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Revision of Chinese species of the ant genus *Parasyscia* Emery, 1882 (Hymenoptera: Formicidae: Dorylinae)

ZHILIN CHEN[1,2,3], CUIJUN LIANG[1,2,4] & CONGCONG DU[1,2*]
[1]*Key Laboratory of Ecology of Rare and Endangered Species and Environmental Protection (Guangxi Normal University), Ministry of Education, Guilin 541004, China.*
[2]*Guangxi Key Laboratory of Rare and Endangered Animal Ecology (Guangxi Normal University), Guilin 541004, China.*
[3] *chenzhilin35@163.com; https://orcid.org/0000-0001-6564-1528*
[4] *978563629@qq.com; https://orcid.org/0000-0002-4558-4244*
[*]*Corresponding author Cleverduwang@gmail.com; https://orcid.org/0000-0002-8078-4751*

Abstract

Seven species of the ant genus *Parasyscia* Emery, 1882 in the subfamily Dorylinae are recognized in China, including one known species, *P. reticulata* (Emery, 1923), and five new species: *P. wilsoni* **sp. nov.**, *P. nigrita* **sp. nov.**, *P. tibetana* **sp. nov.**, *P. shii* **sp. nov.**, *P. xui* **sp. nov.** and one new record species, *P. ganeshaiahi* Aswaj *et al*, 2021. The worker caste of *P. reticulata* is reported for the first time. The species *P. fossulata* (Forel, 1895) is excluded from the ant fauna of China. A revised key for the Asian species of *Parasyscia* based on the worker caste is provided.

Key words: taxonomy, new species, revised key, Dorylinae

Introduction

The subfamily Dorylinae contains both the conspicuous "army ants" found throughout the world's tropics and a set of genera that are mostly cryptic ants of leaf litter, rotten wood, and soil. The latter were formerly grouped in the subfamily Cerapachyinae, and many of the constituent genera were synonymized into the single genus *Cerapachys* Smith, 1857. Borowiec (2016, 2019) showed that Cerapachyinae and *Cerapachys* were paraphyletic. Borowiec (2016) recognized a newly expanded Dorylinae to include army ants and the former Cerapachyinae. The generic boundaries within the larger Dorylinae were completely revised, and many of the older genera were resurrected. One of these was *Parasyscia*.

The genus *Parasyscia* was established based on the type species *Parasyscia piochardi* by Emery (1882). It was soon treated as a subgenus of *Cerapachys* by Forel (1892) and was latter synonymized under *Cerapachys* by Kempf (1972). More recently, Borowiec (2016) restored the genus status of *Parasyscia*, pointing out that this genus could be distinguished from other doryline genera by the following morphological characteristics of workers: propodeal spiracle positioned low on sclerite; propodeal lobes present; constriction between abdominal segments III and IV, no constriction between remaining abdominal segments; petiole dorsolaterally emarginate; pronotomesopleural suture fused; helcium axial; middle tibia with a single pectinate spur; pretarsal claws unarmed; and first gastral segment often anterodorsally marginate.

The workers of the genus *Parasyscia* are monomorphic. Colonies usually have a single queen and fewer than 100 workers. Most species nest in soil, rotten logs and under stones (Brown 1975), except *P. zimmermani* (Wilson, 1959), which is an arboreal nester (Sarnat and Economo 2012). Species of this genus mostly inhabit mature broadleaf forests, but there are a few exceptions. For example, *P. imerinensis* Forel, 1891, was observed in an urban habitat of the botanical garden and zoo in Antananarivo, Madagascar (Borowiec, 2016). Species of this genus have been observed feeding on *Pheidole* sp. and *Strumigenys loriae* Emery, 1897 (Wilson 1958). Wilson (1958) observed a colony of *P. opaca* (Emery, 1901) with larvae of the same size, suggesting synchronous brood production.

Currently, this genus comprises 52 valid species, and here we describe five new species bringing the total to 57

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species. They are distributed in seven zoogeographic regions (*sensu* Holt *et al* 2013) (Table 1). The Asian continent, comprising the Saharo-Arabian, Oriental and Sino-Japanese regions, contains 27 species. In this paper, we revise the *Parasyscia* species of China. Five new species are described, and the worker caste of *P. reticulata* is described for the first time. A key to the Asian species of *Parasyscia* based on the worker caste is also provided.

TABLE 1. List of *Parasyscia* species by zoogeographical region (*sensu* Holt *et al* 2013). Species newly described here are marked with an asterisk.

Regions	Species
Palaearctic	*piochardi*
Madagascar	*imerinensis*
Saharo-Arabian	*browni, wittmeri*
Sino-Japanese	*hashimotoi, rifati*
Oceanian	*desposyne, dominula, flavaclavata, inconspicua, lindrothi, majuscula, nitens, opaca, polynikes, sculpturata, superata, terricola, zimmermani*
Afrotropical	*afer, arnoldi, centurio, cribrinodis, faurei, kenyensis, lamborni, natalensis, nitidulus, peringueyi, sudanensis, sylvicola, valida, villiersi, vitiensis*
Oriental	*aitkenii*, *bryanti, conservata, dohertyi, foveolata, fossulata, ganeshaiahi, indica, keralensis, kodecorum, luteoviger, muiri, nigrita*, reticulata, rufithorax, salimani, schoedli, seema, shii*, tibetana*, wighti, wilsoni*, xui**

Materials and methods

The examined specimens are deposited in the repositories with acronyms as follows: (1) GXNU (Insect Collection, Guangxi Normal University, Guilin, Guangxi, China); (2) SWFU (Insect Collection, Southwest Forestry University, Kunming, Yunnan Province, China); (3) IZCAS (Institute of Zoology, Chinese Academy of Sciences, Beijing, China). Holotype images of *P. reticulata* are available from AntWeb (http://www.antweb.org). The specimens were examined with a Leica M205A stereomicroscope. High–quality multifocused montage images were produced with KEYENCE (VHX–6000) digital imaging system. Measurements are in mm.

Measurements and indices

HL—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—Maximum width of head in full-face view, excluding the eyes.

CI—Cephalic index = HW × 100 / HL.

SL—Straight–line length of the antennal scape, excluding the basal constriction or neck.

SI—Scape index = SL × 100 / HW.

ED—Maximum diameter of eye.

MSL—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.

PW—Maximum width of pronotum measured in dorsal view.

PL—Length of petiole (abdominal segment II) measured in lateral view from the anterior process to the posteriormost point of the tergite, where it surrounds the gastral articulation.

PH—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.

DPW—Maximum width of petiole in dorsal view.

LPI—lateral petiole index = PH × 100 / PL.

DPI—Dorsal petiole index = DPW × 100 / PL.

TL—Total outstretched length of the individual, from the mandibular apex to the gastral apex.

Key to Asian species of Parasyscia based on the worker caste

Notes. We follow Bharti & Akbar (2013) and treat *P. keralensis* (Karmaly, *et al*, 2012) as a species inquirenda, thus excluding it from this key.

1. Eye degenerate, small, its maximum diameter smaller than or equal to the width of basal funicular segment, not breaking the lateral margins of head (Fig. 1A–B). **2**
-. Eye large and protruding, its maximum diameter two times more than the width of basal funicular segment, breaking lateral margins of head (Fig. 1C–D) **7**

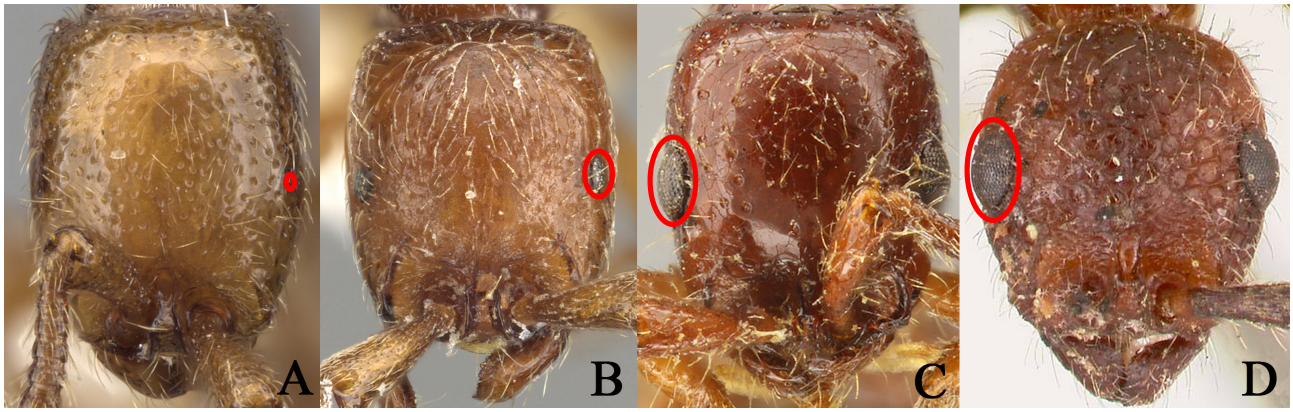

FIGURE 1. Head in full-face view. *P. piochardi* (From https://www.antweb.org, CASENT0281973, imaged by Shannon Hartman) (A), *P. wittmeri* (From https://www.antweb.org, paratype, CASENT0902708, imaged by Zach Lieberman) (B), *P. muiri* (Ant Image Database, image by Gary D. Alpert) (C), *P. fossulata* (from https://www.antweb.org, syntype, FOCOL0797, imaged by Christiana Klingenberg) (D).

2. Mid-dorsal portion of mesosoma smooth and shiny, without puncta (Fig. 2A). **3**
-. Mid-dorsal portion of mesosoma punctate (Fig. 2B) **4**

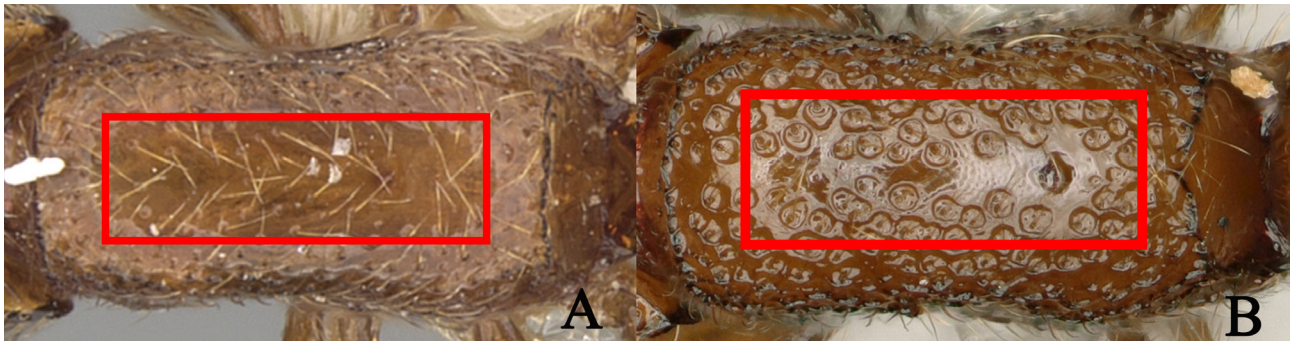

FIGURE 2. Mesosoma in dorsal view. *P. piochardi* (From https://www.antweb.org CASENT0281973, imaged by Shannon Hartman) (A), *P. reticulata* (imaged by Zhilin Chen) (B).

3. Maximum diameter of eye equal to the basal width of scape; ventral margin of subpetiolar process straight; in lateral view petiolar node subrectangular, the front and the back parallel (Fig. 3A). . . . . ***P. wittmeri* (Collingwood, 1985)**
-. Maximum diameter of eye smaller than the basal width of scape; ventral margin of subpetiolar process concave; in lateral view petiolar node trapezoid, with top narrower than bottom (Fig. 3B). . . . . ***P. piochardi* Emery, 1882**

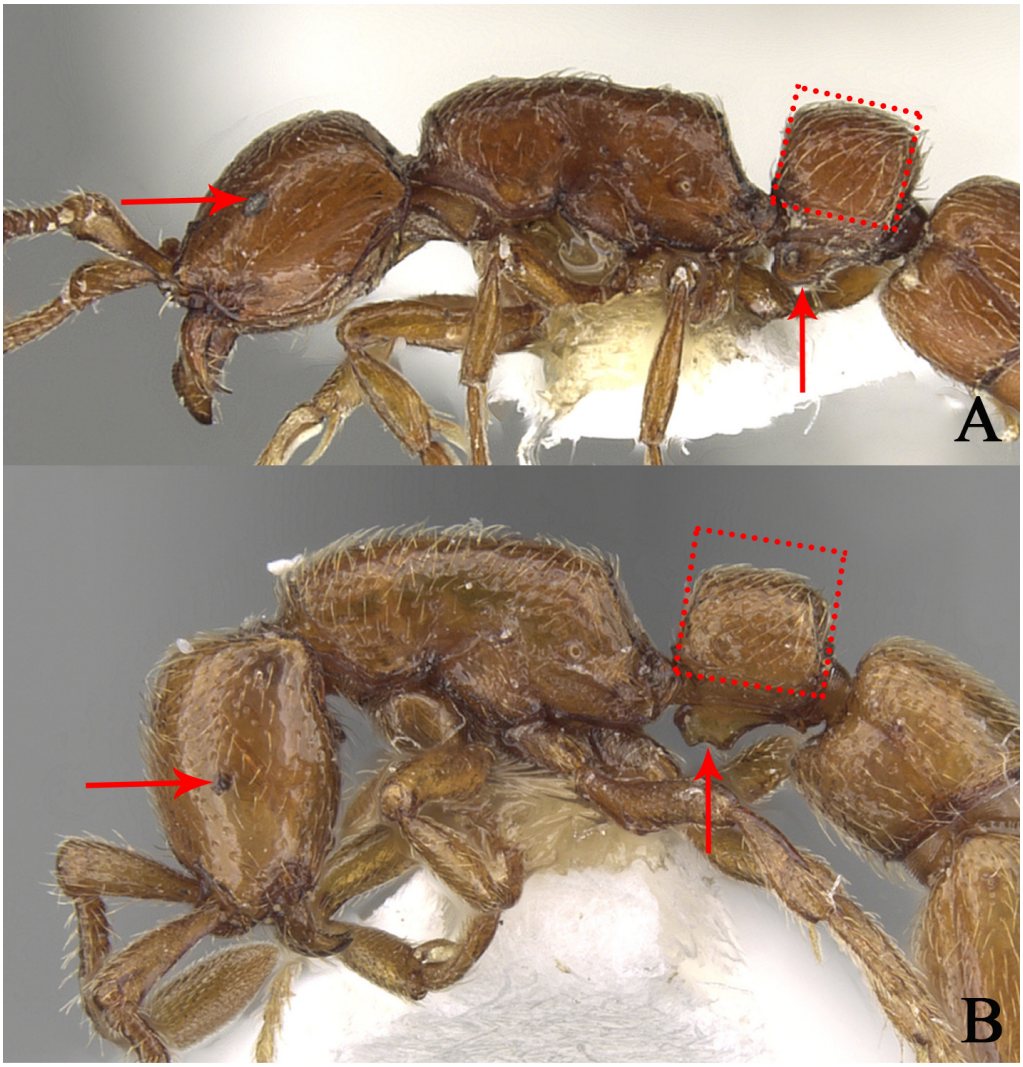

FIGURE 3. Body in lateral view. *P. wittmeri* (From https://www.antweb.org, paratype, CASENT0902708, imaged by Zach Lieberman) (A), *P. piochardi* (From https://www.antweb.org, CASENT0281973, imaged by Shannon Hartman) (B).

