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continued on the back inside cover

Cover: Rufous-headed Hornbill *Rhabdotorrhinus waldeni* © Philip Godfrey C. Jakosalem.

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SHORT COMMUNICATION

Two new species of army ants of the *Aenictus ceylonicus* group (Hymenoptera: Formicidae) from Kerala, India

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Abstract: The genus *Aenictus* Shuckard is a diverse group of army ants in the Old World tropics and subtropics. Herein, two new species from India (*Aenictus kodungallurensis* and *Aenictus malakkaparensis*) belonging to *Aenictus ceylonicus* group were discovered from Kerala, India. An updated key to the *Aenictus ceylonicus* species group from southern Asia is presented.

Keywords: Coastal area, Dorylinae, elevation, hand picking, Kodungallur, Malakkapara, taxonomic analysis, Thrissur.

Aenictus Shuckard 1840, belonging to the subfamily *Dorylinae* of the family *Formicidae,* is one of the true army ant genera occurring throughout Africa and in tropical and subtropical areas from India, Middle-east, southern China, Taiwan, Japan, Afghanistan, Armenia, southern Asia to New Guinea and Australia (Gotwald 1995; Shattuck 1999, 2008; Jaitrong & Yamane 2013). The genus *Aenictus* Shuckard, is the most diverse among all 18 genera of the monophyletic army ant subfamily Dorylinae (Brady et al. 2014) with 187 valid species and 30 valid subspecies (Bolton 2020). In the present paper we deal with the largest species group, the *Aenictus ceylonicus* Mayr group that has been revised in detail by Jaitrong & Yamane (2013). The group contains 23 species distributed in southern Asia. Two new species based on the worker caste are described here. Morphological and bionomic information is presented for each species. A key to the species is given. Most of the species of this species group have more or less limited distribution ranges. This may be due to the poor dispersal ability generally seen among the *Aenictus* species, in which the propagule (reproductive unit) is an apterous queen plus accompanying workers (Jaitrong & Yamane 2013).

Materials and Methods

The specimens were collected using hand picking method. The taxonomic analysis was done using a Labomed stereo zoom microscope. Optika Litevision stereozoom microscope was used to take images and measurements. Images taken were subsequently cleaned as per the requirement for Adobe Photoshop CC 2017. Images of whole ants and micro sculpture of parts were obtained using ZESS scanning electron microscope. Measurements and indices follow Jaitrong & Yamane (2013). Taxonomy follow Bolton (1994), Jaitrong & Yamane (2011, 2013) and Bharti et al. (2012). Holotype is deposited at the Zoological Survey of India Western Ghats Regional Centre (ZSIWGRC), Kozhikode, Kerala, India.

Morphological terminology for measurements (given in millimeters) and indices include: HL—Maximum length of head in dorsal view, measured in straight line from

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Competing interests: The authors declare no competing interests.

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the anterior most point of the median clypeal margin to the midpoint of a line drawn across the posterior margin of head; HW—Maximum width of head in dorsal view; SL—Maximum length of the scape excluding the basal neck and condyle; ML—Mesosoma length. In side view, maximum longitudinal distance from posteroventral corner of mesosoma to the farthest point on the anterior face of pronotum, excluding the neck; PTL—Maximum length of the petiole in dorsal view; PTH—Petiole Height. Maximum height of petiole in profile; PPTL—Maximum length of the postpetiole in dorsal view.

TL—Total Length. HL + ML + PTL + PPTL + GL.

CI—Cephalic Index. (HW/HL) × 100.

SI—Scape Index. (SL/HW) × 100.

Results

Diagnosis: Jaitrong & Yamane (2011) defined this species group as follows:

Antenna 10-segmented; scape reaching or extending beyond half of head length, but not reaching the occipital corner of head in full-face view. Mandible linear; it's basal and lateral margins almost parallel; masticatory margin with large apical tooth followed by medium-sized subapical tooth; between subapical tooth and basal tooth 0–6 small denticles present. With mandibles closed, a gap is present between mandibles and anterior margin of clypeus. Anterior clypeal margin weakly concave or almost straight, lacking denticles. Frontal carina short and thin, reaching or slightly extending beyond the level of posterior margin of torulus; anterior curved extension of frontal carina reaching or extending beyond the level of anterior clypeal margin in full-face view; parafrontal ridge absent. Promesonotum usually convex dorsally and sloping gradually to propodeum. Subpetiolar process developed. Head and first gastral tergite smooth and shiny. Body yellowish, reddish or dark brown; typhlatta spot absent.

Aenictus malakkaparensis sp. nov.
(Images 1–8)

urn:lsid:zoobank.org:act:7344C361-9591-470B-B359-479C1A68D2DC

Type material: Holotype: ZSI/WGRC/IR-INV.13903, 04.xii.2018, Female, worker, Malakkapara, Thrissur, India, Kerala, 10.280N, 76.861E, 1,016m, hand collection from ground, coll. A. Antony.

Holotype worker measurements: TL 2.57mm; HL 0.57mm; HW 0.49mm; SL 0.38mm; ML 0.90mm, PTL 0.21mm, PTH 0.19mm, PPTL 0.20mm, CI 84; SI 77.

Worker description

Head: Head in full-face view sub rectangular, slightly longer than broad, sides convex, posterior margin almost straight; anterior part of head is broader than posterior part. Antennae with 10 segments, with ill-defined three segmented club and scape is short reaching almost 1/2 of head length. Anterior clypeal margin almost straight or feebly concave. Mandibles with basal margin edentate, masticatory margin of mandible with large acute apical tooth followed by a medium-sized subapical tooth, three denticles, and a medium-sized basal tooth.

Mesosome: Promesonotum convex dorsally and sloping gradually to metanotal groove; mesopleuron relatively long, clearly demarcated from metapleuron by a groove. Propodeum in profile with almost straight dorsal outline; propodeal junction angulate; declivity of propodeum flat, with blunt lateral carinae but not demarcated basally by a transverse carina.

Petiole, Post Petiole. Petiole longer than high, node short, elevated posteriorly and dorsal outline convex; sub petiolar process low and short, with anterior and posterior corners bluntly angulated and its ventral outline convex. Postpetiole clearly smaller than petiole, its dorsal outline convex.

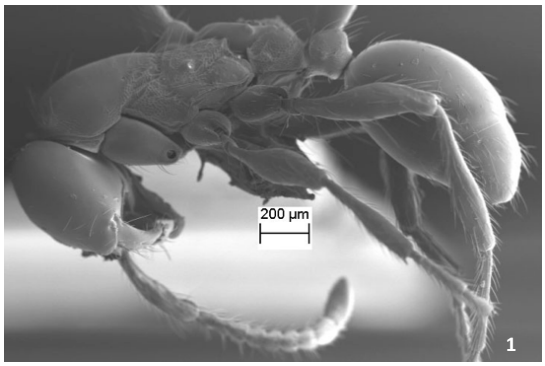
Head, antenna and gaster entirely smooth and shiny; mandible finely striate with long decumbent hairs. Promesonotum smooth and shiny except for anteriormost portion punctate; mesopleuron with slightly irregular rugae; metapleuron, and propodeum wrinkled and reticulate. Petiole and postpetiole entirely reticulate except small area on dorsa smooth and shiny. Head and mesosoma dorsally with relatively sparse standing hairs. Legs with dense long decumbent hairs.

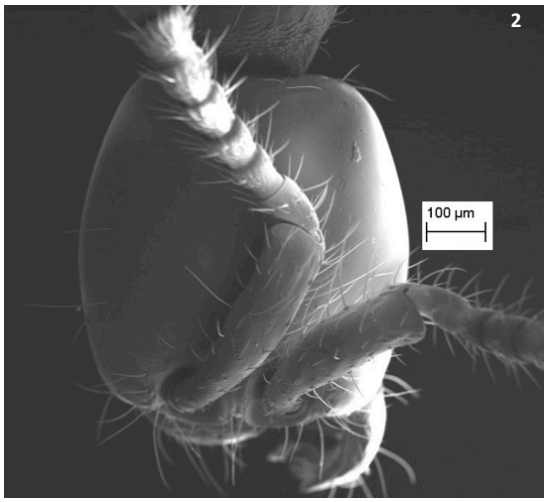
Mesosoma, petiole and postpetiole reddish-brown; head, antennal scape, gaster and legs yellowish-brown.

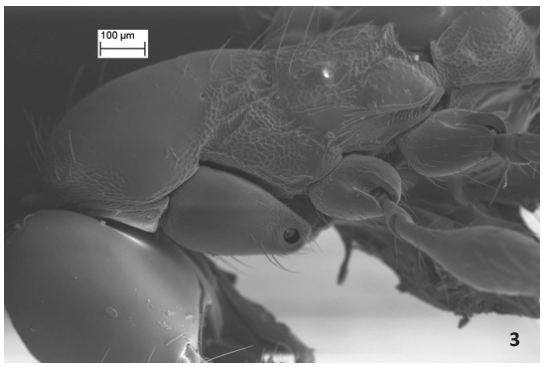
Etymology: The species name is after the type locality, Malakkapara.

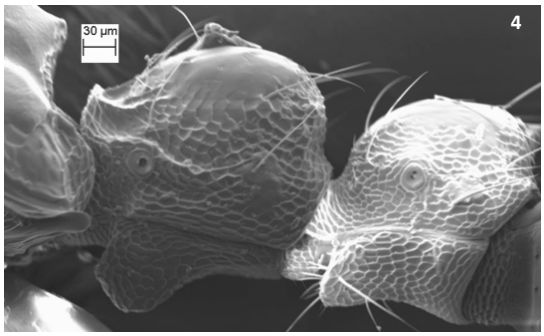
Distribution: Known only from the type locality in Kerala.

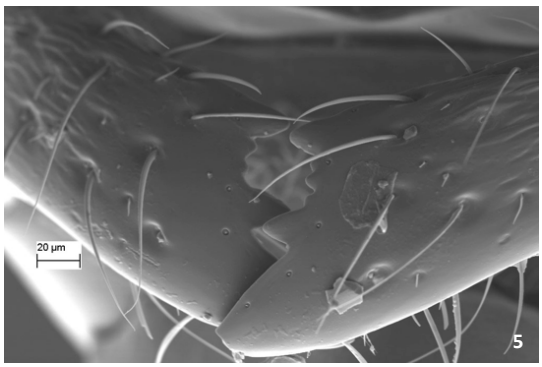
Remarks: *Aenictus malakkaparensis* sp. nov. is similar to *Aenictus appressipilosus* from which it can be fairly separated by a combination of characters. *Aenictus appressipilosus* have two long standing hairs mixed with few short appressed hairs on the vertex and has a few appressed hairs mixed with few decumbent hairs on promesonotum whereas in *Aenictus malakkaparensis* sp. nov. two long standing hairs are absent and its sub petiolar process is low and short, with anterior and posterior corners bluntly angulated and the ventral outline convex.

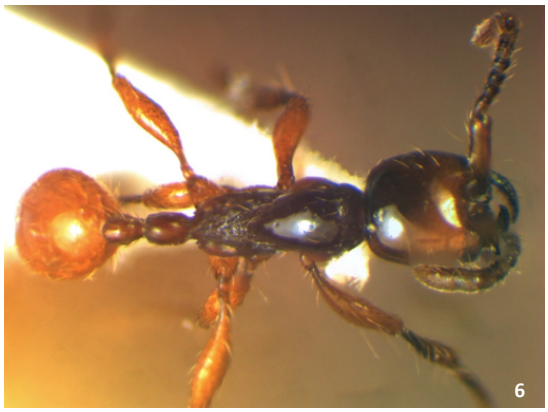


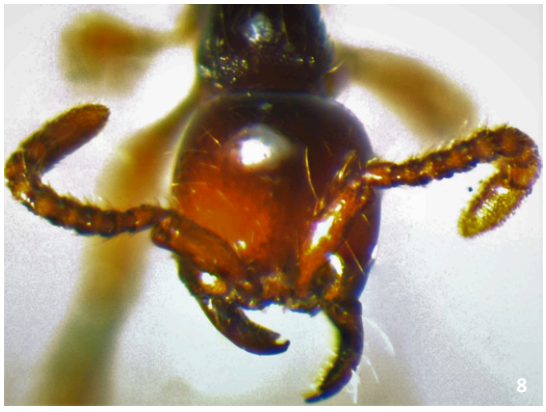


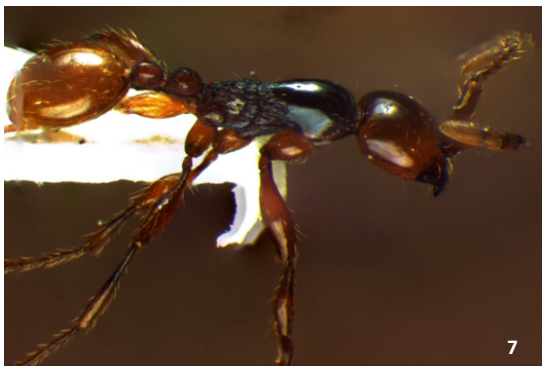












Images 1–8. *Aenictus malakkaparensis* sp. nov. worker (SEM images): 1—lateral view of body | 2—front of head | 3—Mesonotum | 4—Subpetiolar process | 5—Mandible. Stereozoom Images | 6—dorsal view of body | 7—lateral view of body | 8—front of head.

Aenictus kodungallurensis sp. nov.
(Images 9–16)

urn:lsid:zoobank.org:act:353B7C3C-1BFD-42D6-8601-216C111509B3

Type material: Holotype: ZSI/WGRC/IR-INV.13902, 11.vi.2016, Female, worker, Kodungallur, Thrissur, Kerala, India, 10.238N, 76.161E, 9 m, hand collection on ground, coll. A. Antony.

Holotype worker measurements: TL 2.40mm; HL 0.54mm; HW 0.50mm; SL 0.40mm; ML 0.89mm, PTL 0.20mm, PTH 0.17mm, PPTL 0.17mm, CI 89; SI 76.

Worker description

Head: Head in full-face view sub rectangular, slightly longer than broad, sides convex, posterior margin almost straight; anterior part of head is broader than posterior part. Antennae with 10 segments, with ill-defined three segmented club and scape reaching almost 2/3 of head length. Anterior clypeal margin almost straight or feebly concave. Mandibles with basal margin edentate, masticatory margin of mandible with a large acute apical tooth followed by a medium-sized subapical tooth, two denticles, and a medium-sized basal tooth.

Mesosome: Promesonotum convex dorsally and sloping gradually to metanotal groove; mesopleuron relatively long, clearly demarcated from metapleuron by a groove. Propodeum in profile with almost straight dorsal outline; propodeal junction angulate; declivity of propodeum flat, with blunt lateral carinae but not demarcated basally by a transverse carina.

Petiole longer than high, node short, elevated posteriorly and dorsal outline convex; subpetiolar process low and subrectangular with anteroventral and posteroventral corners bluntly angulated and margin between the corners straight to feebly concave. Postpetiole clearly smaller than petiole, its dorsal outline convex.

Head, antenna and gaster entirely smooth and shiny; mandible finely striate. Promesonotum smooth and shiny except for anterior most portion punctate; mesopleuron with slightly irregular rugae; metapleuron, and propodeum wrinkled and reticulate. