petiolar node distinctly longer than high in lateral view. Sides of mesothorax, metathorax and propodeum mostly smooth and shiny. Body color black. Relatively larger species with total length 5.9 - 6.3 mm (Vietnam, Myanmar, India, Sri Lanka, Bangladesh, Philippines, Singapore, Indonesia; China: Yunnan, Hubei, Hunan, Zhejiang, Fujian, Guangxi, Guangdong, Hainan, Hong Kong, Macao) (Figs. 19 - 27). *L. peuqueti*
- Petiolar node as high as long in lateral view. Sides of mesothorax, metathorax and propodeum mostly irregularly rugose and opaque. Body color black, gaster blackish brown. Relatively smaller species with total length 4.5 mm (Japan; China: Taiwan) (Figs. 141 - 143). *L. confucii*
- 39 Clypeus truncated at apex. Eyes relatively smaller and occupying one fourth of head side. Petiolar node relatively longer in lateral view, about 1.3 times as high as long, dorsal margin distinctly longer than anterior margin, anterodorsal corner narrowly rounded, the node obviously longer than broad in dorsal view (China: Guangxi) (Figs. 144 - 146). *L. laeviterga*
- Clypeus pointed and strongly convex at apex. Eyes larger and occupying one third of head side. Petiolar node relatively higher in lateral view, about 1.4 times as high as long, dorsal margin as long as anterior margin, anterodorsal corner broadly

rounded, the node as broad as long in dorsal view (China: Yunnan) (Figs. 36 - 43). *L. sunzii* sp.n.

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