4. Lateral surface of head and mesosoma densely and coarsely reticulate (Fig. 4A). **5**
-. Lateral surface of head and mesosoma smooth and shiny, or with small, sparse puncta, interspaces between puncta smooth and shiny (Fig. 4B) **6**

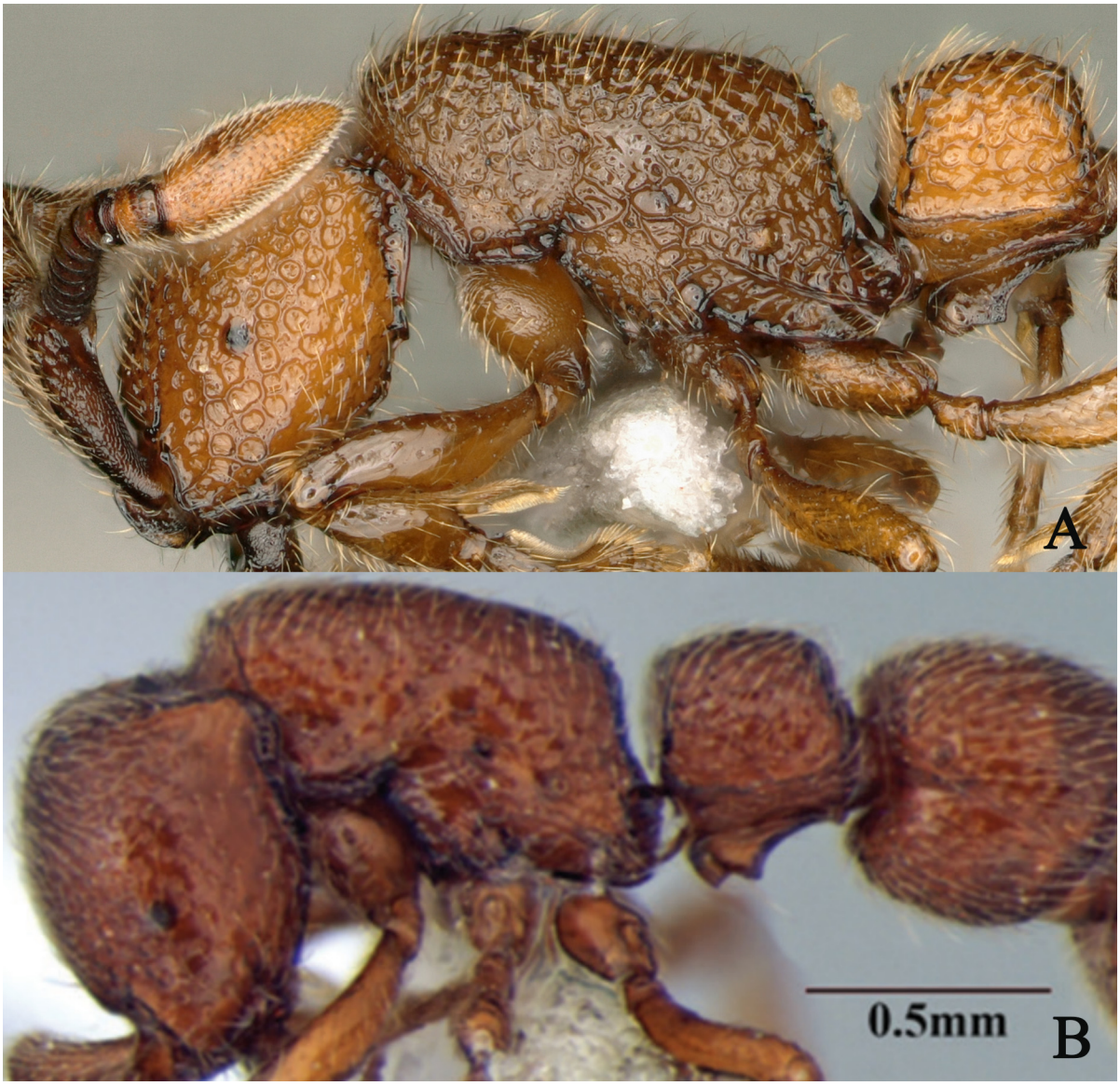

FIGURE 4. Body in lateral view. *P. reticulata* (imaged by Zhilin Chen) (A), *P. wighti* (holotype, imaged from Bharti & Akbar, 2013) (B).

5. In lateral view, anterodorsal corner of petiolar node angular, level with posterodorsal corner; in dorsal view, petiole subrectangular, lateral margins parallel (Fig. 5A–B). . . . . ***P. reticulata*** **(Emery, 1923)**

-. In lateral view, anterodorsal corner of petiolar node rounded, and lower than posterodorsal corner; in dorsal view, petiole trapezoid, broader posteriorly (Fig. 5C–D). . . . . ***P. hashimotoi*** **(Terayama, 1996)**

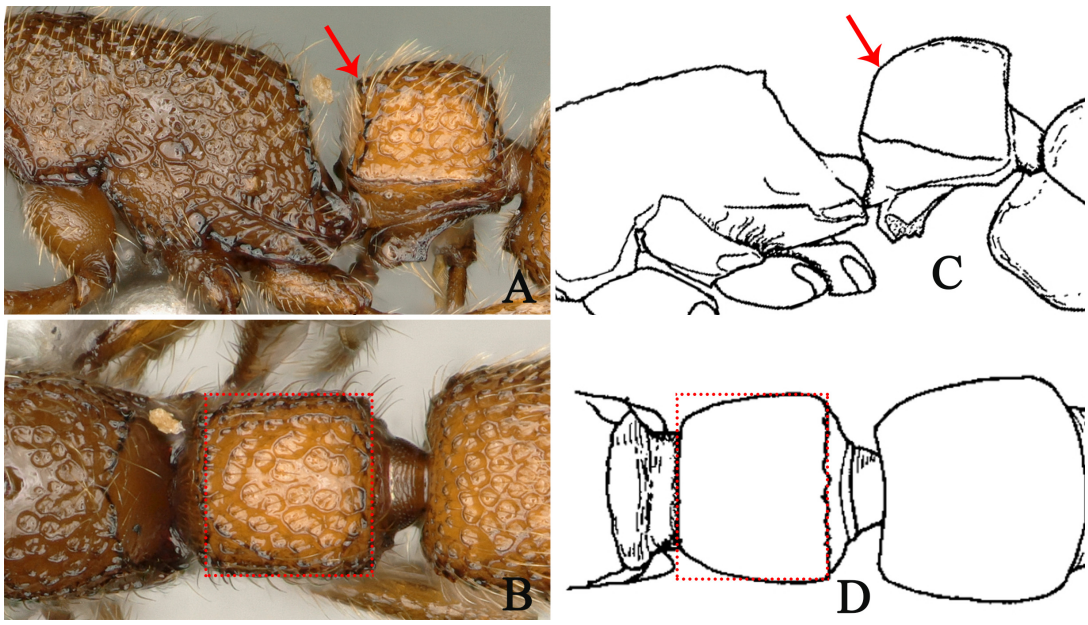

FIGURE 5. Petiole in lateral and dorsal view. *P. reticulata* (imaged by Zhilin Chen) (A, B), *P. hashimotoi* (Cited from Terayama, 1996) (C, D).

6. Antennae 12-segmented . . . . . ***P. wighti* (Bharti & Akbar, 2013)**
-. Antennae 11-segmented . . . . . ***P. ganeshaiahi* Aswaj *et al*, 2021**
7. In lateral view, petiole trapezoid, anterior and posterior faces convex (Fig. 6A–B) **8**
-. In lateral view, petiole subrectangular, anterior and posterior faces flat, parallel (Fig. 6C–D) **12**

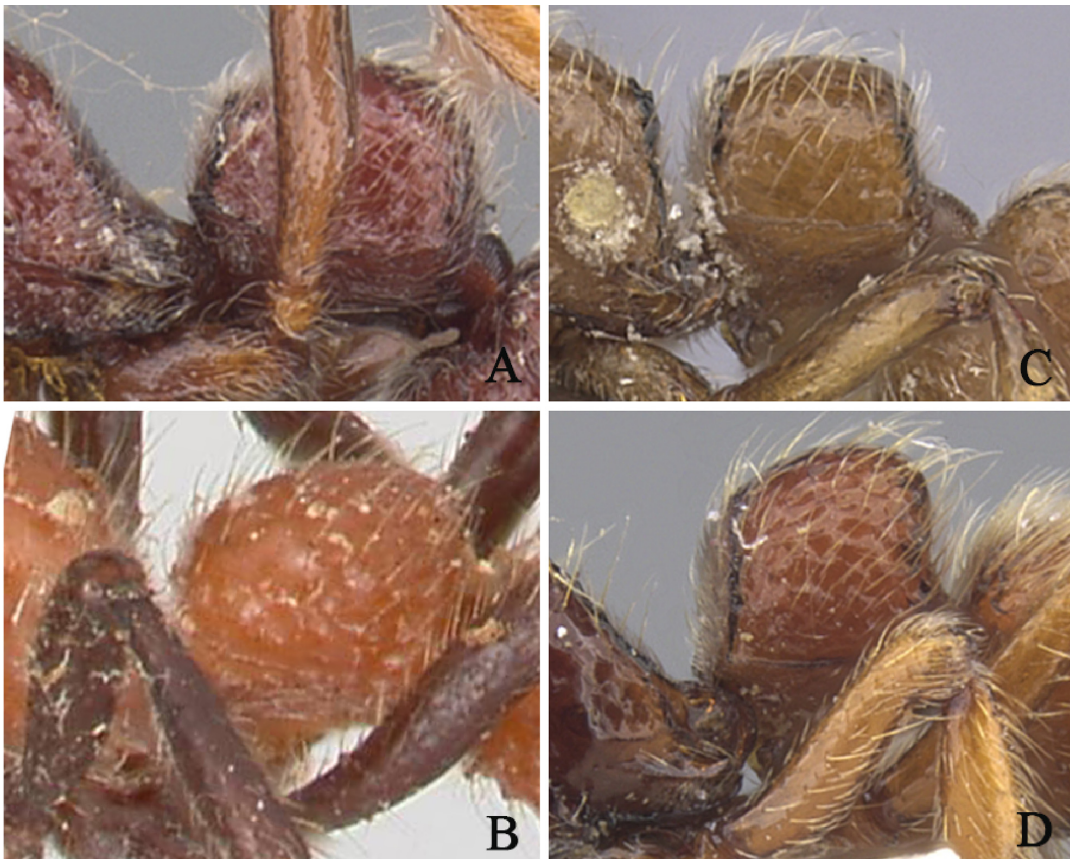

FIGURE 6. Petiole in lateral view. *P. rufithorax* (From https://www.antweb.org, paratype, CASENT 0902743, imaged by Will Ericson) (A), *P. fossulata* (From https://www.antweb.org, syntype, CASENT0263910, imaged by Christiana Klingenberg) (B), *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910, imaged by Will Ericson) (C), *P. luteoviger* (From https://www.antweb.org, paratype, CASENT0902744, imaged by Will Ericson) (D).

8. Abdomen clearly concolorous (Fig. 7A) **9**
-. Abdomen clearly bicolored (Fig. 7B). **10**

FIGURE 7. Metasoma in lateral view. *P. muiri* (Ant Image Database, image by Gary D. Alpert) (A), *P. fossulata* (From https://www.antweb.org, syntype, CASENT0263910, imaged by Christiana Klingenberg) (B).

9. Body dark reddish-brown; in lateral view, dorsal outline of mesosoma strongly convex; in dorsal view, anterolateral margin of first gastral segment relatively more convex (Fig. 8A–B) . . . . . ***P. muiri* (Wheeler & Chapman, 1925)**
-. Body light yellow; in lateral view, dorsal outline of mesosoma slightly convex; in dorsal view, anterolateral margin of first gastral segment relatively less convex, tapering more evenly to juncture with third abdominal segment (Fig. 8C–D) . . . . . ***P. shii* sp. nov.**

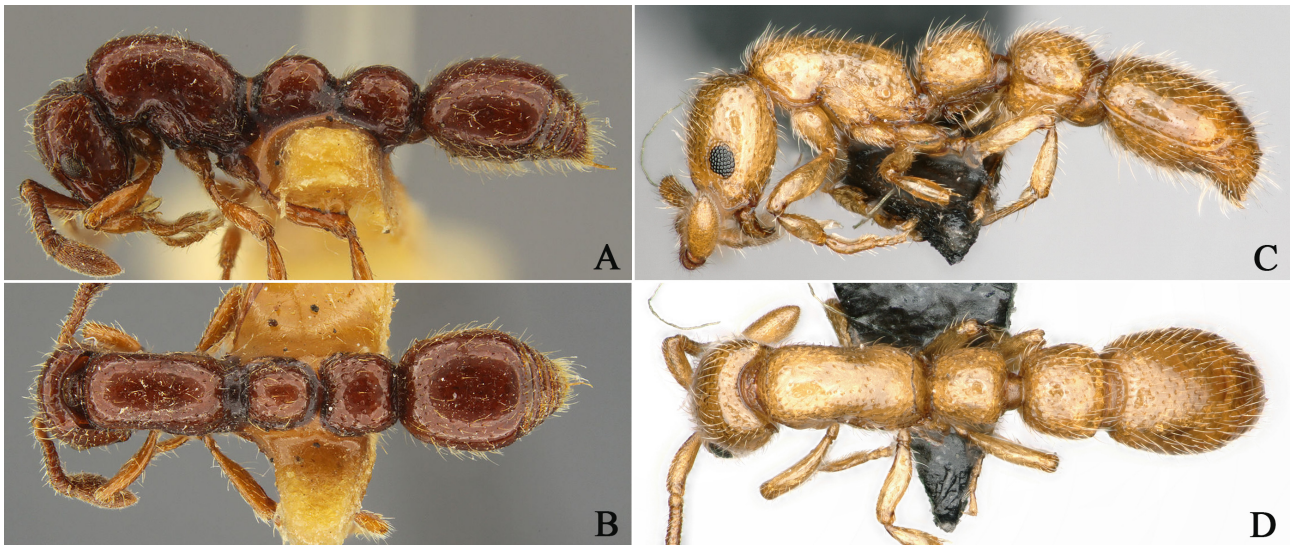

FIGURE 8. Body in lateral and dorsal view. *P. muiri* (Ant Image Database, imaged by Gary D. Alpert) (A, B), *P. shii* **sp. nov.** (imaged by Zhilin Chen) (C, D).

10. In full-face view, head rounded, posterolateral corner broadly rounded (Fig. 9A) . . . . . ***P. fossulata* (Forel, 1895)**
-. In full-face view, head subrectangular, posterolateral corner narrowly rounded or clearly angular (Fig. 9B–C) **11**

FIGURE 9. Head in full-face view. *P. fossulata* (From https://www.antweb.org, syntype, CASENT0263910, imaged by Christiana Klingenberg) (A), *P. rufithorax* (From https://www.antweb.org, paratype, CASENT 0902743, imaged by Will Ericson) (B), *P. tibetana* **sp. nov.** (imaged by Zhilin Chen) (C).

11. In full-face view, posterior margin of head slightly convex, posterolateral corner narrowly rounded (Fig. 9B); head with tiny piligerous puncta; posterodorsal margin of propodeum without carina; if carina present, it is extremely degraded (Fig. 10A). . . . . ***P. rufithorax* (Wheeler & Chapman, 1925)**

-. In full-face view, posterior margin of head strongly concave, posterolateral corner clearly angular (Fig. 9C); head with coarse puncta; posterodorsal margin of propodeum with strong carina (Fig. 10B) . . . . . .***P. tibetana* sp. nov.**

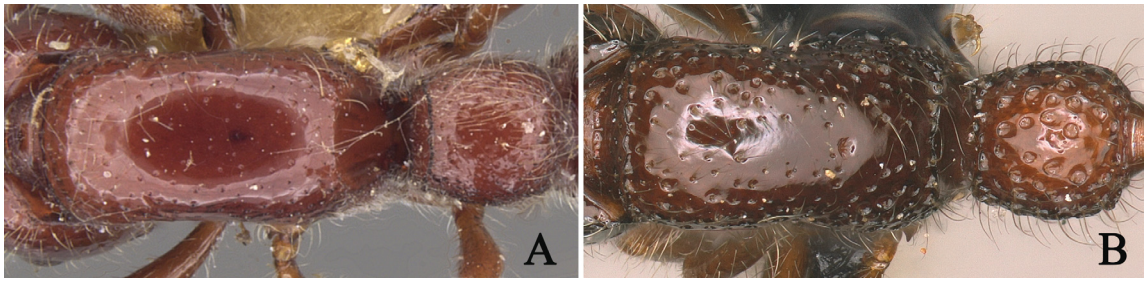

FIGURE 10. Mesosoma in dorsal view. *P. rufithorax* (From https://www.antweb.org, paratype, CASENT 0902743, imaged by Will Ericson) (A), *P. tibetana* **sp. nov.** (imaged by Zhilin Chen) (B).

12. Abdomen clearly bicolored (Fig. 11A). **13**

-. Abdomen concolorous or nearly so (Fig. 11B–C) **14**

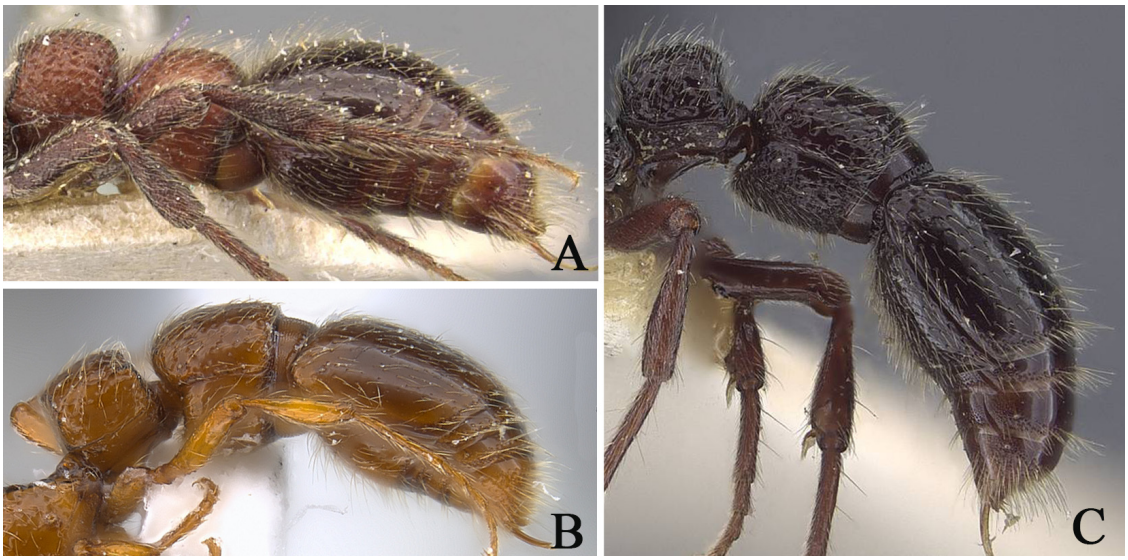

FIGURE 11. Metasoma in lateral view. *P. aitkenii* (From https://www.antweb.org, type, CASENT0907048, imaged by Zach Lieberman) (A), *P. rifati* (From https://www.antweb.org, paratype, CASENT0902743, imaged by Will Ericson) (B), *P. salimani* (From https://www.antweb.org, syntype, CASENT0916792, imaged by Zach Lieberman) (C).

13. In lateral view, posterodorsal corner of propodeum rounded; mesosoma and petiole with shallow puncta (Fig. 12A) . . . . . .
. . . . . ***P. aitkenii* (Forel, 1900)**

-. In lateral view, posterodorsal corner of propodeum angular; mesosoma and petiole with deep puncta (Fig. 12B) . . . . . .
. . . . . ***P. wilsoni* sp. nov.**

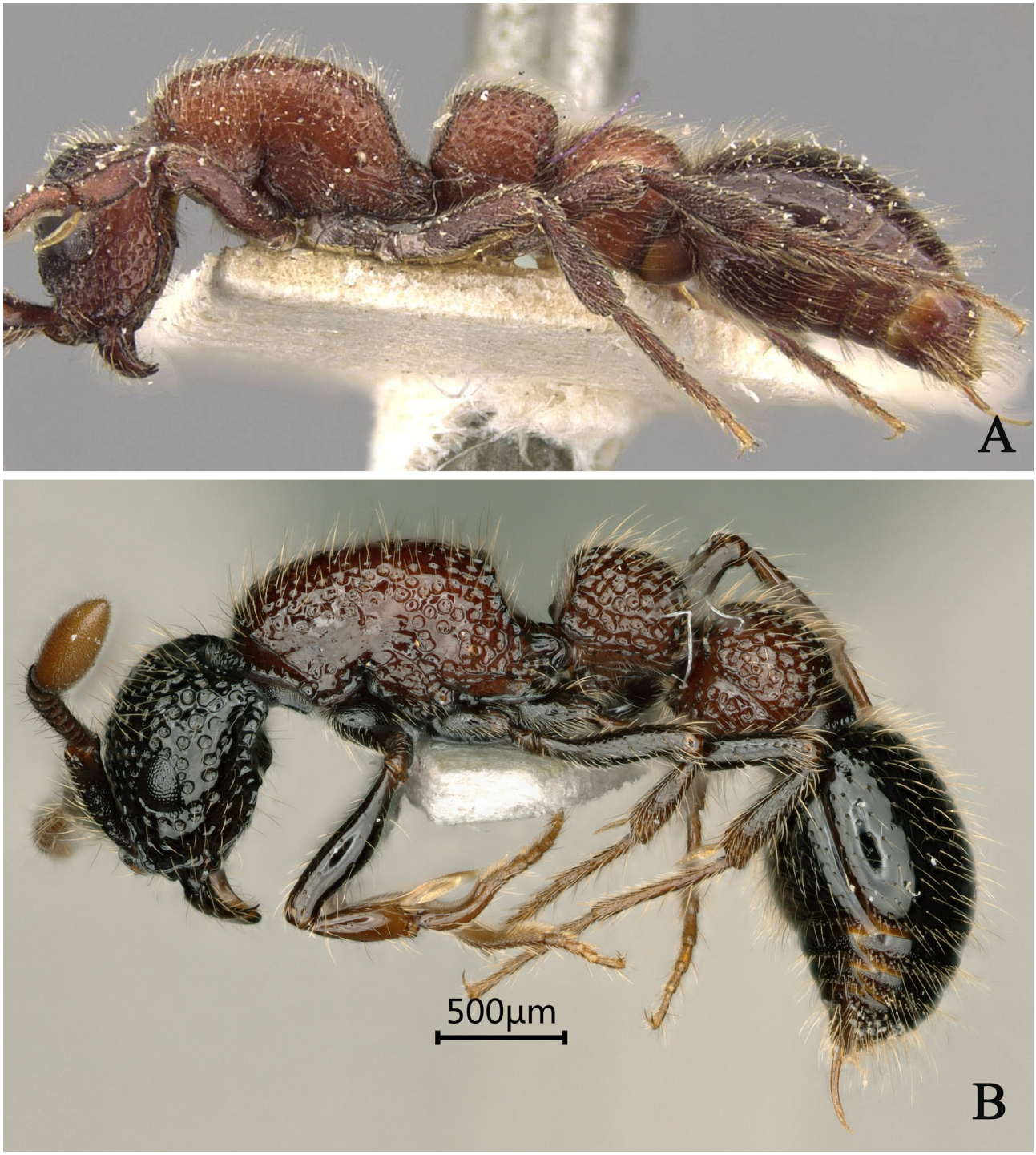

FIGURE 12. Body in lateral view. *P. aitkenii* (From https://www.antweb.org, type, CASENT0907048, imaged by Zach Lieberman) (A), *P. wilsoni* **sp. nov.** (imaged by Zhilin Chen) (B).

14. In full-face view, center of head with longitudinal groove, almost reaching to the posterior margin of the head (Fig. 13A). . . .
. . . . . ***P. conservata* (Viehmeyer, 1913)**

-. In full-face view, center of head without longitudinal groove (Fig. 13B) **15**

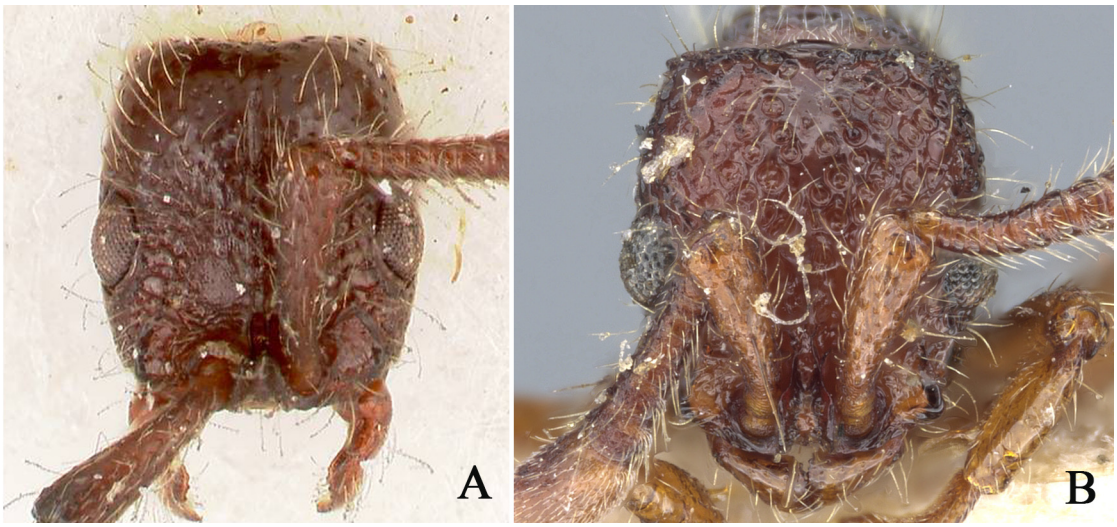

FIGURE 13. Head in full-face view. *P. conservata* (From https://www.antweb.org, type, FOCOL0799, imaged by Christiana Klingenberg) (A), *P. dohertyi* (From https://www.antweb.org, syntype, CASENT0903776, imaged by Zach Lieberman) (B).

15. In dorsal view, petiole longer than wide (Fig. 14A). . . . . ***P. indica* (Brown, 1975)**
-. In dorsal view, petiole broader than long (Fig. 14B) **16**

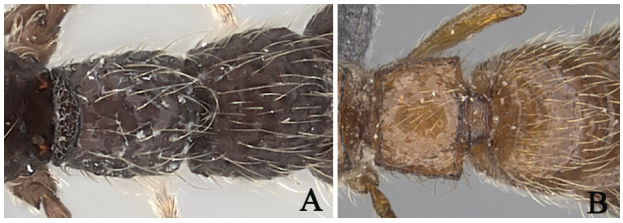

FIGURE 14. Petiole in dorsal view. *P. indica* (From https://www.antweb.org, type, CASENT0217387, imaged by Michele Esposito) (A), *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910, imaged by Will Ericson) (B).

16. In full-face view, the front of head with a wide and deep arc-shaped groove (Fig. 15A) . . . . . ***P. kodecorum* (Brown, 1975)**
-. In full-face view, the front of head without a wide and deep arc-shaped groove (Fig. 15B). **17**

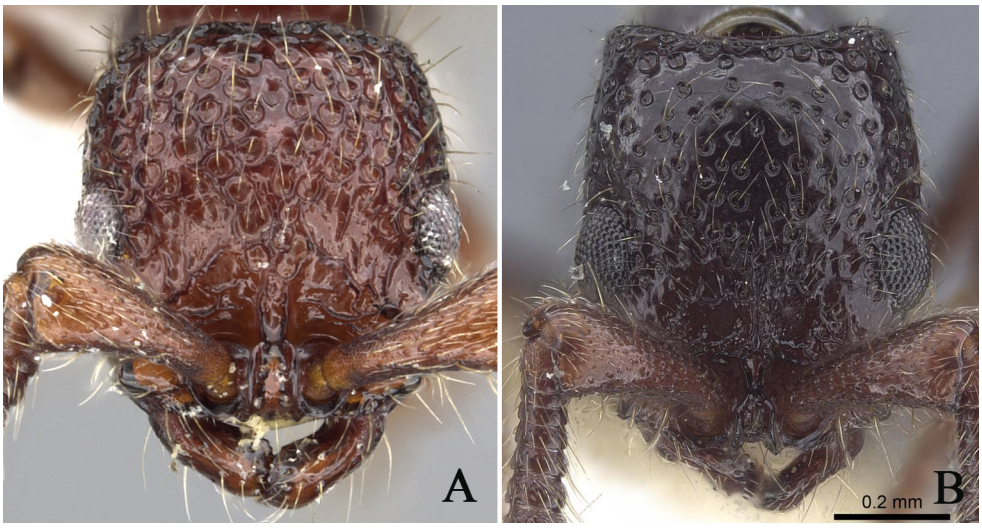

FIGURE 15. Head in full-face view. *P. kodecorum* (From https://www.antweb.org, paratype, CASENT0902722, imaged by Zach Lieberman) (A), *P. salimani* (From https://www.antweb.org, syntype, CASENT0916792, imaged by Zach Lieberman) (B).

17. In full-face view, head coarsely and densely punctate, margins of puncta partially connected to reticulation (Fig. 16A–B) **18**

-. In full-face view, head smooth and shiny, or, if punctate, with margins of puncta not connected to reticulation (Fig. 16C–D) **21**

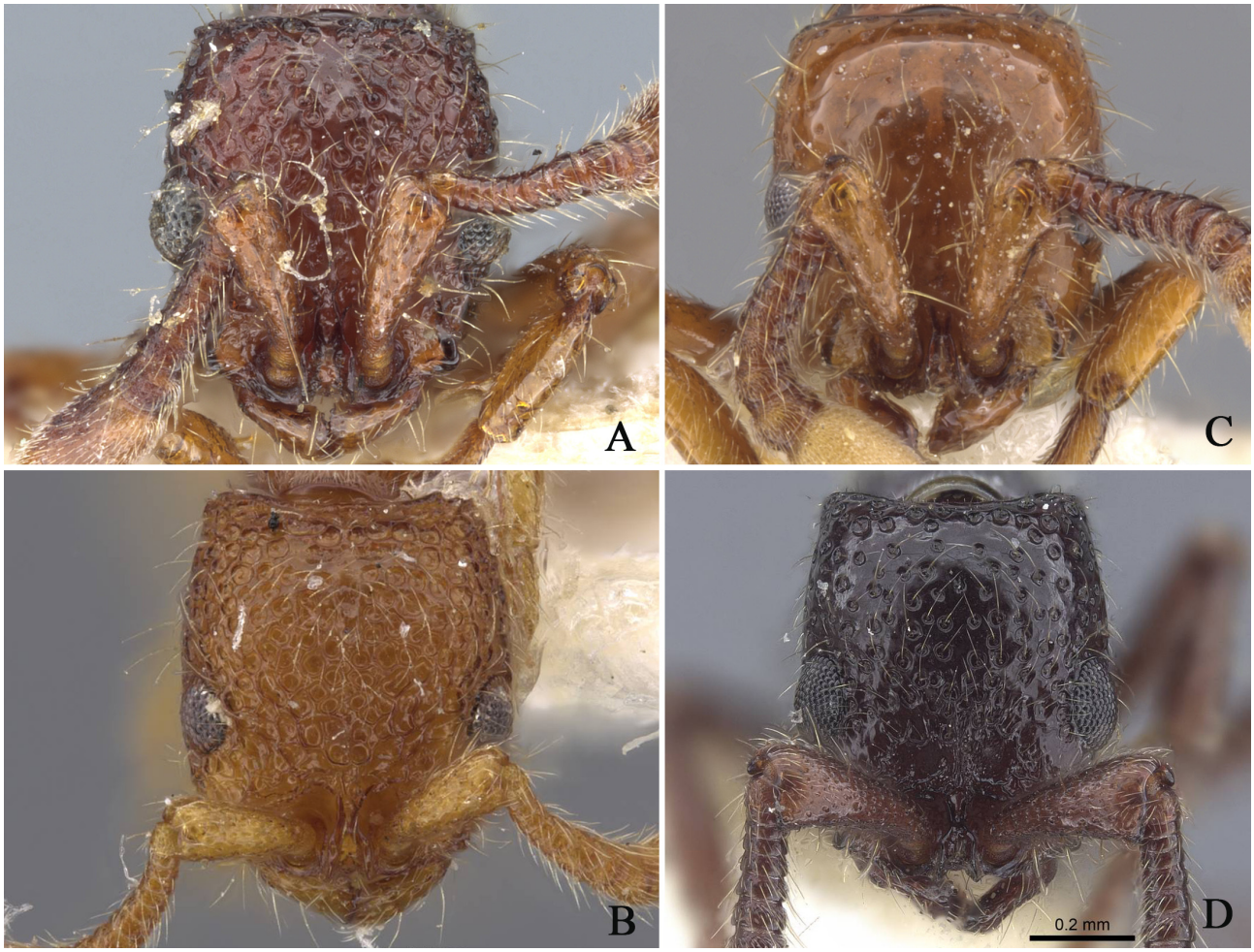

FIGURE 16. Head in full-face view. *P. dohertyi* (From https://www.antweb.org, syntype, CASENT0903776, imaged by Zach Lieberman) (A), *P. foveolata* (From https://www.antweb.org, holotype, CASENT0917354, imaged by Kate Martynova) (B), *P. rufithorax* (From https://www.antweb.org, paratype, CASENT 0902743, imaged by Will Ericson) (C), *P. salimani* (From https://www.antweb.org, syntype, CASENT0916792, imaged by Zach Lieberman) (D).

18. In lateral view, petiolar node higher than long (Fig. 17A) . . . . . ***P. foveolata* (Radchenko, 1993)**

-. In lateral view, petiolar node longer than high (Fig. 17B) **19**

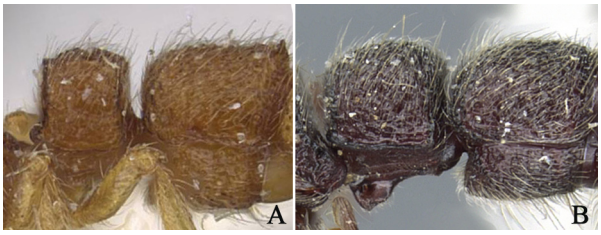

FIGURE 17. Petiole in lateral view. *P. foveolata* (From https://www.antweb.org, holotype, CASENT0917354, imaged by Kate Martynova) (A), *P. dohertyi* (From https://www.antweb.org, syntype, CASENT 0903775, imaged by Zach Lieberman) (B).

19. In full-face view, posterolateral corner of head angular; in dorsal view, tergite of postpetiole with scattered shallow puncta (Fig. 18A–B) . . . . . ***P. nigrita* sp. nov.**

-. In full-face view, posterolateral corner of head rounded; in dorsal view, tergite of postpetiole rugoso-reticulate (Fig. 18C–F) **20**

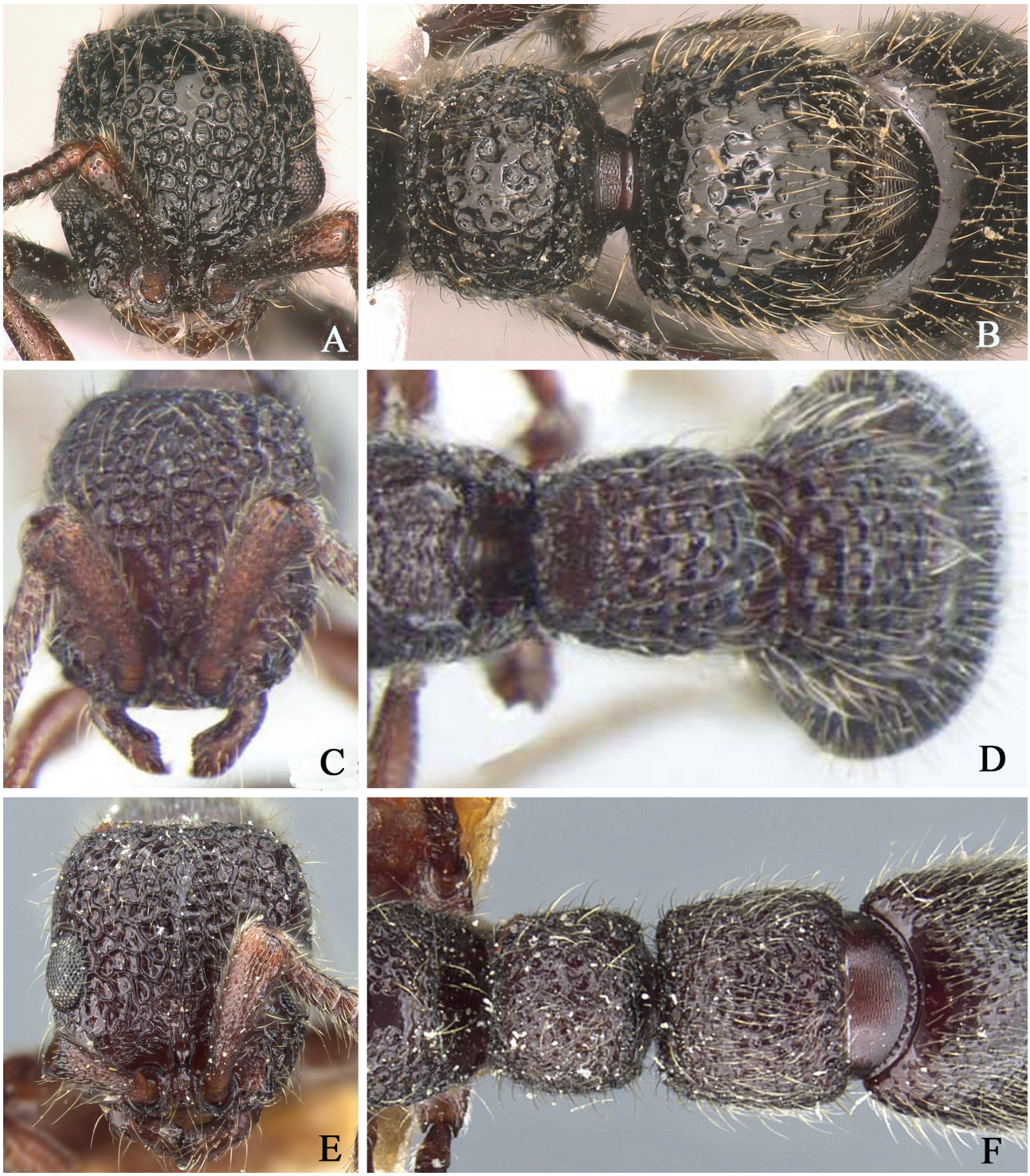

FIGURE 18. Head in full-face view and metasoma in dorsal view. *P. nigrita* **sp. nov.** (imaged by Zhilin Chen) (A, B), *P. browni* (From Bharti & Wachkoo, 2013, holotype) (C, D), *P. dohertyi* (From https://www.antweb.org, syntype, CASENT 0903775, imaged by Zach Lieberman) (E, F).

20. The mid-dorsal portion of mesosoma with confluent puncta; posterior face of propodeum rugose (Fig. 19A) . . . . . ***P. browni* (Bharti & Wachkoo, 2013)**

-. The mid-dorsal portion of propodeum with separated puncta; posterior face of propodeum smooth and shiny (Fig. 19B) . . . . . ***P. dohertyi* (Emery, 1902)**

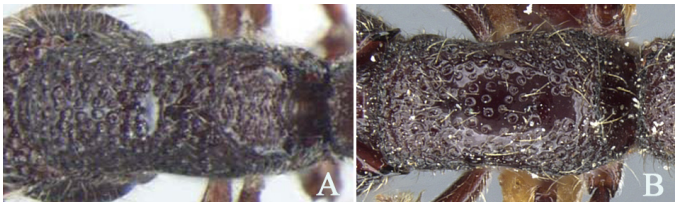

FIGURE 19. Mesosoma in dorsal view. *P. browni* From Bharti & Wachkoo, 2013, holotype (A), *P. dohertyi* (From https://www.antweb.org, syntype, CASENT 0903775, imaged by Zach Lieberman) (B).

21. Small size (TL ≤ 2 mm) . . . . . ***P. bryanti* (Wheeler, 1919)**
-. Large size (TL > 2.8 mm). **22**
22. In full-face view, posterior margin of head distinctly concave, posterolateral corner forming prominent lobe; the maximum diameter of eye larger than the maximum diameter of the apical funicular segment; body black (Fig. 20A–B)…… . . . . . ***P. salimani* (Karavaiev, 1925)**
-. In full-face view, posterior margin of head straight, posterolateral corner not forming prominent lobe; the maximum diameter of eye slightly smaller than or equal to the maximum diameter of the apical funicular segment; body yellow to dark brown (Fig. 20C–D) **23**

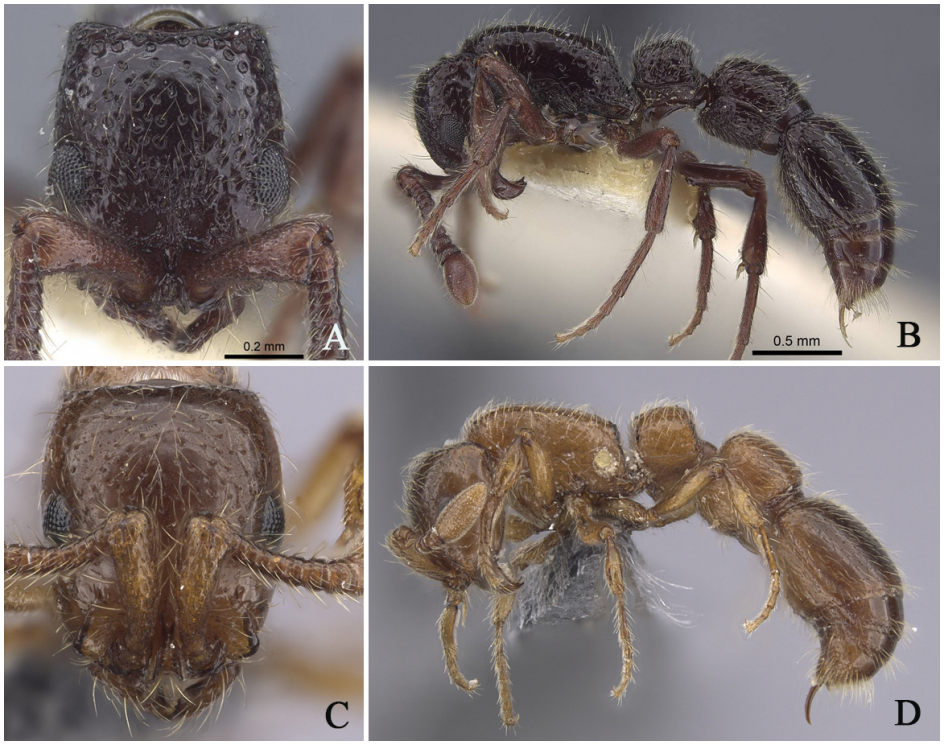

FIGURE 20. Head in full-face view and body in lateral view. *P. salimani* (From https://www.antweb.org, syntype, CASENT0916792, imaged by Zach Lieberman) (A, B), *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910, imaged by Will Ericson) (C, D).

23. In lateral view, posterodorsal margin of propodeum rounded; anterodorsal corner of petiole lower than posterodorsal corner; in dorsal view, posterodorsal margin of propodeum without carina (Fig. 21A–B) . . . . . ***P. luteoviger* (Brown, 1975)**
-. In lateral view, posterodorsal margin of propodeum angular; anterodorsal corner of petiole and posterodorsal corner at the same level; in dorsal view, posterodorsal margin of propodeum with carina (Fig. 21C–D). **24**

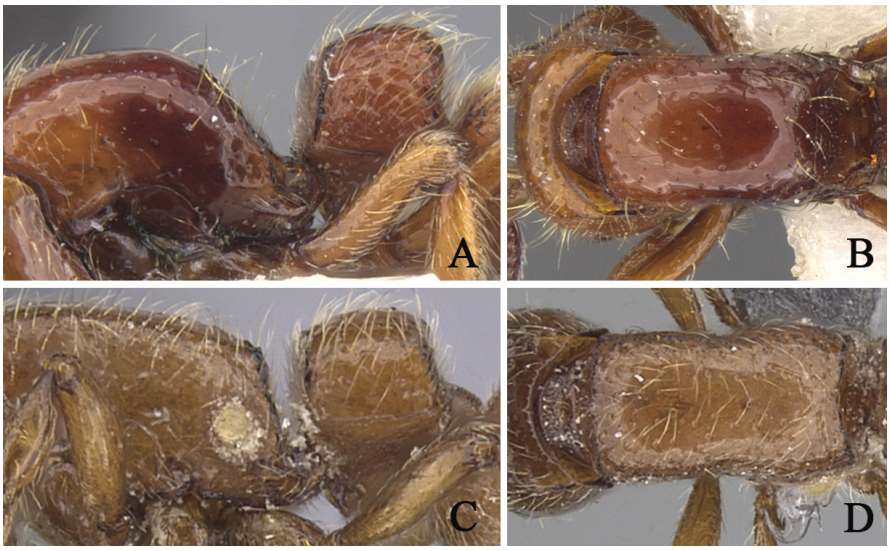

FIGURE 21. Mesosoma and petiole in lateral view, mesosoma in dorsal view. *P. luteoviger* (From https://www.antweb.org, paratype, CASENT0902744, imaged by Will Ericson) (A, B), *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910, imaged by Will Ericson) (C, D).

24. Petiole slightly broader than long, PI=114–116; head subrectangular, lateral margins parallel (Fig. 22A–B) . . . . . ***P. schoedli* (Bharti & Akbar, 2013)**

-. Petiole distinctly broader than long, PI >140; head lateral margins converging anteriorly and posteriorly (Fig. 22C–D) **25**

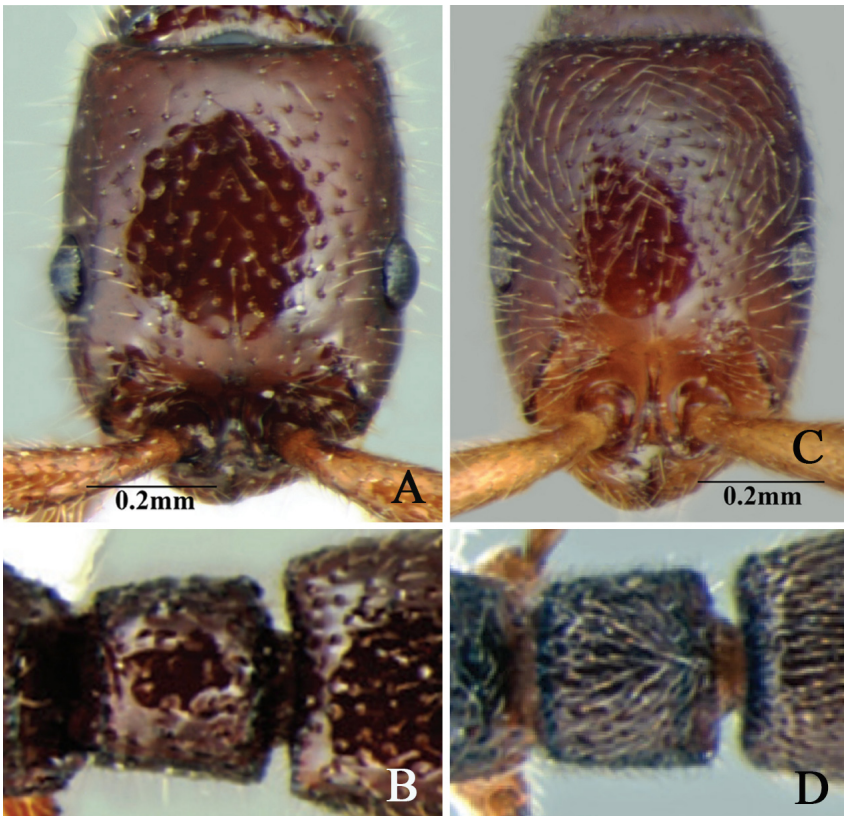

FIGURE 22. Head in full-face view and petiole in dorsal view. *P. schoedli* (From Bharti & Wachkoo, 2013, holotype) (A, B); *P. seema* (From Bharti & Wachkoo, 2013, holotype) (C, D).

25. Eye small, its maximum diameter equal to the width of base of scape (Fig. 23A) . . . . . .***P. seema*** **(Bharti & Akbar, 2013)**
-. Eye large, its maximum diameter almost two times more than width of the base of scape (Fig. 23B–C). **26**

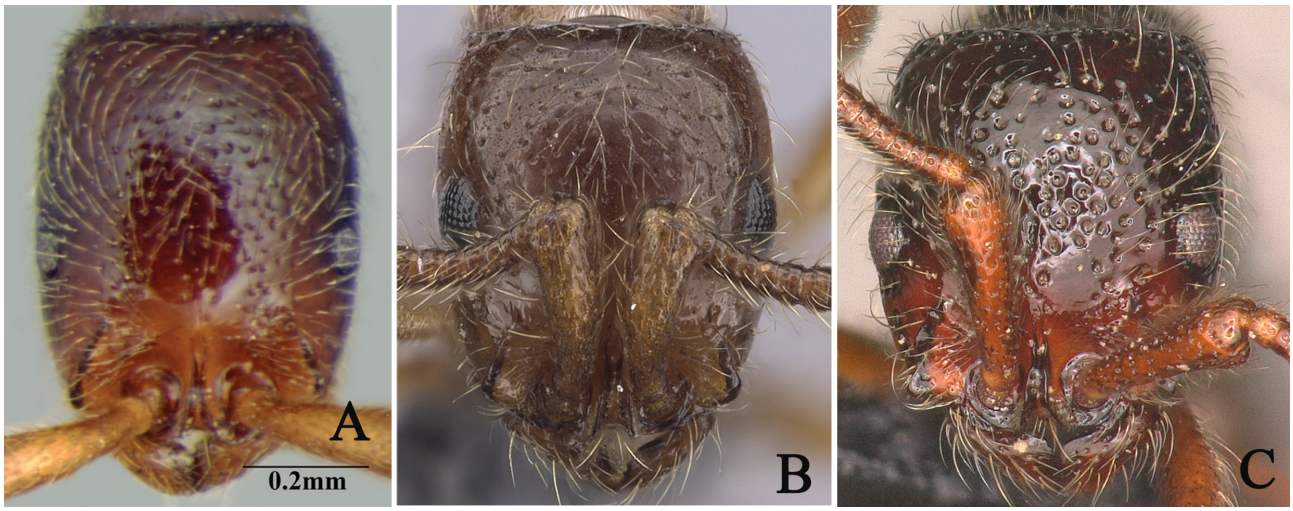

FIGURE 23. Head in full-face view and petiole in dorsal view. *P. seema* (From Bharti & Wachkoo, 2013, holotype) (A), *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910, imaged by Will Ericson) (B), *P. xui* **sp. nov.** (imaged by Zhilin Chen) (C).

26. Lateral mesosoma with small puncta, their maximum diameter smaller than the diameter of spiracle of propodeum; declivity of propodeum straight (Fig. 24A–B) . . . . . .***P. rifati*** **Sharaf & Akbar, 2018**
-. Lateral mesosoma with large puncta, their maximum diameter equal to or larger than the diameter of spiracle of propodeum; declivity of propodeum concave (Fig. 24C). . . . . .***P. xui*** **sp. nov.**

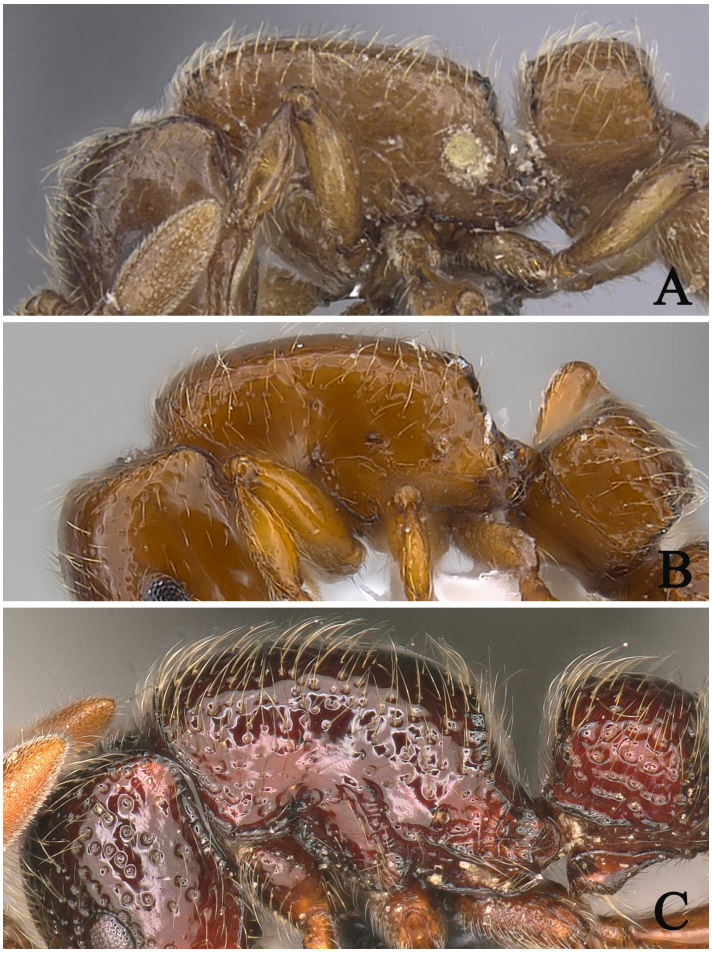

FIGURE 24. Mesosoma and petiole in lateral view. *P. rifati* (From https://www.antweb.org, paratype, CASENT0263910 & CASENT0902743, imaged by Will Ericson) (A, B), *P. xui* **sp. nov.** (imaged by Zhilin Chen) (D).

Taxonomic account of Chinese species

Parasyscia ganeshaiahi Aswaj *et al*, 2021
(New record in China)
(Fig. 25)

Parasyscia ganeshaiahi Aswaj *et al*, 2021: 63, figs. 1, 2A–F (w.) INDIA (Arunachal Pradesh). [Holotype worker images examined from Aswaj *et al*, 2021].

Other material examined. CHINA: *Guangxi*: Guilin City, Ziyuan County, Maoershan Antangping, 1442.85 m, 25.9047° N, 110.4669° E, 9.VII.2019, Gaosong Huang leg., No. GXNU192821 [4 workers, GXNU]; *Guangxi*: Guilin City, Maoershan, 29.VIII.2019, Zhilin Chen leg., No. G194044 [4 workers, GXNU]; *Gaungxi*: Guilin City, Longsheng County, Huaping Village, 1100 m, 25.0065° N, 109.9075° E, 11.VIII.2019, Zhilin Chen leg., No. GXNU1940078 [1 worker, GXNU]; *Guangxi*: Chongzuo City, Zuozhou Town, Pairu, 222 m, 22.56° N, 107.41° E, 11.VI.2016, Zhilin Chen leg., No. G160047 [1 worker, GXNU]; *Hainan*: Qiongzhong Town, Limushan, 681 m, 19.14° N, 109.71° E, 4. IV.2016, Zhilin Chen leg., No. G160131 [1 worker, GXNU].

Diagnosis. Concolorous species, whole body yellow brown. Head distinctly longer than broad, lateral margins convergent anteriorly and posteriorly, with straight posterior margin and angular posterolateral corners. Eyes reduced, maximum diameter smaller than basal funiculus, ommatidial edge ambiguous. Petiole in lateral view trapezoidal, with steep anterior and posterior margin. Head, dorsum of mesosoma and petiole with deep and coarse puncta; dorsum of first gastral segment deeply foveolate-reticulate.

Workers. HL 0.60–0.65, HW 0.45–0.51, CI 75–80, SL 0.25–0.30, SI 50–67, ED 0.10–0.12, MSL 0.70–0.85, PW 0.32–0.36, PL 0.30, PH 0.38–0.40, DPW 0.32–0.34, LPI 110–123, DPI 106–113, TL 2.66–3.16 (n=8).

Notes. The specimens of *P. ganeshaiahi* from China exactly match the original description of Aswaj *et al* (2021), except for the following features: in full-face view head subrectangular, lateral margins convergent anteriorly and posteriorly, posterior margin straight; in lateral view, subpetiolar process of petiole rectangular, with anteroventral corner rounded and posteroventral corner obtuse-angulate, and ventral margin straight.

This species is most likely to be confused with *P. wighti,* but is easily differentiated from the latter by antennae with 11 segments, subpetiolar process rectangular, anteroventral corner rounded and posteroventral corner obtuse-angulate, body yellow brown.

Distribution. China (Hainan, Guangxi), India.

Parasyscia nigrita sp. nov.
(Fig. 26)

Holotype worker: **CHINA**: *Guangdong*: zhaoqing City, Dinghushan, 193 m, 23.1636° N, 112.1626° E, 11.VII.2005, Yangsha Pan leg., No. GXNU058217 [GXNU]; *Paratype*: same data as holotype [1 worker, GXNU].

Diagnosis. Concolorous species, whole body black. Petiole appears square in lateral view, with straight anterior and posterior margins, dorsum slightly convex. Frontal portion of head deeply foveolate-reticulate, posterior portion of head with deep puncta; dorsum of mesosoma with sparse shallow puncta, lateral portion of propodeum deeply foveolate-reticulate.

Holotype worker. HL 0.90, HW 0.83, CI 92, SL 0.45, SI 54, ED 0.22, MSL 1.30, PW 0.56, PL 0.45, PH 0.68, DPW 0.56, LPI 151, DPI 124, TL 4.70.

Paratype worker. HL 0.85, HW 0.81, CI 95, SL 0.44, SI 54, ED 0.21, MSL 1.25, PW 0.55, PL 0.44, PH 0.67, DPW 0.55, LPI 152, DPI 125, TL 4.60 (n=1).

Head. Subrectangular in full-face view, longer than broad (CI 92), with convex of lateral margins and straight posterior margin, posterolateral corners rounded. lateral portion of clypeus forming rounded lobe. Frontal carina short, separate and nearly parallel; antennae with 12 segments, scapes when laid back from their insertions surpass to the posterior margin of eyes. Eyes large, ommatidia with a clear edge. **Mesosoma.** In lateral view, dorsal outline of mesosoma general convex, posterodorsal corner rounded, posterior edge of propodeum carinate, declivity of propodeum almost straight. In dorsal view, propodeum broader than pronotum and mesonotum. **Metasoma**. Petiole in lateral view, appears square, with straight anterior and posterior margins, dorsum slightly convex; subpetiolar

process subrectangular, its ventral margin concave, with rounded anteroventral and psoteroventral corners. In dorsal view, petiole lateral margins convex, anterior and posterior margins straight and parllel, anterolateral corners and posterodorsal corners rounded. Abdominal segment III in lateral view subrectangular, higher than long; in dorsal view abdominal segment III subtrapezoidal, broader posteriorly, almost as long as wide; lateral margins convex. **Sculpture**. Frontal portion of head deeply punctate-reticulate, posterior portion of head with deep puncta; dorsum of mesosoma with sparse shallow puncta; lateral portion of propodeum, petiole and lateral margins of first gastral segment deeply punctate-reticulate, dorsum of abdominal segment III with shallow puncta, the rest of abdominal segments smooth and shiny except piligerous puncta. **Pilosity**. Body entirely densely covered with suberect hairs. **Color**. body black.

Notes. This new species is very similar to *P. browni* and *P. dohertyi,* but can be separated the laters by the combination of the following characters: posterolateral corner of head angular in full-face view; posterior portion of head with deep puncta; tergite of abdominal segment III with scattered wide and shallow puncta in dorsal view.

Distribution. China (Guangdong).

Etymology. The specific epithet refers to the black body.

***Parasyscia reticulata* (Emery, 1923)**
(Figs. 27, 28)

Cerapachys reticulatus Emery, 1923: 60. *Holotype queen*: CHIAN (Taiwan), "Formosa", Suisharyo (H. Sauter) [DEI, unique specimen identifier FOCOL0375] (AntWeb image examined). Combination in *Parasyscia*: Borowiec, 2016: 205.

Other material examined. CHINA: *Guangxi*: Guilin City, Ziyuan County, Maoershan Antangping, 1442.85 m, 25.9047° N, 110.4669° E, 9.VII.2019, Gaosong Huang leg., No. GXNU192821 [4 workers, GXNU].

Diagnosis. Concolorous species, whole body yellowish brown to dark yellowish brown. Eyes reduced, ommatidial edge unclear. Petiole as long as broad in dorsal view, with almost parallel margins. Head, mesosoma petiole and abdominal segment III punctate-reticulate, sculpture of abdominal segment IV from dense punctures to sparse piligerous punctures.

Workers. HL 0.70–0.85, HW 0.60–0.65, CI 72–86, SL 0.40–41, SI 61–67, ED 0.05–0.06, MSL 0.96–1.08, PW 0.46–50, PL 0.40–0.42, PH 0.41–0.56, DPW 0.36–0.40, LPI 117–140, DPI 95–102, TL 3.66–4.20, (n=4).

Head. In full-face view subrectangular, longer than broad, with general convex margins and straight posterior margin, posterolateral corners obtuse-angulate. lateral portion of clypeus rounded lobe. Frontal carina short and closed. Antennae with 12 segments, scapes when laid back from their insertions surpass posterior margin of eyes. Eyes reduced, ommatidia without a clear edge. **Mesosoma.** In lateral view, dorsal outline of mesosoma almost straight, posterodorsal corner in lateral view obtuse-angulate, posterior edge of propodeum carinate, declivity of propodeum almost straight. In dorsal view, propodeum as broad as pronotum. **Metasoma**. Petiole in lateral view, appears subrectangular, with nearly straight anterior and posterior margins, dorsum convex; subpetiolar process subrectangular, its ventral margin straight. In dorsal view, lateral margins of petiole almost parallel, posterior margin almost straight. Abdominal segment III in lateral view first gastral segment square, in dorsal view abdominal segment III subtrapezoidal, broader posteriorly, broader than long; lateral margins weakly convex. **Sculpture**. Head, mesosoma petiole and abdominal segment III punctate-reticulate; in dorsal view, abdominal segment IV from dense punctures to sparse piligerous punctures. **Pilosity**. Body entirely densely covered with suberect or erect hairs. **Color**. Head, petiole and gaster yellow brown, mesosoma dark yellow brown.

Notes. This species was described based on the winged female by Emery (1923). So far, no morphological description of the worker of this species has been reported. Through careful morphological comparison, we found that the workers of specimens (No. GXNU192821, Fig. 28) were consistent with the morphological characteristics of the queen of *P. reticulata*. The worker caste of *P. reticulata* is described for the first time here. This species is nearly identical to *P. hashimotoi* in worker morphology, but the petiole is more symmetrical, with the anterodorsal corner as high as the posterodorsal corner in lateral view, and in dorsal view it is subrectangular, with lateral margins parallel.

Distribution. China (Taiwan, Guangxi).

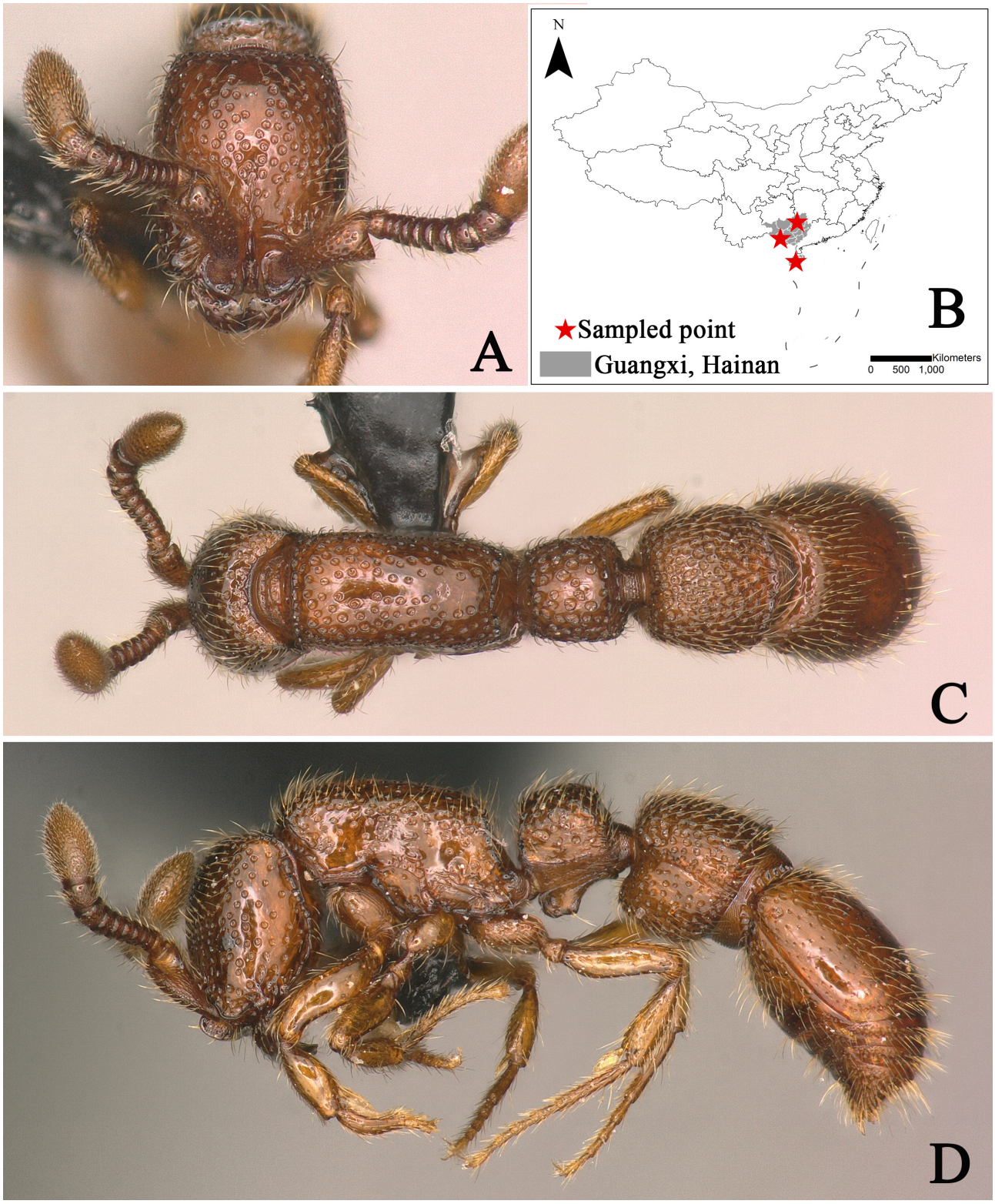

FIGURE 25. *Parasyscia ganeshaiahi*. Non-type worker from Guangxi, China. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

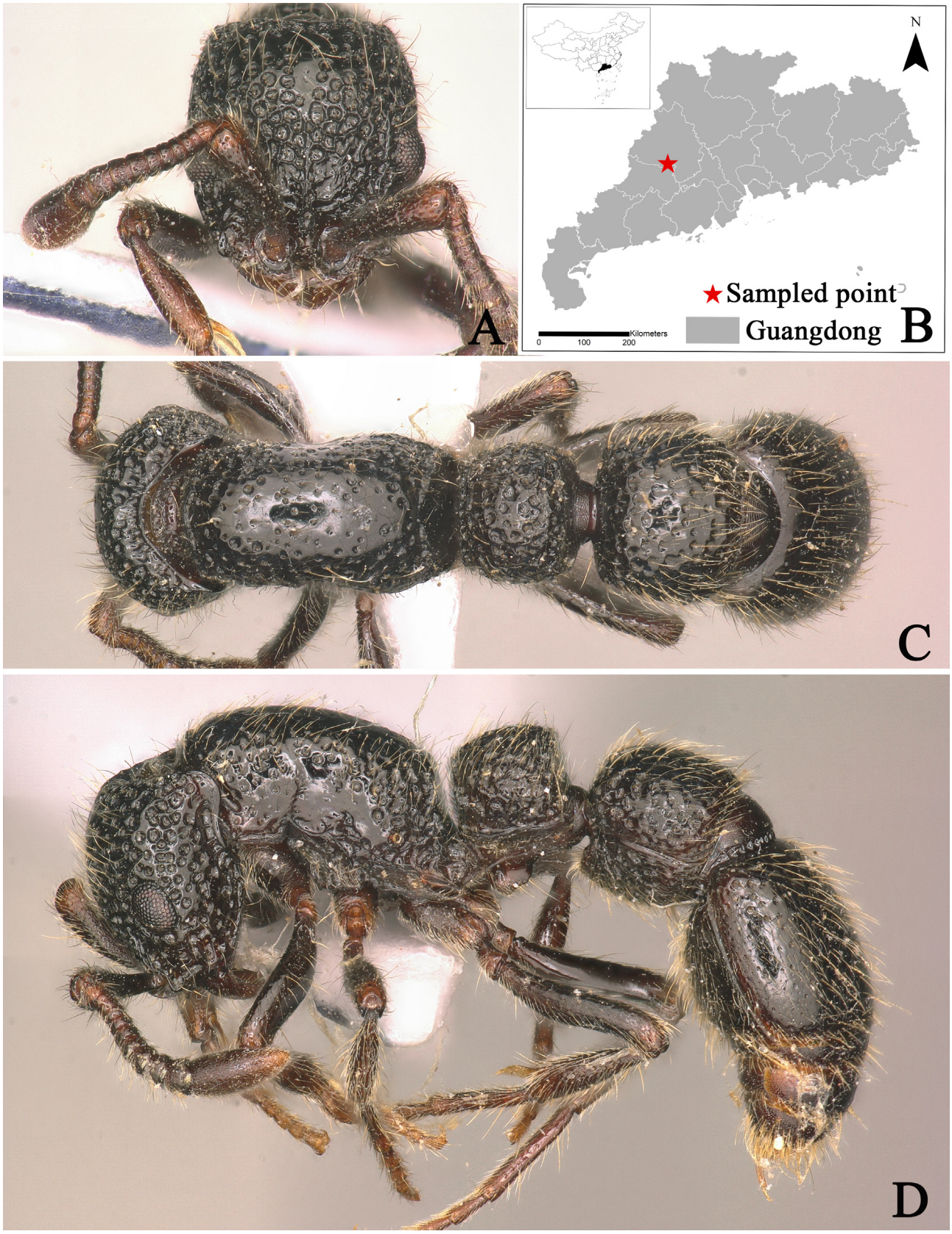

FIGURE 26. *Parasyscia nigrita* **sp. nov.** Holotype worker. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

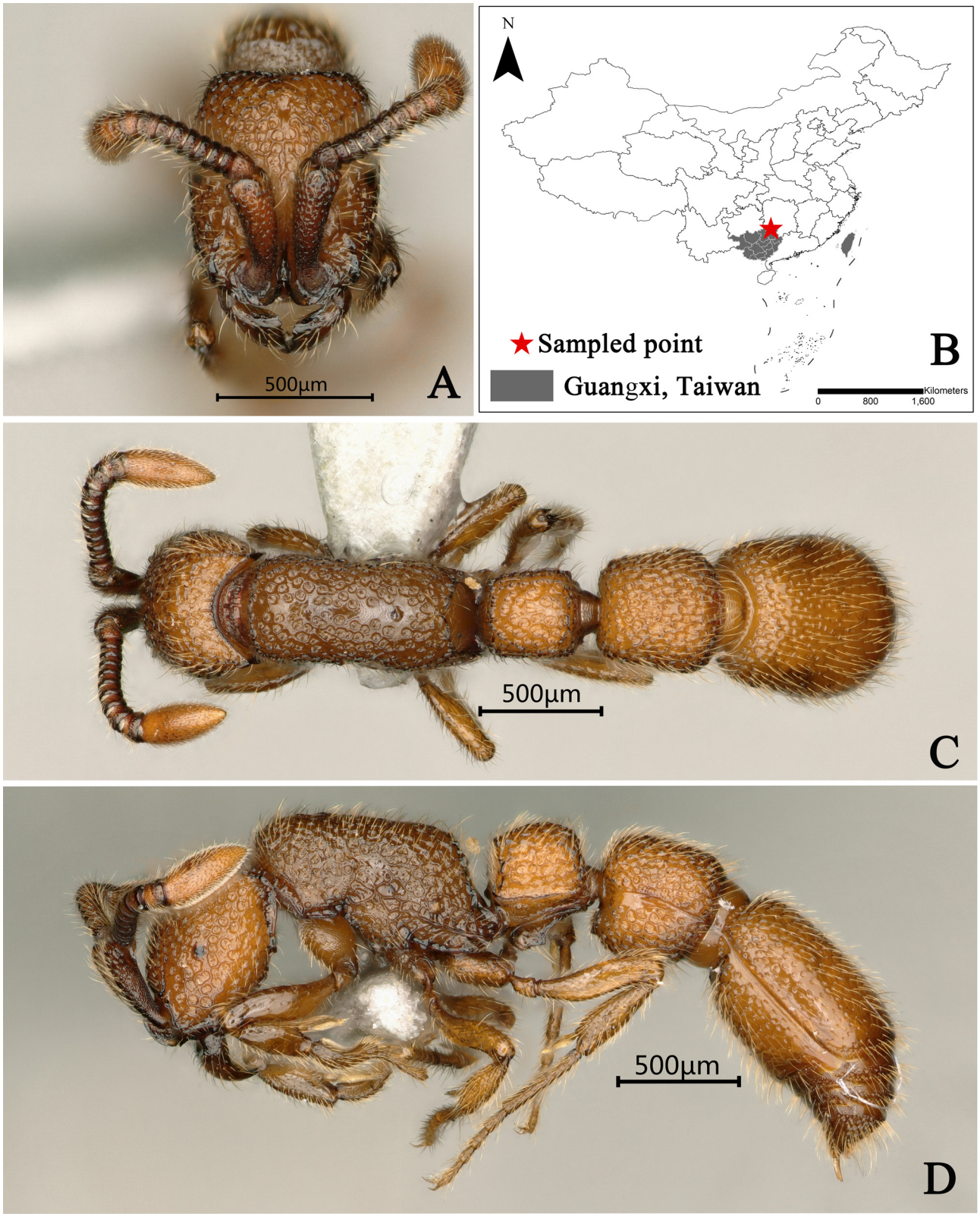

FIGURE 27. *Parasyscia reticulata*. Non-type worker from Guangxi, China. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

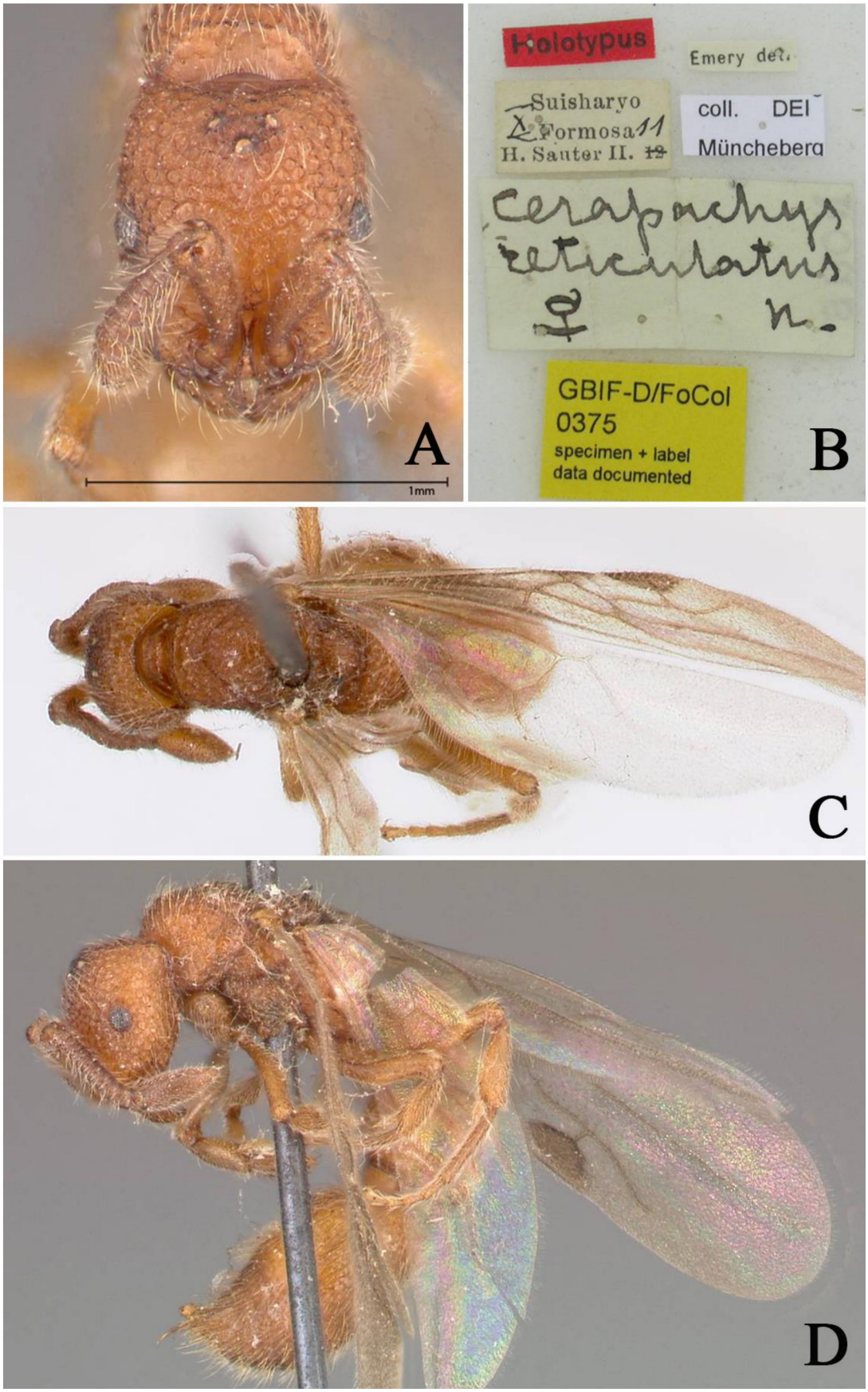

FIGURE 28. *Parasyscia reticulata.* holotype queen (From https://www.antweb.org, FOCOL0375, imaged by Christiana Klingenberg). Head in full-face view (A), Label of Holotype (B), body in dorsal view (C), body in lateral view (D).

***Parasyscia shii* sp. nov.**
(Fig. 29)

Holotype worker: **CHINA**: *Guangxi*: Guilin City, Longsheng County, Huaping Village, 949 m, 25.6039° N, 109.0975°E, 11.VIII.2019, Chunxuan Luo leg., No. GXNU192346 [GXNU]; *Paratypes*: same data as holotype [1 worker, GXNU; 1 worker, SWFU].

Other material examined. CHINA: *Zhejiang*: Qiangdaohu, 29.IV.2018, Yuhao Zhao leg., GXNU186721 [2 workers, GXNU].

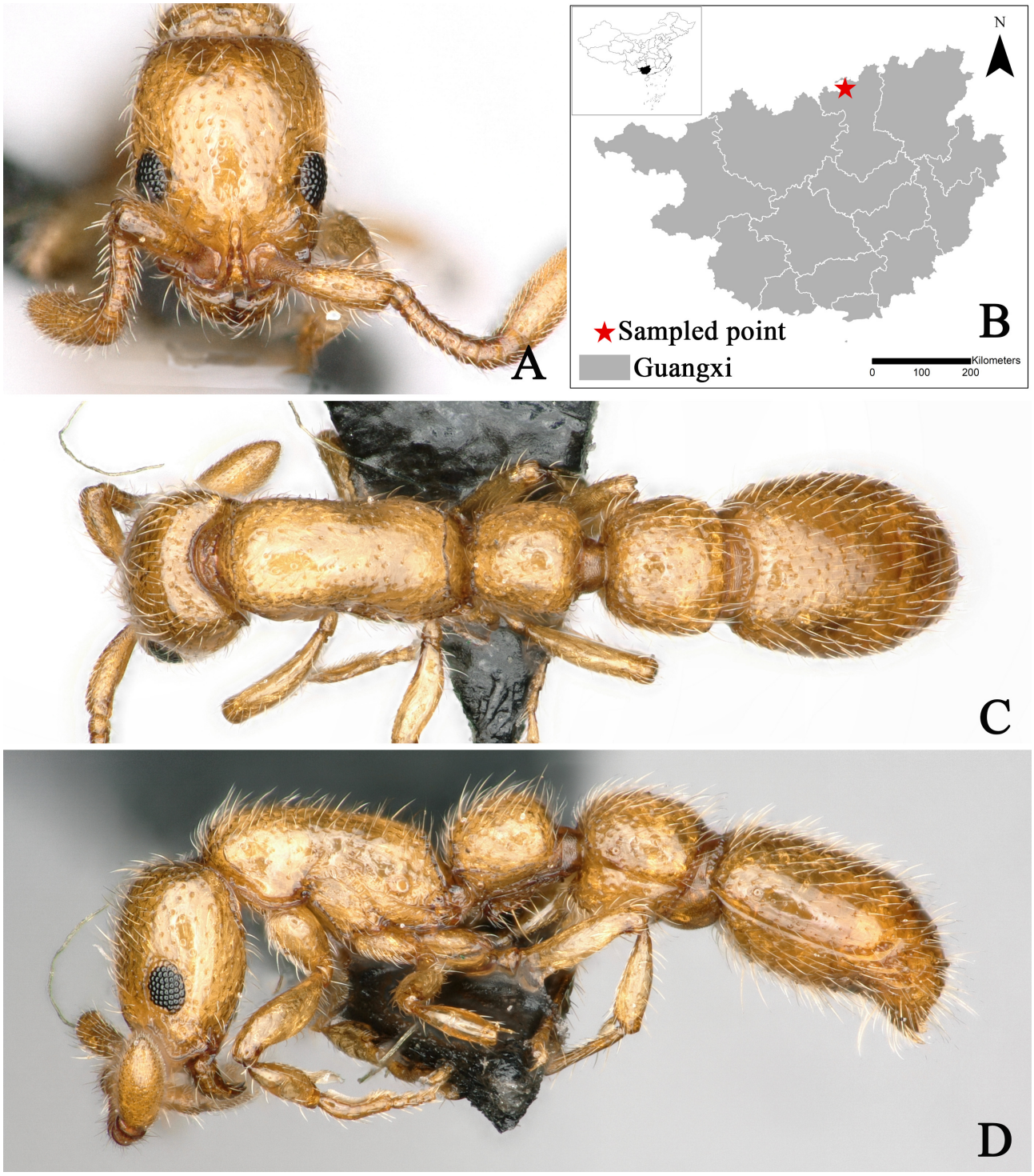

FIGURE 29. *Parasyscia shii* **sp. nov.** Holotype worker. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

Diagnosis. Concolorous species, whole body yellow. Head in full-face view distinct longer than broad (CI 74–77), with straight posterior margin, rounded posterolateral corners; maximum diameter of eyes distinct broader than the width of apical funiculus. Subpetiolar process cuneiform, anteroventral corner angular and posteroventral corner broadly rounded. Body smooth and shiny, except sparsely shallow piligerous punctures.

Holotype worker. HL 0.68, HW 0.52, CI 76, SL 0.32, SI 61.54, ED 0.15, MSL 0.90, PW 0.40, PL 0.36, PH 0.40, DPW 0.36, LPI 111.11, DPI 100, TL 3.36.

Paratype workers. HL 0–0.65–0.68, HW 0.49–0.52, CI 74–77, SL 0.32–0.37, SI 61–74, ED 0.14–0.15, MSL 0.86–0.90, PW 0.35–0.40, PL 0.34–0.36, PH 0.36–0.40, DPW 0.34–0.36, LPI 108–113, DPI 100–102 TL 2.90–3.36 (n=2).

Head. In full-face view subrectangular, distinctly longer than broad (CI 74–77), lateral margins convergent anteriorly, and posterior margin straight, posterolateral corners rounded. Anteromedial portion of clypeus concave, lateral portion of clypeus forming angular lobe. Frontal carina short, separate and nearly parallel. Antennae with 11 segments. Eyes large, maximum diameter distinct broader than the width of apical funiculus, ommatidia with a clear edge. **Mesosoma.** In lateral view dorsal outline of mesosoma feebly convex, pronotmespleural suture obscure, posterodorsal corner obtuse-angulate, posterior edge of propodeum carinate, declivity of propodeum straight. In dorsal view, propodeum slightly broader than pronotum and mesonotum. **Metasoma**. Petiole in lateral view, appears rounded, with steep anterior margin and convex posterior margin, dorsum strong convex; subpetiolar process cuneiform, anteroventral tooth sharp and posteroventral corner broadly rounded. In dorsal view, petiole lateral margins convex, anterior margin straight and carinate, anterolateral corner angular and posterodorsal corner rounded. Abdominal segment III in lateral view first gastral segment rounded, higher than long; in dorsal view abdominal segment III subtrapezoidal, broader posteriorly, broader than long; lateral margins convex. **Sculpture**. Body smooth and shiny, except sparsely shallow piligerous punctures. **Pilosity**. Body entirely and densely covered with suberect long hairs. **Color**. Body yellow.

Notes. This species is verily similar to *P. muiri*, but can be separated from the latter by a combination of the following characteristics: body light yellow; in lateral view, dorsal outline of mesosoma slightly convex; in dorsal view, first gastral segment broader posteriorly.

Distribution. China (Zhejiang, Guangxi).

Etymology. The new species is named after an excellent katydids taxonomist, Fuming Shi (Hebei University, China), who is the doctoral supervisor of the first author.

***Parasyscia tibetana* sp. nov.**
(Fig. 30)

Holotype worker: **CHINA**: *Tibet*: Motuo County, Motuo Village, 1230 m, 29.3021° N, 95.3400° E, 27.VIII.2016, Zhilin Chen leg., No. G160428 [GXNU]; *Paratypes*: same data as holotype [1 worker, GXNU; 1 worker, SWFU, 1 worker, IZCAS].

Diagnosis. Bicolored species, mesosoma, petiole and first gastral segment yellow brown to dark yellow brown, head and the rest of abdominal segments dark brown to black. Head distinct longer than broad, posterior margin concave, posterolateral corners angular. Subpetiolar process subrectangular, anteroventral corner sharply angular and posteroventral corner rounded. Head with deeply puncta, dorsum of mesosoma smooth and shiny, except shallow piligerous punctures.

Holotype worker. HL 0.90, HW 0.72, CI 80, SL 0.45, SI 62.5, ED 0.15, MSL 1.15, PW 0.56, PL 0.45, PH 0.55, DPW 0.45, LPI 122, DPI 100 TL 4.25.

Paratype workers. HL 0.81–0.93, HW 0.70–0.76, CI 78–83, SL 0.41–0.47, SI 58–63, ED 0.15–0.16, MSL 1.10–1.18, PW 0.51–0.58, PL 0.43–0.46, PH 0.54–0.57, DPW 0.0.43–0.48, LPI 120–1.25, DPI 100–103, TL 4.00–4.37 (n=3).

Head. In full-face view subrectangular, longer than broad, lateral margins convergent from eye-level to anterior and posterior head, and posterior margin concave, posterolateral corners angular. Anteromedial portion of clypeus concave, lateral portion of clypeus forming angular lobe. Frontal carina short, separate and nearly parallel. Antennae with 12 segments. Eyes large, maximum diameter as wide as apical funiculus, ommatidia with a clear edge. **Mesosoma.**

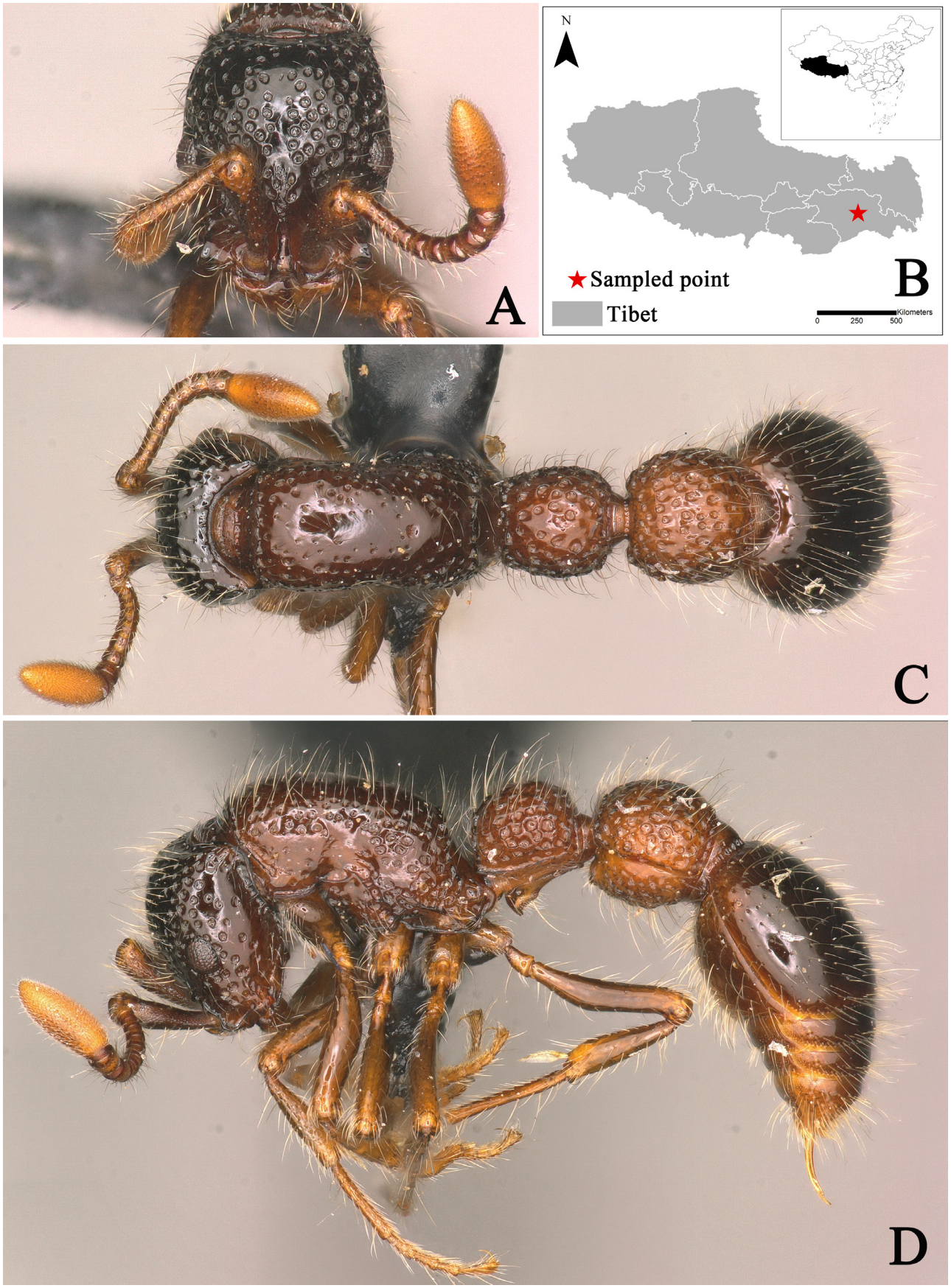

FIGURE 30. *Parasyscia tibetana* **sp. nov.** Holotype worker. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

In lateral view, dorsal outline of mesosoma general convex, posterodorsal corner obtuse-angulate, posterior edge of propodeum carinate, declivity of propodeum slightly concave. In dorsal view, propodeum slightly broader than pronotum and mesonotum. **Metasoma**. Petiole in lateral view, appears trapezoidal, with steep anterior margin and convex posterior margin, dorsum strong convex; subpetiolar process subrectangular, anteroventral tooth sharp and posteroventral corner rounded, ventral margin concave. In dorsal view, petiole lateral margins convex, anterior margin straight, anterolateral corner angular and posterodorsal corner rounded. Abdominall segment III in lateral view rounded, higher than long. In dorsal view, abdominal segment III subtrapezoidal, broader posteriorly, almost as long as wide; lateral margins convex. **Sculpture**. Head with deeply puncta, upper half of pronotum sparsely shallow puncta, lower half of pronotum smooth and shiny, lateral margins of propodeum with deeply puncta, petiole and lateral margins of abdominal segment III deeply punctate-reticulate, dorsum of mesosoma smooth and shiny, except shallow piligerous punctures. **Pilosity**. Body entirely densely covered with suberect long hairs. **Color**. Petiole and first gastral segment yellow brown, mesosoma dark yellow brown, head and the rest of gaster dark brown to black.

Notes. This species is very similar to *P. rufithorax*, but can be separated from the latter by a combination of the following characteristics: posterior margin of head obviously concave and posterolateral corner clearly angular in full-face view; head with coarse punctures; eyes smaller (ED 0.15–0.16); posterodorsal margin of propodeum with carina.

Distribution. China (Tibet).

Etymology. The specific epithet is given after the type locality (Tibet).

***Parasyscia wilsoni* sp. nov.**
(Fig. 31)

Holotype worker: **CHINA**: *Yunnan*: Xishuangbanna, Mengla, 1321 m, 21.6466° N, 101.5247° E, 28.VIII.2019, Yunchuang Xiong leg., No. GXNU194010 [GXNU]. *Paratypes:* same data as holotype, No. GXNU194022 [1 worker, GXNU; 1 worker, SWFU].

Diagnosis. Bicolored; mesosoma, petiole and abdominal segment III reddish; head and rest of gastral segments black, posterior margin straight, posterolateral corners rounded, eyes large. Posterior edge of propodeum with carinate, posterior corner in lateral view obtusely angular. Head, mesosoma, petiole and abdominal segment III with deep puncta, or punctate-reticulate.

Measurements of holotype worker. HL 1.05, HW 0.90, CI 86, SL 0.63, SI 70, ED 0.18, MSL 1.35, PW 0.70, PL 0.55, PH 0.45, DPW 0.58, LPI 82, DPI 105, TL 5.08.

Measurements of paratype workers. HL 0.90–0.97, HW 0.85–0.90, CI 92–94, SL 0.55–0.57, SI 63–64, ED 0.16–0.17, MSL 1.24–1.31, PW 0.62–0.66, PL 0.50–0.52, PH 0.62–0.64, DPW 0.51–0.53, LPI 123–124, DPI 102, TL 4.66–4.92, (n=2).

Head. in full-face view subrectangular, longer than broad (CI 86), broader posteriorly, with general convex margins and straight posterior margin, posterolateral corners rounded. lateral portion of clypeus straight, without any prominent lobe. Frontal carina short, separate and feebly convergent posteriorly. Antennae with 12 segments, scapes when laid back from their insertions surpass to the posterior margin of eyes. Eyes large (ED ≥0.16), ommatidia with a clear edge. **Mesosoma**. In lateral view, dorsal outline general convex, posterodorsal corner obtuse-angulate, posterior edge of propodeum carinate, declivity of propodeum almost straight. In dorsal view, propodeum broader than pronotum and mesonotum. **Metasoma**. Petiole in lateral view, petiolar node appears subrectangular, with nearly straight anterior and posterior margins, dorsum convex, anterodorsal corner angular, posterodorsal corner rounded; subpetiolar process subrectangular, ventral margin straight, or cuneiform, anteroventral corner rounded, posteroventral corner obtuse-angulate. In dorsal view, petiole lateral margins convergent anteriorly, anterior margin straight and carinate, anterolateral corners and posterodorsal corners rounded. In lateral view, first gastral segment subrectangular, higher than long. In dorsal view, first gastral segment subtrapezoidal, broader posteriorly, almost as long as wide; lateral margins weakly convex. **Sculpture**. Head with large puncta, mid-dorsal portion of mesosoma with sparse puncta, lower half of pronotum smooth and shiny, propodeum punctate, petiole and puncta deeply punctate-reticulate; rest of abdominal segment mostly smooth and shiny, with sparse piligerous punctures. **Pilosity**. Body entirely densely covered with suberect or erect hairs. **Color**. Mesosoma, petiole and abdominal segment III reddish brown, head and rest of gastral segments black.

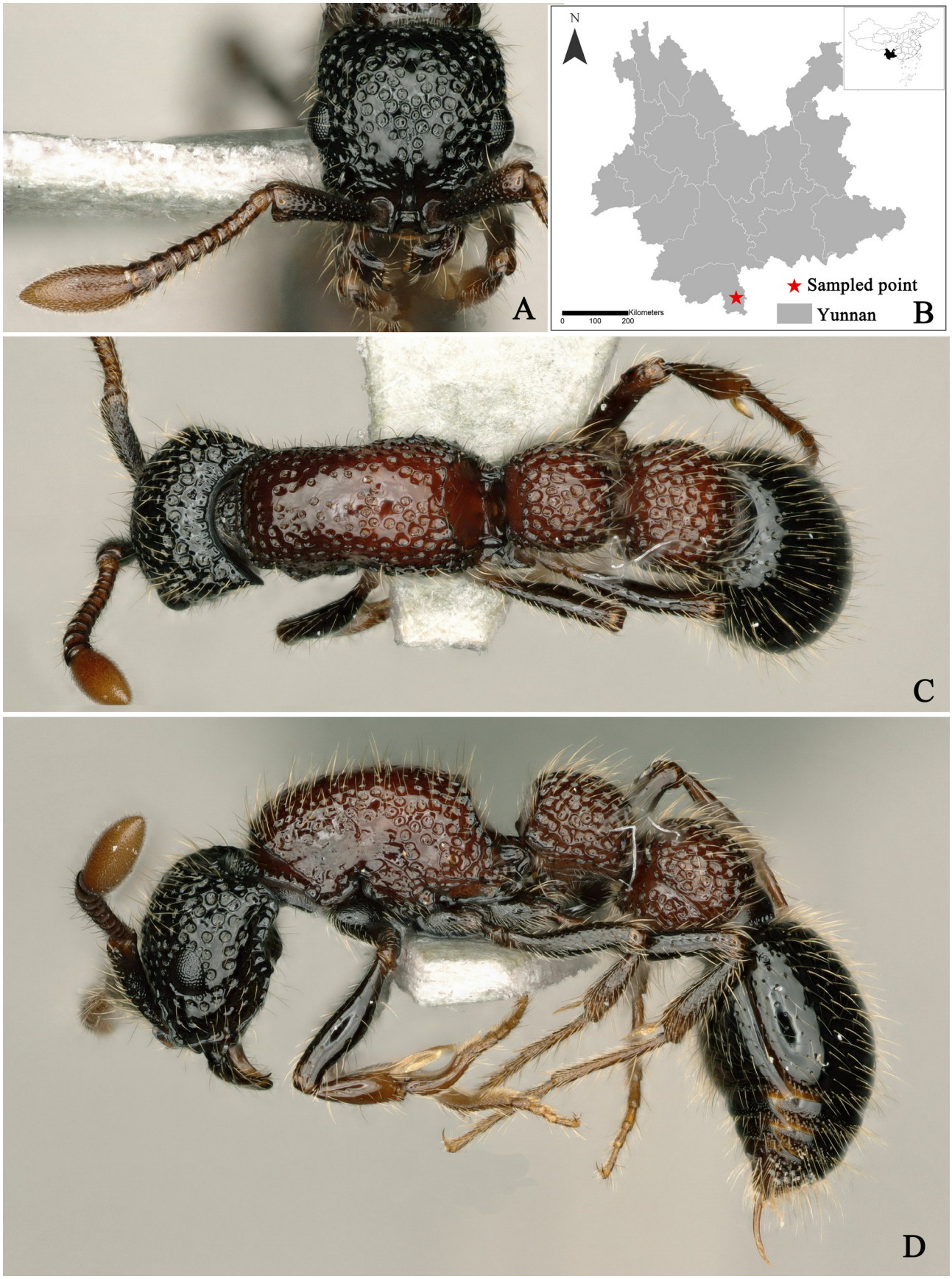

FIGURE 31. *Parasyscia wilsoni* **sp. nov.** Holotype worker. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

Distribution. China (Yunnan).

Notes. *P. wilsoni* **sp. nov.** is very closed to *P. aitkenii*, but can be easily distinguished from the latter by the posterodorsal corner of propodeum angular, and the angle between the dorsum and the declivity of propodeum about 110°; mesosoma and petiole with deep punctures. whereas *P. aitkenii* posterodorsal corner of propodeum is rounded, the angle between the dorsum and the declivity of propodeum about 130°; mesosoma and petiole with shallow punctures.

Etymology. The specific epithet is dedicated to the renowned scientist Edward O. Wilson from Harvard University, in honour of his outstanding contribution in the fields of myrmecology, sociobiology, biodiversity, and conservation.

***Parasyscia xui* sp. nov.**
(Fig. 32)

Holotype worker: **CHINA**: *Tibet*: Motuo County, Motuo Village, 1230 m, 29.3000° N, 95.3400° E, 27.VIII.2016, Zhilin Chen leg., No. G160366 [GXNU]; *Paratypes:* same data as holotype [1 worker, GXNU; 1 worker, SWFU, 1 worker, IZCAS].

Diagnosis. Concolorous species, whole body reddish brown. lateral margins of head distinctly convergent anteriorly, with angular posterolateral corners; maximum diameter of eye equal to width of apical funiculus. Petiole appears square in lateral view, 1.5 times broader than long in dorsal view.

Holotype worker. HL 0.55, HW 0.42, CI 76.36, SL 0.50, SI 119.05, ED 0.15, MSL 1.01, PW 0.54, PL 0.40, PH 0.60, DPW 0.55, LPI 150, DPI 138, TL 3.87.

Paratype workers. HL 0.52–0.56, HW 0.41–0.45, CI 73–79, SL 0.50–0.53, SI 118–123, ED 0.15–0.16, MSL 1.00–1.11, PW 0.520.55, PL 0.40–0.43, PH 0.58–0.61, DPW 0.54–0.60, LPI 148–154, DPI 136–140, TL 3.70–3.91 (n=3).

Head. In full-face view subrectangular, longer than broad, lateral margins distinctly convergent anteriorly, and posterior margin almost straight and slight concave medially, posterolateral corners angular. Anteromedial portion of clypeus concave, lateral portion of clypeus forming angular lobe. Frontal carina short, separate and nearly parallel; antennae with 11 segments. Eyes large, maximum diameter equal to width of apical funiculus, ommatidial edge clear. **Mesosoma.** In lateral view, dorsal outline of mesosoma convex, posterodorsal corner obtuse-angulate, posterior edge of propodeum carinate, declivity of propodeum concave. In dorsal view, propodeum lightly broader than pronotum and mesonotum. **Metasoma**. Petiole in lateral view, appears square, with steep anterior and posterior margin, dorsum slightly convex; subpetiolar process rectangular, posteroventral corner obtuse-angulate. In dorsal view, petiole lateral margins convex, anterior margin and posterior margin straight, and carinate; anterolateral corner angular and posterodorsal corner rounded. In lateral view, abdominal segment III rectangular, higher than long. In dorsal view, abdominal segment III subtrapezoidal, broader posteriorly, broader than long; lateral margins slightly convex. **Sculpture**. Median portion of head with abundant punctures, peripheral portion sparse punctures, diameter of puncture as broader as two time than ommatidia; mesosoma sparse piligerous punctures; petiole and abdominal segment III with deep and coarse puncta; the rest of abdominal segments smooth and shiny except sparsely shallow piligerous. **Pilosity**. Body entirely densely covered with suberect long hairs. **Color**. Body reddish brown.

Notes. The new species is similar to *P. rifati*, but is easily differentiated from the latter by a combination of the following characteristics: body reddish brown, punctures of head large, their maximum diameter almost 2 times more than the ommatidia of eyes; declivity of propodeum concave.

Distribution. China (Tibet).

Etymology. The new species is named in honor of Zhenghui Xu (Southwest Forestry University, China) for his outstanding contributions to the ant fauna of China.

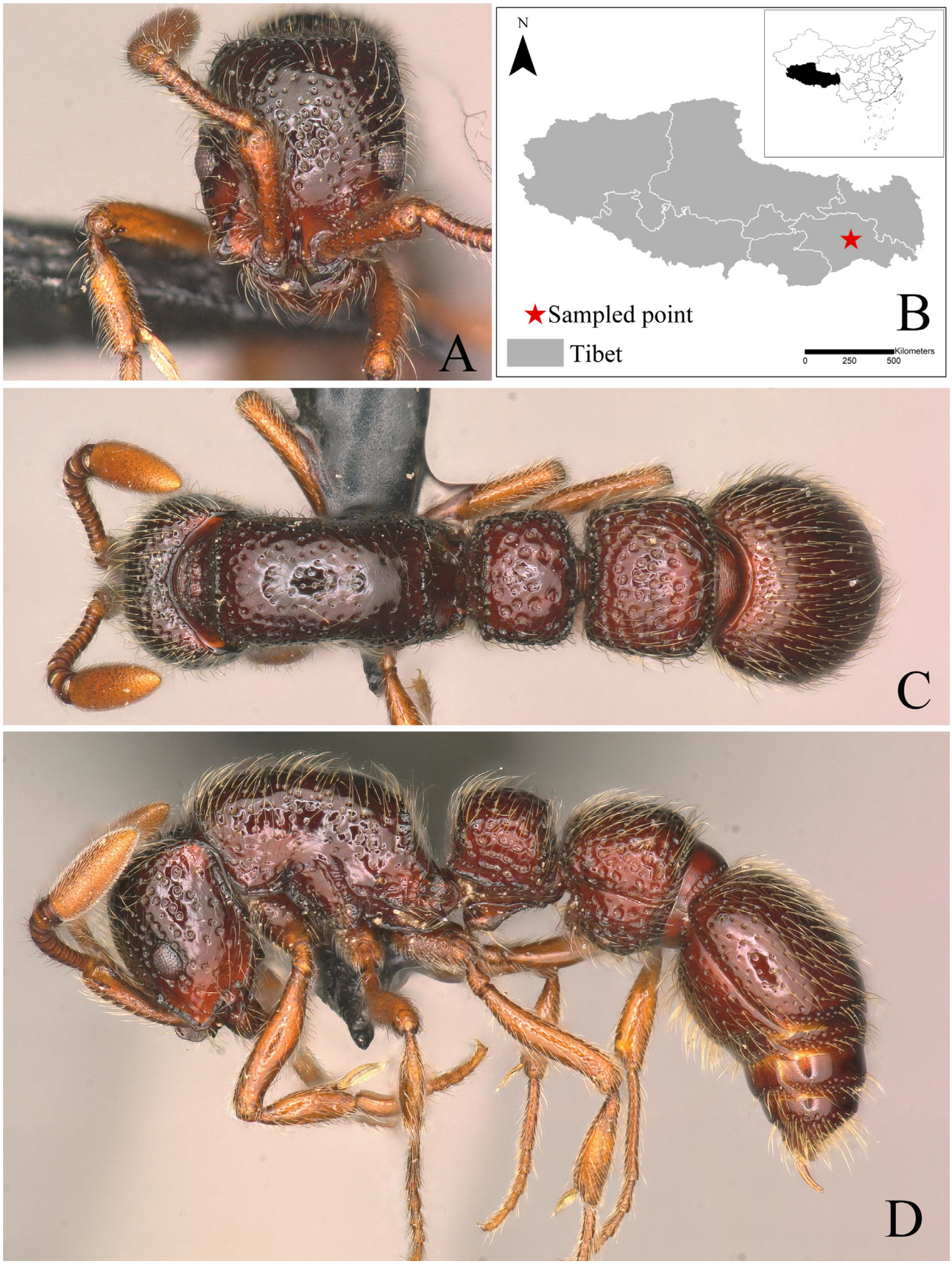

FIGURE 32. *Parasyscia xui* **sp. nov.** Holotype worker. Head in full-face view (A), distribution map (B), body in dorsal view (C), body in lateral view (D).

Discussion

Prior to this study, only one of the 23 Asian species was recorded from mainland China. *Parasyscia fossulata* was reported in Yunnan and Tibet by Xu (1998), Liu C. *et al* (2018), and Liu X. *et al* (2016). Examining the relevant specimens from these studies by Zhenghui Xu (Southwest Forestry university, China), it was found that they had been misidentified and were actually *Cerapachys guizhouensis* Zhou, 2006. In this paper, *Parasyscia* was recorded in mainland China for the first time, with five new species and one new record.

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References

Aswaj, P., Sahanashree, R., Udayakantha, W.S., Aniruddha, M. & Priyadarsanan, D.R. (2021) Two new species of doryline ants (Hymenoptera, Formicidae) with 11-segmented antennae from India. *ZooKeys*, 1056, 59–72. https://doi.org/10.3897/zookeys.1056.68722

Bharti, H. & Akbar, S.A. (2013) Taxonomic studies on the ant genus *Cerapachys* Smith (Hymenoptera, Formicidae) from India. *ZooKeys*, 336, 79–103. https://doi.org/10.3897/zookeys.336.5719

Bharti, H. & Wachkoo, A.A. (2013) *Cerapachys browni* and *Cerapachys costatus*, two new rare ant species (Hymenoptera: Formicidae) from India. *Biologia*, 68 (6), 1189–1192. https://doi.org/10.2478/s11756-013-0260-9

Borowiec, M.L. (2016) Generic revision of the ant subfamily Dorylinae (Hymenoptera, Formicidae). *ZooKeys*, 608, 1–280. https://doi.org/10.3897/zookeys.608.9427

Borowiec, M.L. (2019) Convergent evolution of the army ant syndrome and congruence in big-data phylogenetics. *Systematic Biology*, 68 (4), 642–656. https://doi.org/10.1093/sysbio/syy088

Brown, W.L. Jr. (1975) Contributions toward a reclassification of the Formicidae. V. Ponerinae, tribes Platythyreini, Cerapachyini, Cylindromyrmecini, Acanthostichini, and Aenictogitini. Search. *Agriculture, Ithaca, New York*, 5 (1), 1–115.

Collingwood, C.A. (1985) Hymenoptera: Fam. Formicidae of Saudi Arabia. *Fauna of Saudi Arabia*, 7, 230–302.

Emery, C. (1882) ("1881") [Untitled. 3e Genre.—*Parasysciaa*, Emery, nov. gen.]. *In*: Ernest, A. (1882d), Les fourmis [part]. *In*: André, Edmond, A. (1882), *1881–1886. Species des Hyménoptères d'Europe et d'Algérie. Tome Deuxième*. Edmond André, Beaune, pp. 235–236

Emery, C. (1897) Viaggio di Lamberto Loria nella Papuasia orientale. XVIII. Formiche raccolte nella Nuova Guinea dal Dott. Lamberto Loria. *Annali del Museo Civico di Storia Naturale*, 38[=(2)18], 546–594. https://doi.org/10.5962/bhl.part.8735

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. *Természetrajzi Füzetek*, 25, 152–160.

Emery, C. (1902) Note mirmecologiche. *Rendiconti delle Sessioni della Reale Accademia delle Scienze dell'Istituto di Bologna*, New Series, 6, 22–34.

Emery, C. (1923) Einige exotische Ameisen des Deutschen Entomologischen Institutes. *Entomologische Mitteilungen. Berlin-Dahlem*, 12, 60–62.

Forel, A. (1891) Les Formicides. [part]. *In*: Grandidier, A., *Histoire physique, naturelle, et politique de Madagascar. Volume XX. Histoire naturelle des Hyménoptères. Deuxième partie (28e fascicule)*. Hachette et Cie, Paris, v + 237 pp.

Forel, A. (1892) Les Formicides. [concl.]. *In*: Grandidier, A., *Histoire physique, naturelle, et politique de Madagascar*. *Vol. XX*. *Histoire naturelle des Hyménoptères. Deuxième partie. Supplèment au 28e fascicule*. Hachette et Cie, Paris, pp. 229–280.

Forel, A. (1895) Nouvelles fourmis de diverses provenances, surtout d'Australie. *Annales de la Société Entomologique de Belgique*, 39, 41–49.

Forel, A. (1900) Les Formicides de l'Empire des Indes et de Ceylan. Part VII. *Journal of the Bombay Natural History Society*, 13, 303–332.

Holt, B.G., Lessard, J.P., Borregaard, M.K., Fritz, S.A., Araújo, M.B., Dimitrov, D. & Rahbek, C. (2013) An update of Wallace's zoogeographic regions of the world. *Science*, 339 (6115), 74–78. https://doi.org/10.1126/science.1228282

Karavaiev, V. (1925) Ponerinen (Fam. Formicidae) aus dem Indo-Australischen Gebiet. *Konowia*, 4, 69–81.

Karmaly, K.A., Rabeesh, T.P. & Sumesh, S. (2012) Description of new species of genus Cerapachys, Smith (Hymenoptera: Formicidae) from Kerala, India. *Journal of Entomological Research, New Delhi*, 36 (2), 157–159.

Kempf, W.W. (1972) Catálogo abreviado das formigas da região Neotropical. *Studia Entomologica*, 15, 3–344.

Liu, C., Dudley, K.L., Xu, Z. & Economo, E.P. (2018) Mountain metacommunities: climate and spatial connectivity shape ant diversity in a complex landscape. *Ecography*, 41 (1), 101–112. https://doi.org/10.1111/ecog.03067

Liu, X., Xu Z., Yu, N. & Zhang, C. (2016) Distribution patterns of ant species (Hymenoptera: Formicidae) in Galongla Mountains and Medog Valley of Southeastern Tibet. *Scientia Silvae Sinicae*, 52 (11), 88–95.

Radchenko, A.G. (1993) New ants of the subfamily Cerapachyinae (Hymenoptera, Formicidae) from Vietnam. *Zhurnal Ukrains'koho Entomolohichnoho Tovarystva*, 1 (1), 43–47.

Sarnat, E.M. & Economo, E.P. (2012) *The ants of Fiji. University of California Publications in Entomology. Vol. 132*. University of California Press, Berkeley, California, xiii + 384 pp.

Sharaf, M.R., Akbar, S.A. & Aldawood, A.S. (2018) Review of the Arabian rare ant genus Parasyscia Emery, 1882 (Hymenoptera: Formicidae) with description of a new species from the Asir Mountains, Saudi Arabia. *African Entomology*, 26 (1), 215–223. https://doi.org/10.4001/003.026.0215

Smith, F. (1857) Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. [part]. *Journal and Proceedings of the Linnean Society of London*, Zoology, 2, 42–88. https://doi.org/10.1111/j.1096-3642.1857.tb01759.x

Terayama, M. (1996) Taxonomic studies on the Japanese Formicidae, part 2. Seven genera of Ponerinae, Cerapachyinae and Myrmicinae. *Nature & Human Activities*, 1, 9–32.

Viehmeyer, H. (1913) Ameisen aus dem Kopal von Celebes. *Stettiner Entomologische Zeitung*, 74, 141–155.

Wheeler, W.M. (1919) The ants of Borneo. *Bulletin of the Museum of Comparative Zoology*, 63, 43–147.

Wheeler, W.M. & Chapman, J.W. (1925) The ants of the Philippine Islands. Part I, Dorylinae and Ponerinae. *Philippine Journal of Science*, 28, 47–73.

Wilson, E.O. (1958) Studies on the ant fauna of Melanesia. I. The tribe Leptogenyini. II. The tribes Amblyoponini and Platythyreini. *Bulletin of the Museum of Comparative Zoology*, 118, 101–153.

Wilson, E.O. (1959) Studies on the ant fauna of Melanesia. VI. The tribe Cerapachyini. *Pacific Insects*, 1, 39–57.

Xu, Z. (1998) A report of fourty-one ant species newly recorded in China from Xishuangbanna District of Yunnan Province (Hymenoptera: Formicidae). *Zhongguo Xue Shu Qi Kan Wen Zhai*, 4, 1119–1121.

Zhou, S. (2006) Formicidae. *In*: Li, Z.Z. & Jin, D.C. (Ed.), *Insects from Fanjingshan Landscape.* Guizhou Science and Technology Publishing House, Guiyang, pp. 579–589.