

A new species of the *Aenictus pachycerus* species group (Hymenoptera: Formicidae) from the Western Ghats, India, with a key to members of the *A. pachycerus* species group

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Abstract

A new species of the genus *Aenictus* Shuckard, 1840 is described from the Western Ghats region, India, under the name *A. kodagura* Shakur & Bagchi, sp. nov. based on the worker caste. The new species belongs to the *Aenictus pachycerus* species group and shares affinities with *A. sirenicus* Yamane & Wang, 2015, in having a smooth head, smooth pronotum and sculptured propodeum, pedunculate petiole and postpetiole. The new species can be differentiated from *A. sirenicus* by the presence of subpetiolar process, propodeum being slightly convex in profile, petiole and postpetiole being comparable in length, and a uniform pale brown coloration of the body. The holotype was collected from coffee plantations in Kodagu district of Karnataka.

Keywords Dorylinae | new species | forest fragment

1. Introduction

The subfamily Dorylinae Leach, 1815 consists of predatory ants, occurring mostly in tropical and sub-tropical regions along with the warm temperate regions of the world (Borowiec 2016). Members of Dorylinae can be distinguished by the following combination of characters (Borowiec 2016): ‘metapleural gland orifice concealed by a dorsal cuticular flap, large and convex sternite of the helcium, and exposed abdominal spiracles of segments V–VII.’ The genus *Aenictus*, Shuckard, 1840 of the subfamily Dorylinae, includes 203 species and 25 subspecies (Bolton 2024). Species of the genus are widespread in the old world, with the majority found in the

tropical and sub-tropical regions of Africa and Asia and a few extending into the southern parts of the Palearctic and Australian regions (Jaitrong & Yamane 2011, Borowiec 2016, Janicki et al. 2016). Shuckard (1840) named *Aenictus* after a male, referring to its ‘enigmatical structure.’ Species of this genus show army ant behaviour and conduct raids consisting of many workers targeting other ants, social wasps, and termites (Borowiec 2016).

Workers of the genus *Aenictus* can be distinguished from other Dorylinae by the following combination of characters (Borowiec 2016): ‘8- to 10-segmented antennae, propodeal spiracle positioned high on the propodeum, and conspicuously binodal waist (abdominal segment IV is conspicuously the largest abdominal segment).’

The genus *Aenictus* is represented by 37 species and subspecies in India (Sahoo et al. 2024). Jaitrong & Yamane (2011) grouped species from the Oriental, Indo-Australian, and Australasian regions into 12 species groups. The *Aenictus pachycherus* species group is represented by 20 species, all of which are distributed within Asia. Here, we describe a new species belonging to this group, based on workers collected from coffee plantations in the Western Ghats region of India.

2. Materials and methods

Specimens of this new species were collected using opportunistic hand collection and pitfall traps from coffee plantations in the southern Western Ghats. Measurements were done using an Olympus SZX10 microscope. The holotype was imaged using a Keyence VHX 6000 digital microscope at 200× magnification.

2.1 Measurements and indices (Fig. 1):

- HL Head length: maximum measurable distance from the mid-point of the anterior clypeal margin to the mid-point of the posterior margin of the head in full-face view.
- HW Head width: maximum head width measured in full-face view.
- SL Scape length: maximum length of antennal scape shaft excluding the basal condyle.
- PnW Pronotal width: the maximum width of the pronotum, in dorsal view.
- WL Weber's length: the maximum diagonal length of the mesosoma, measured from the angle at which the pronotum meets the cervix to the posterior basal angle of the propodeal lobe in profile.
- PL Petiole length: the maximum length of abdominal segment II, measured as the line connecting the antero-central point of the petiole at the junction with the propodeum and the postero-central point at the junction with the postpetiole in profile view.
- PH Petiole height: the maximum height of the petiole, measured as the perpendicular distance to a reference line (red line in Fig. 1D) that extends from the center of petiole-propodeal junction to the center of petiole-postpetiolar junction in profile view.
- PW Petiole Width: the maximum width of the petiolar node, in dorsal view.
- PPL Postpetiole length: the maximum length of abdominal segment III, measured as the line connecting the

antero-central point of the postpetiole at the junction with the petiole and the postero-central point at the junction with the gaster in profile view.

- PPH Postpetiole height: the maximum height of the postpetiolar node, measured as the perpendicular distance to a reference line that extends from the center of the petiole-postpetiolar junction to the center of postpetiole-gaster junction in profile view.
- PPW Postpetiole width: the maximum width of the postpetiolar node, in dorsal view.
- TL Total length: HL+WL+PL+PPL
- CI Cephalic Index: (HW/HL)×100
- SI Scape Index: (SL/HW)×100

2.2 Depositories:

- NCBS – National Centre for Biological Sciences, Bangalore
- IISc – Indian Institute of Science, Bangalore

3. Results and Discussion

3.1 Taxonomy

Aenictus pachycherus species group

Diagnosis. Members of the *A. pachycherus* group can be distinguished by the following combination of characters (Jaitrong & Yamane 2011): 'presence of 10-segmented antennae; well-developed parafrontal ridge; typhlatta spots absent; anterior clypeal margin convex; mandible triangular to subtriangular; with mandibles closed a gap absent between mandibles and anterior clypeal margin; Head in full-face view with occipital corner rounded, without lateral protuberance; mesonotum not visibly demarcated from mesopleuron; metanotal groove indistinct; first gastral segment clearly smooth and shiny or weakly shagreened with smooth and shiny interspaces; sub petiolar process weakly developed or almost absent.'

Aenictus kodagura Shakur & Bagchi, sp. nov.

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(Fig. 2)

Type Material

Holotype: worker from India, Karnataka, Kodagu district, Teralu, Coorg raga, 12.27042°N, 75.75820°E, 905 m alt., hand collection, 11.v.2022, Mohammad Abdus Shakur leg. (IISc)

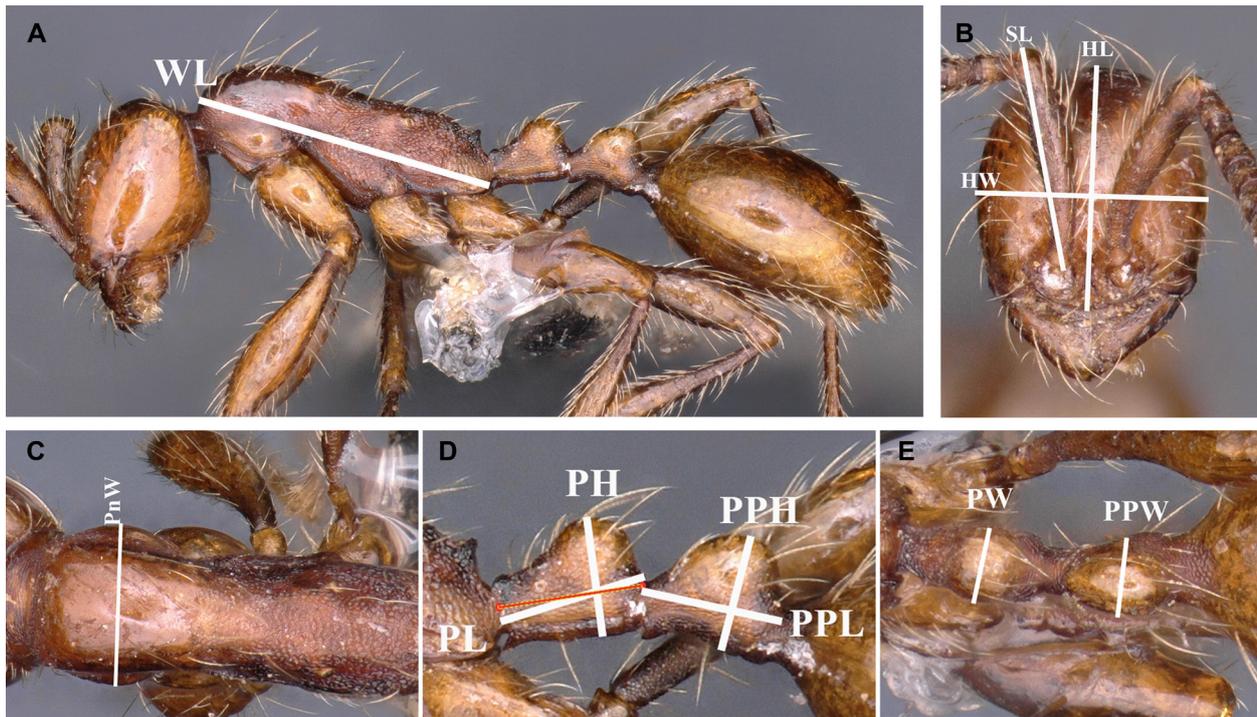


Figure 1. Standard measurements used in this study. Head length (HL), Head width (HW), Scape length (SL), Pronotal width (PnW), Weber's length (WL), Petiole length (PL), Petiole height (PH), Petiole width (PW), Postpetiole length (PPL), Postpetiole height (PPH), Postpetiole width (PPW).

Paratypes: 40 workers from India, Karnataka, Kodagu district, Teralu, Coorg raga, 12.27042°N, 75.75820°E, 905 m alt., hand collection, 11.v.2022 (same info as holotype); 1 worker from India, Karnataka, Kodagu district, Arji, 12.18166°N, 75.79683°E, 911 m alt., pitfall trap, 26.i.2021; 1 worker from Bhetri, 12.27026°N, 75.75824°E, 906 m alt., pitfall trap, 23.ii.2021; Mohammad Abdus Shakur leg. (IISc, NCBS)

Description

Measurements ($n = 7$, holotype measurements are in parenthesis). HL 0.66–0.71 (0.66), HW 0.55–0.59 (0.55), SL 0.51–0.58 (0.54), PnW 0.31–0.34 (0.32), WL 0.98–1.07 (1.05), PL 0.24–0.28 (0.24), PH 0.21–0.23 (0.22), PW 0.14–0.16 (0.14), PPL 0.24–0.27 (0.24), PPH 0.2–0.23 (0.21), PPW 0.14–0.16 (0.14), TL 2.13–2.33 (2.19), CI 80–87.88 (83.33), SI 92.72–101.75 (98.18).

Head: Head in full-face view slightly longer than broad (CI – 83.33) with posterior and lateral margins weakly convex. Eye and typhlata spots (a pair of large, pale patches located on the posterolateral portion of the head that contrast sharply with the remainder of the head) absent. Antenna 10-segmented, scape long (SI – 98.18), reaching posterior margin of head. Frontal carinae short, not extending beyond the posterior margin of antennal sockets. Parafrontal ridges small and indistinct. Clypeus indistinct; anterior margin of clypeus convex and lacks

denticles. When mandibles are closed, no gap exists between mandibles and clypeus. Masticatory margin of mandibles with two teeth (apical and pre-apical) followed by 7–11 denticles of two sizes, the larger alternating with 1–2 smaller. Pre-apical tooth smaller than apical tooth; some individuals have a single denticle on the basal mandibular margin.

Mesosoma: Mesosoma elongate, gradually sloping towards propodeum (in profile view), promesonotal suture and metanotal groove indistinct. In profile, pronotum convex and forms a continuous line with mesonotum. In dorsal view, anterior margin of pronotum nearly straight, anterolateral corners slightly angulated. In profile, propodeum weakly convex, slightly lower than pronotum. In dorsal view, anterior and posterior margins of propodeum roughly equal. Propodeal declivity encircled with a distinct rim. Propodeal spiracle vertically ellipsoid or slit shaped, located close to the dorsal propodeal margin. Mesopleuron continuous with mesonotum. Mesopleuron and metapleuron are separated by a narrow furrow. In some workers, the promesonotum forms a stronger arch and visibly breaks the dorsal outline, while it is continuous in others.

Petiole and Postpetiole: Petiole and postpetiole pedunculate to subsessile, and roughly equally long. In profile, petiole longer than high, dorsum of petiole and post-petiole rounded. In dorsal view, petiole and

postpetiole longer than broad. Subpetiolar process with a low, sharp anteriorly directed triangular lobe. Postpetiole with a sharp anteroventral edge.

Gaster: Oval. Sting present.

Color: Whole body pale brown. Antennae, mandibles, mesosoma, and tibiae are darker, while the head, coxae, femur, petiole, post-petiole, and gaster are lighter.

Sculpture: Head mostly smooth and shiny, except for a few scattered hair pits. Antennal scapes and funicular segments matt, covered by a fine micro-reticulum. Mandibles mostly smooth with few scattered hair pits. Dorsum of pronotum smooth without any sculpture; mesonotum and propodeum transversely rugulo-reticulate. Meso-metanotal suture obsolete. In profile, anterior and lateral sides of pronotum faintly microreticulate; mesopleuron, lateral and posterolateral margins of propodeum rugulo-reticulate. Petiole and

postpetiole micro-reticulate laterally, dorsum smooth. Legs mostly smooth and shiny, apical portion of femur and tibia superficially reticulate. Gaster smooth and shiny.

Pilosity: Represented predominantly by long setae mixed with few short setae scattered across the body, except lateral sides of the pronotum and mesonotum which lack setae. Longest setae on pronotum on average 0.26 mm long.

Ecology: Holotype and 40 paratype workers of *Aenictus kodagura* were hand collected following excavation activities in a coffee plantation, along with *Aenictus kadalarensis* (Sahoo et al., 2023), *Anochetus daedalus* (Marathe & Priyadarsanan, 2016), *Carebara affinis* (Jerdon, 1851), *Centromyrmex feae* (Emery, 1889), *Dorylus orientalis* (Westwood, 1835). One paratype was collected in a pitfall trap from coffee plantations (*Coffea robusta*) dominated by silver

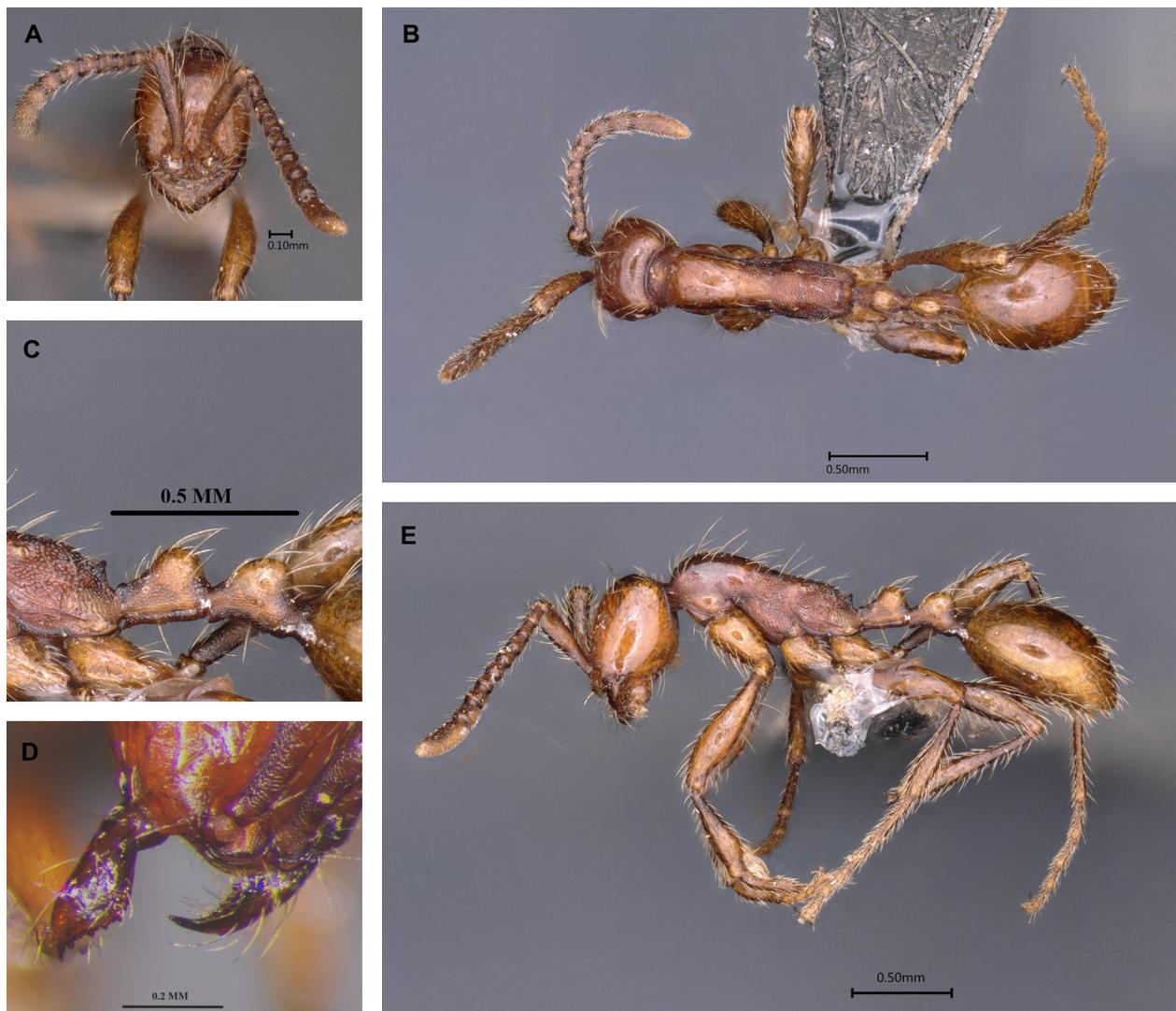


Figure 2. *Aenictus kodagura* sp. nov., holotype, worker: (A) Head in full-face view, (B) Body in dorsal view, (C) Petiole and postpetiole, (D) Body in profile view, (E) Dentition on the mandibles.

oak (*Grevillea robusta* (A. Cunn. ex R. Br), jackfruit (*Artocarpus* spp.), black plum (*Syzygium* spp.), while another paratype worker was collected in a pitfall trap from a forest fragment.

Etymology: The species name is the demonym of the type locality Kodagu, in the region’s Kodava language.

Differential diagnosis

Aenictus kodagura is placed in the *A. pachycerus* species group due to the following characters: anterior clypeal margin being convex and lacking denticles; lacks a gap between mandibles and anterior clypeal margin when mandibles are closed; head and first gastral segment smooth; mesonotum not visibly demarcated from mesopleuron; indistinct metanotal groove; pedunculate petiole and a weakly developed subpetiolar process.

Aenictus kodagura shares affinities with *A. sirenicus* from Borneo, as both have a smooth and shiny head, slender body, smooth pronotum and sculptured propodeum, slender and elongated petiole, and poorly developed parafrontal ridges. However, it can be differentiated by the following characters, among others:

(1) *A. kodagura* is a smaller species with a broader head (TL < 2.3 mm, HL < 0.71 mm, CI > 80), but *A. sirenicus* is a larger species with a narrow head (TL > 3.3 mm, HL > 0.8 mm, CI < 80). (2) Presence of an anteriorly directed subpetiolar process in *A. kodagura*, but *A. sirenicus* lacks subpetiolar process. (3) The petiole and postpetiole are almost similar in length in *A. kodagura*, but the petiole is longer than the postpetiole in *A. sirenicus*. (4) *Aenictus kodagura* is unicolored pale brown, but *A. sirenicus* is bicolored with mesosoma darker than the rest of the body.

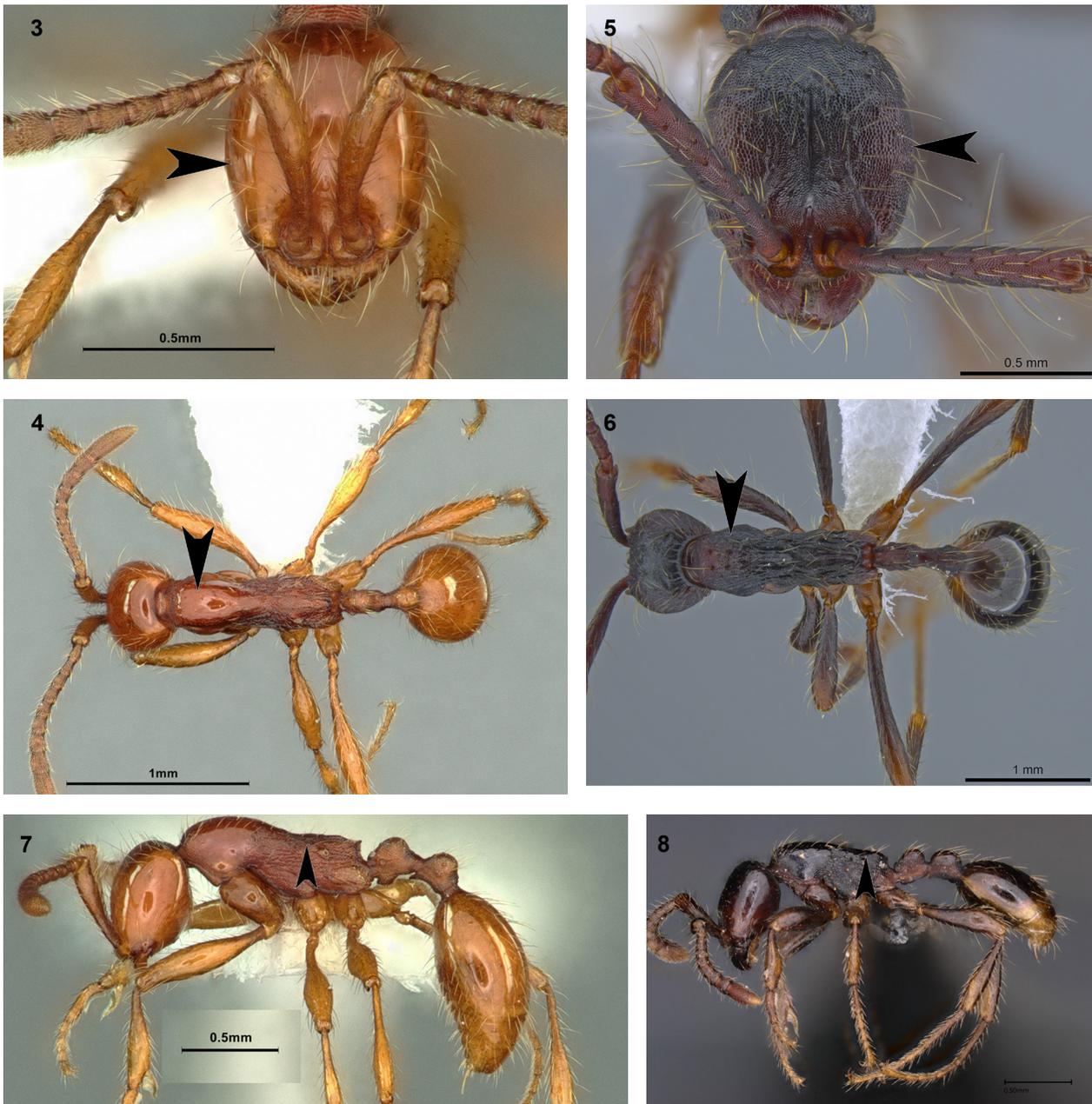
Six species of the *A. pachycerus* group are known from India: *A. aitkenii* (Forel, 1901), *A. dentatus* (Forel, 1911), *A. kadalarensis*, *A. kodaguensis* (Sahoo et al., 2024), *A. pachycerus* (Smith, 1858), and *A. punensis* (Forel, 1901). *Aenictus kodagura* can be distinguished from *A. aitkenii*, *A. dentatus*, *A. kodaguensis*, and *A. pachycerus* in having a smooth head and pronotum while it is microreticulated in the others. *Aenictus kodagura* can be distinguished from *A. kadalarensis* in having a sculptured propodeum and pedunculated petiole instead of smooth propodeum and cuboidal petiole; it can be distinguished from *A. punensis* in having a subpetiolar process.

3.2 Key to *A. pachycerus* species group modified from Jaitrong & Wiwatwitaya (2013), with inputs for *A. aitkenii* (Forel 1901), *A. aratus* (Forel 1900), *A. nesiotis* (Wheeler & Chapman 1930) from Shattuck (2008)

- 1 Head entirely smooth and shiny; dorsum of pronotum entirely smooth and shiny (Figs 3 and 4) 2
- Head entirely sculptured or only partly smooth and shiny; dorsum of pronotum partly sculptured or smooth and shiny (Figs 5 and 6) 9
- 2 Promesonotum in profile with clearly convex dorsal outline; propodeum placed lower than promesonotum (Fig. 7) 3
- Mesosoma dorsally flat or feebly convex; propodeum not placed lower than promesonotum (Fig. 8) 5
- 3 Dorsum of propodeum smooth; hairs short and sparse (Figs 9 and 10) (Philippines) *powersi* (Wheeler & Chapman 1930)
- Dorsum of propodeum sculptured, hairs long and prominent especially on mesosoma (Figs 11 and 12) 4
- 4 Larger species (HL ~ 0.76 mm); mandibles with 3–4 teeth (Fig. 13) (Papua New Guinea) *chapmani* (Wilson 1964)

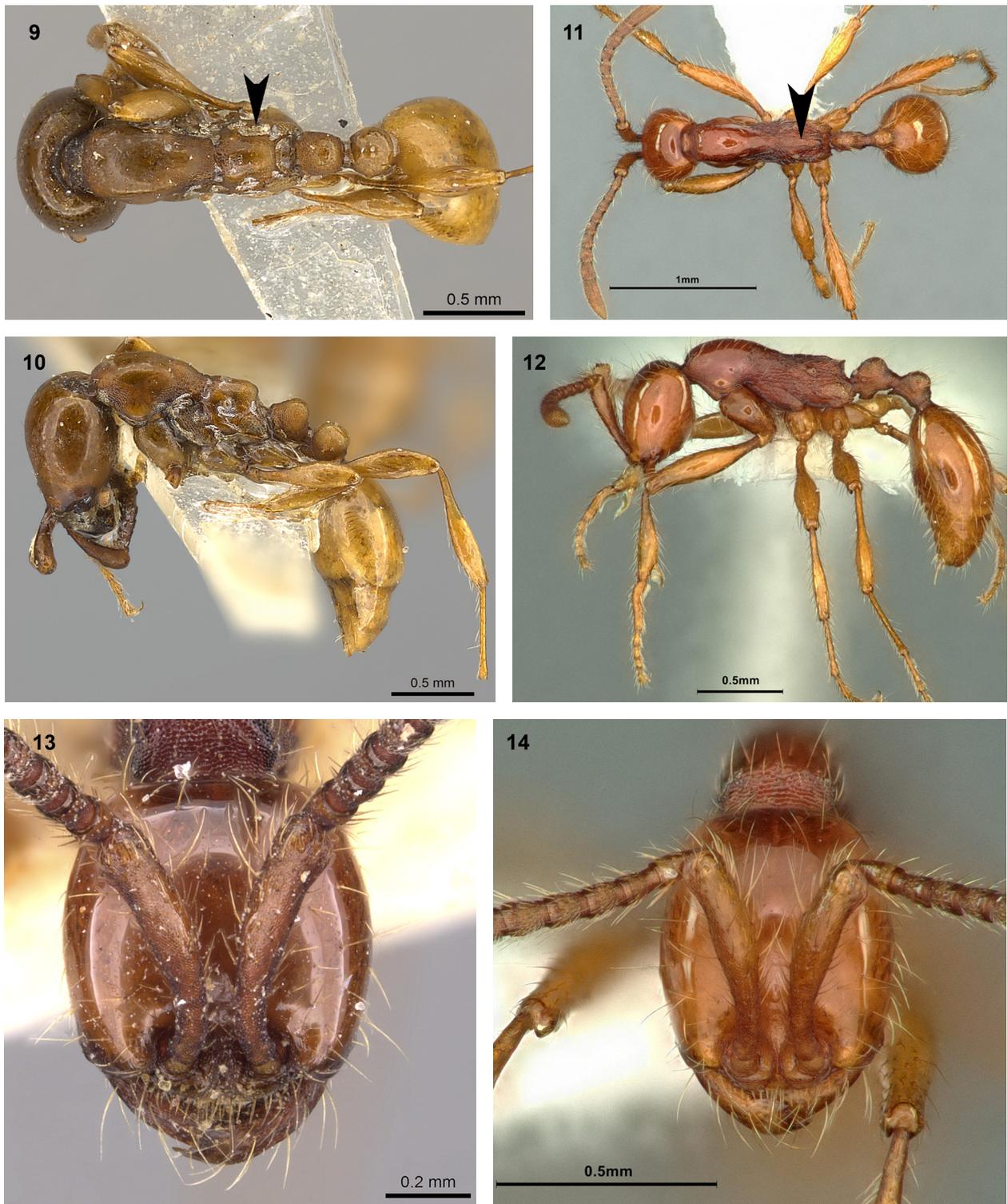
- Smaller species (HL < 0.62 mm); mandibles with 6–7 teeth (Fig. 14) (Australia) *prolixus* (Shattuck 2008)
- 5 Petiole and postpetiole elongated and pedunculate; parafrontal ridges poorly developed (Figs 15 and 16) ... 6
- Petiole and postpetiole cuboidal; parafrontal ridges well developed (Figs 17 and 18) 7
- 6 Larger species (TL > 3.3 mm, HL > 0.8 mm), lacks a sub-petiolar process (Fig. 19) (Borneo) *sirenicus* (Yamane & Wang 2015)
- Smaller species (TL < 2.3 mm, HL < 0.71 mm), anteriorly directed sub-petiolar process (Fig. 20) (India) *kodagura* sp. nov.
- 7 Smaller species (HW ~ 0.53 mm); mesosoma dorsally flat in profile, mesosoma in profile with microreticulum (Fig. 21) (India) *kadalarensis* (Sahoo et al., 2023)
- Larger species (HW > 0.63mm); mesosoma flat to feebly convex in profile, mesosoma in profile with longitudinal rugae or striae (Fig. 22) 8
- 8 Smaller species (HW 0.63–0.65 mm); propodeum with a transverse ridge separating dorsal and posterior face; longest pronotal hair 0.25–0.28 mm (Fig. 23) (Philippines) *carolianus* (Zettel & Sorger, 2010)

- Larger species (HW 0.75–0.78 mm); propodeum in profile with straight dorsal outline; longest pronotal hair ca. 0.15 mm (Fig. 24) (Philippines)
..... *reyesi* (Chapman, 1963)
- 9 First gastral tergite superficially shagreened (Figs 25 and 26) 10
- First gastral tergite smooth and shiny (Figs 27 and 28) 11
- 10 Scapes relatively short (SI < 115), masticatory margin of mandible with 5 denticles (Fig. 29) (India)
..... *kodaguensis* (Sahoo et al., 2024)
- Scapes relatively long (SI > 117), masticatory margin of mandible with 11–12 denticles (Fig. 30) (China, Vietnam, Laos, and Thailand).....
.....*paradentatus* (Jaitrong & Yamane 2012)
- 11 Side of head partly smooth and shiny; dorsal face of pronotum partly shiny (Figs 31 and 32) 12
- Side of head entirely sculptured (punctate or reticulate); dorsal face of pronotum entirely sculptured and opaque (Figs 33 and 34) 16
- 12 Pronotum shiny with large smooth areas laterally (Fig. 35) 13
- Pronotum matt with micro reticulations laterally (Fig. 36) 15
- 13 Posterolateral corners and occiput region of head smooth or most with sparse micro reticulae (Figs 37 and 38) (Papua New Guinea, Australia)
..... *philiporum* (Wilson 1964)
- Posterolateral corners and occiput region of head sculptured (Figs 39 and 40) 14
- 14 Area just outside parafrontal ridge shagreened; vertex reticulate, with sparse standing hairs (less than 12); postpetiole almost as long as petiole (Sulawesi)
..... *sulawesiensis* (Jaitrong & Wiwatwitaya, 2013)
- Area just outside parafrontal ridge with several irregular longitudinal rugulae; vertex finely punctate; vertex with denser standing hairs (more than 15); petiole distinctly longer than petiole (Java)
..... undescribed species - A. sp. 84 of WJT
- 15 Head shiny except for the microreticulae band on occiput and area close to parafrontal ridges, body yellow to brown (Fig. 41) (India and China)
..... *punensis* (Forel 1901)
- Head opaque entirely microreticulate, body reddish brown (India) (Fig. 42) *pachycerus* (Smith, F 1858)
- 16 Dorsocaudal propodeum in profile with protruding edge that is longer than maximum length of propodeal spiracle, very thin, acute, and far overhanging declivitous face; antennal scape longer (SI 143–152) (Fig. 43) (Malay Peninsula, Sumatra, Thailand, China, Vietnam, Borneo and Java) *dentatus* (Forel 1911)
- Edge of dorsocaudal propodeum not longer than maximum spiracle width and not overhanging the declivitous face; antennal scape shorter (SI 110 or less than) (Fig. 44) 17
- 17 Lateral face of pronotum partly smooth and shiny or superficially shagreened with smooth and shiny interspaces; area just outside parafrontal ridge with 3–5 irregular longitudinal rugulae (Figs 45 and 46) (Borneo). *kutai* (Jaitrong & Wiwatwitaya, 2013)
- Lateral face of pronotum entirely sculptured and opaque; area just outside parafrontal ridge finely punctate or microreticulate (Figs 47 and 48) 18
- 18 Basal half of femora reticulate but with smooth and shiny bottoms; smaller species (Fig. 49) 19
- Entire femora finely punctate; larger species (Fig. 50).. 21
- 19 Scapes relatively long (SI > 107) (Fig. 51) (India, Myanmar, Malaysia, Borneo, Philippines, Papua New Guinea, Australia) *aratus* (Forel 1900)
- Scapes relatively short (SI < 103) (Fig. 52) 20
- 20 Petiole and postpetiole broader and bulbous, head relatively broader (CI > 87), scapes relatively longer (SI > 115) (Figs 53 and 54) *aikenii* (Forel 1901)
- Petiole and postpetiole narrow; head relatively narrow (CI < 88), scapes relatively longer (SI < 115) (Figs 55 and 56) (Philippines, Papua New Guinea, Australia) *nesiotis* (Wheeler & Chapman 1930)
- 21 Petiole sessile; subpetiolar process developed, triangular; ventral outline of postpetiole almost straight or weakly convex; larger species (TL 4.85–5.10 mm; HW 0.90–0.98 mm) (Fig. 57) (S. China and Vietnam) *bobaiensis* (Zhou & Chen, 1999)
- Petiole subsessile; subpetiolar process low, ventral outline convex; ventral outline of postpetiole feebly concave; smaller species (TL 3.65–4.20 mm; HW 0.70–0.80 mm) (Fig. 58) (Malay Peninsula, Sumatra, Borneo, and Buru Island) *levior* (Karavaiev 1926)



Figures 3–6. Head and profile view of: (3–4) *A. prolixus* (from www.antweb.org CASENT0883439, imaged by Zachary Griebenow), and (5–6) *A. paracentatus* (from www.antweb.org CASENT0651422, imaged by J. Longino)

Figures 7–8. Profile view of: (7) *A. prolixus* (from www.antweb.org CASENT0883439, imaged by Zachary Griebenow), and (8) *A. kadalarensis*



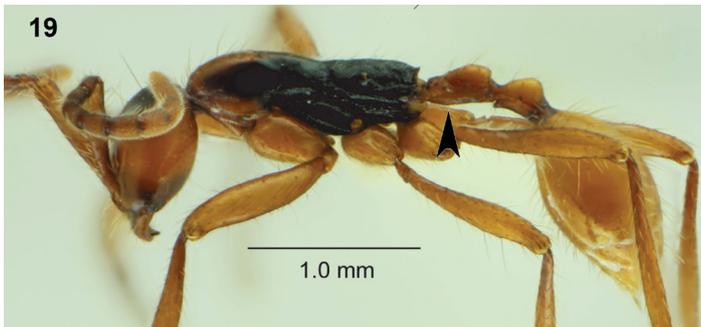
Figures 9–12. Dorsal and profile view of: (9–10) *A. powersi* (from www.antweb.org CASENT0217383, imaged by Will Ericson), and (11–12) *A. prolixus* (from www.antweb.org CASENT0883439, imaged by Zachary Griebenow).

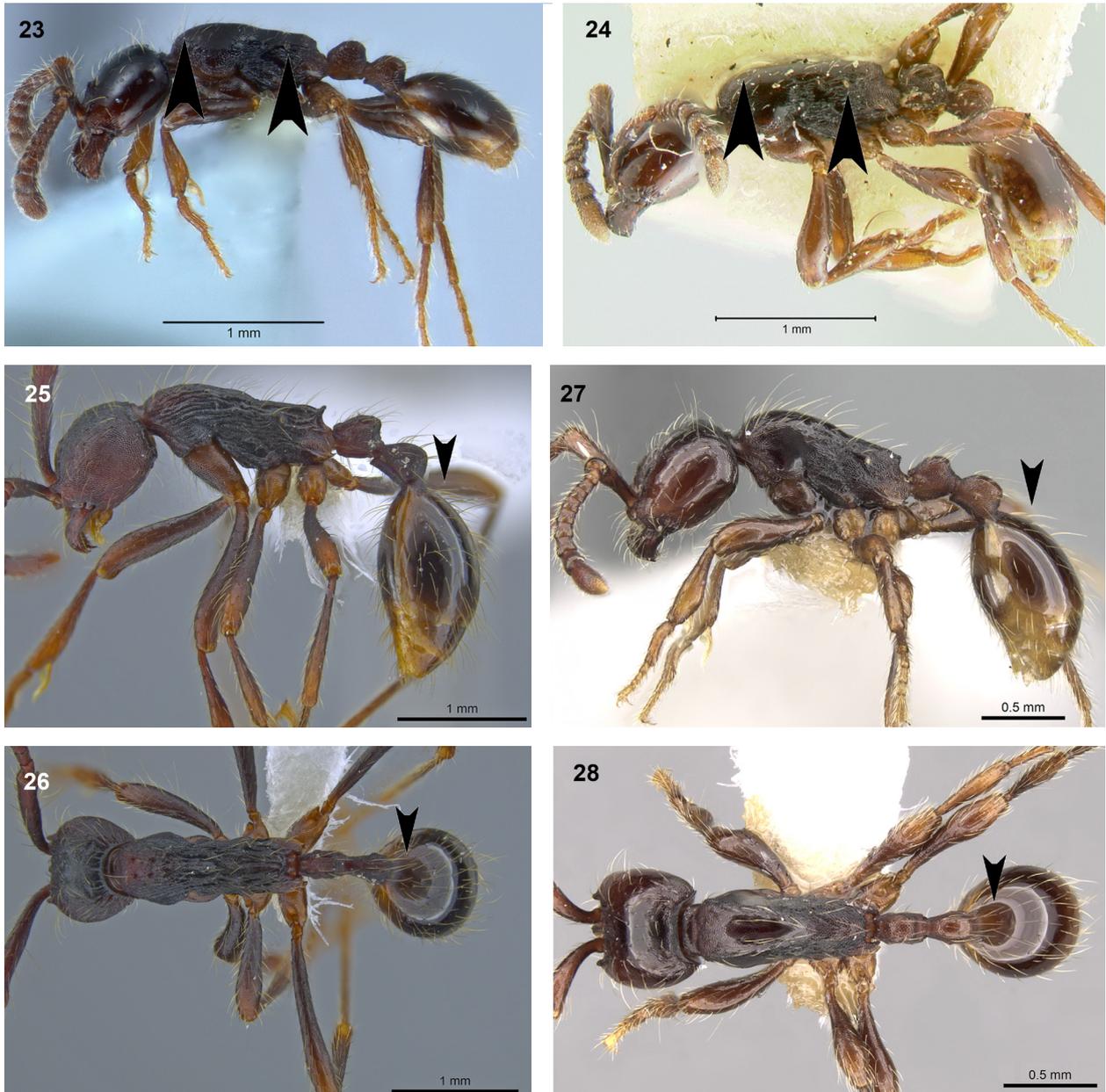
Figures 13–14. Head view of: (13) *A. chapmani* (from www.antweb.org CASENT0905730, imaged by Will Ericson), and (14) *A. prolixus* (from www.antweb.org CASENT0883439, imaged by Zachary Griebenow).

► **Figures 15–18.** Profile and head view of: (15–16) *A. kodagura* sp. nov., and (17–18) *A. kadalarensis*.

► **Figures 19–20.** Profile view of: (19) *A. sirenicus* (from Yamane & Wang 2015), and (20) *A. kodagura* sp. nov.

► **Figures 21–22.** Profile view of: (21) *A. kadalarensis*, and (22) *A. carolianus* (from www.antbase.net no: 01063, imaged by Daniela Magdalena Sorger).





Figures 23–24. Profile view of: (23) *A. carolianus* (from www.antbase.net no: 01063, imaged by Daniela Magdalena Sorger), and (24) *A. reyesi* (from www.antwiki.org).

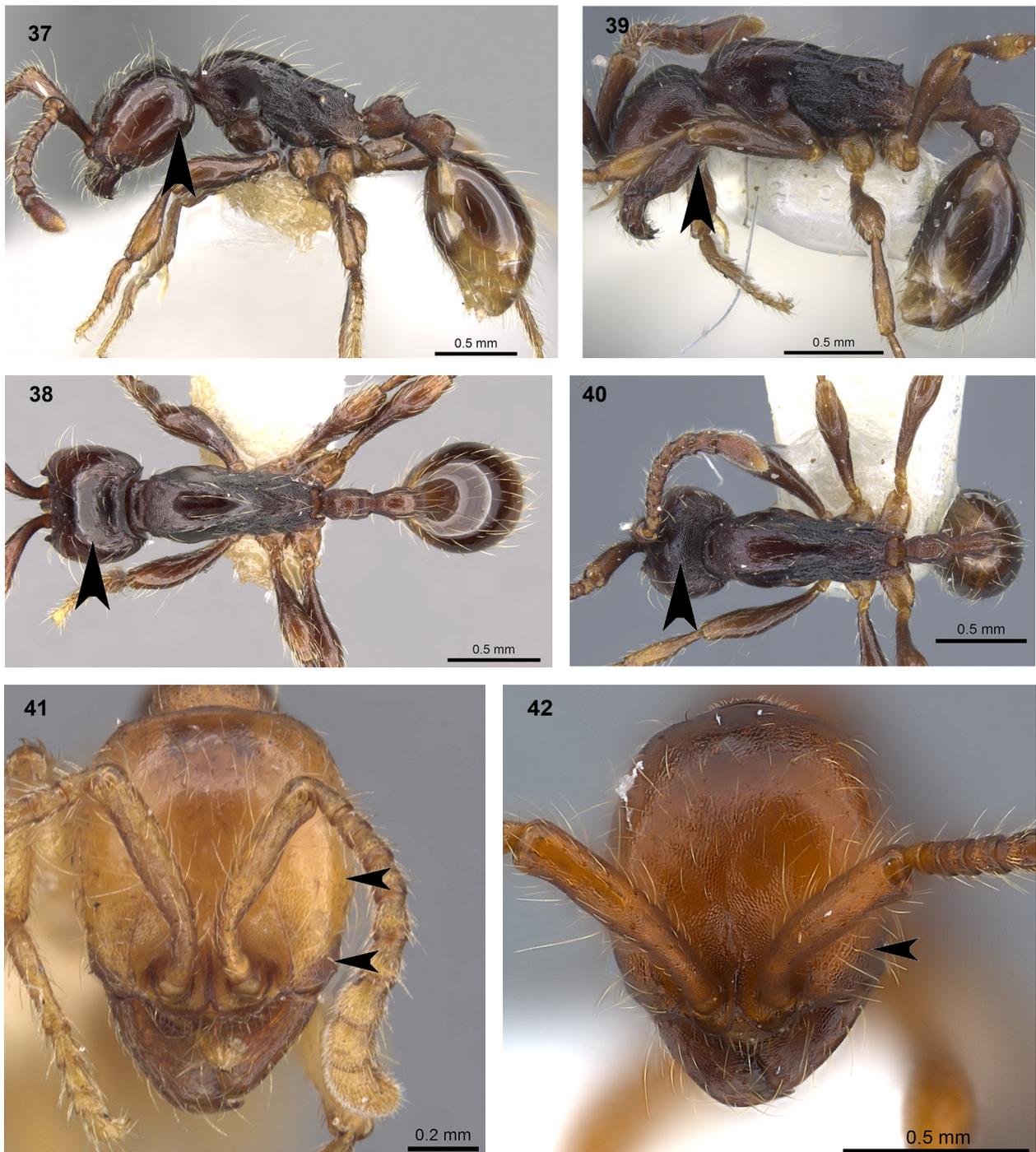
Figures 25–28. Profile and dorsal view of: (25–26) *A. paradentatus* (from www.antweb.org CASENT0651422, imaged by J. Longino), and (27–28) *A. philiporum* (from www.antweb.org CASENT0281954, imaged by Shannon Hartman).

► **Figures 29–30.** Head view of: (29) *A. kodaguensis* (from Sahoo et al. 2024), and (30) *A. paradentatus* (from www.antweb.org CASENT0651422, imaged by J. Longino).

► **Figures 31–34.** Profile and dorsal view of: (31–32) *A. philiporum* (from www.antweb.org CASENT0281954, imaged by Shannon Hartman), and (33–34) *A. dentatus* (from www.antweb.org CASENT0249273, imaged by Shannon Hartman).

► **Figures 35–36.** Profile view of: (35) *A. philiporum* (from www.antweb.org CASENT0281954, imaged by Shannon Hartman), and (36) *A. pachycerus* (from www.antweb.org CASENT0919637, imaged by Flavia Esteves).





Figures 37–40. Profile and dorsal view of: (37–38) *A. philiporum* (from www.antweb.org CASENT0281954, imaged by Shannon Hartman), and (39–40) *A. sulawesiensis* (from www.antweb.org CASENT0917242, imaged by Kate Martynova)

Figures 41–42. Head view of: (41) *A. punensis* (from www.antweb.org CASENT0907017, imaged by Will Ericson), and (42) *A. pachycerus* (from www.antweb.org CASENT0217379, imaged by Estella Ortega).

► **Figures 43–44.** Profile view of: (43) *A. dentatus* (from www.antweb.org CASENT0249273, imaged by Shannon Hartman), and (44) *A. aratus* (from www.antweb.org JTLC000008745, imaged by Will Ericson).

► **Figures 45–48.** Profile and head view of: (45–46) *A. kutai* (from www.antbase.net, Martin Pfeiffer), and (47–48) *A. aratus* (from www.antweb.org JTLC000008745, imaged by Will Ericson).

► **Figures 49–50.** Profile view of: (49) *A. aratus* (from www.antweb.org JTLC000008745, imaged by Will Ericson), (50) *A. levior* (from www.antweb.org CASENT0249264, imaged by Shannon Hartman).





Figures 51–52. Head view of: (51) *A. aratus* (from www.antweb.org JTLC000008745, imaged by Will Ericson), (52) *A. aitkenii* (from www.antweb.org CASENT0905986, imaged by Z. Lieberman).

Figures 53–56. Dorsal and head view of: (53–54) *A. aitkenii* (from www.antweb.org CASENT0905986, imaged by Z. Lieberman), and (55–56) *A. nesiotis* (from www.antweb.org CASENT0249265, imaged by Shannon Hartman).



Figures 57–58. Profile view of: (57) *A. bobaiensis* (from www.antbase.net, Martin Pfeiffer), (58) *A. levior* (from www.antweb.org CASENT0249264, imaged by Shannon Hartman).

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5. References

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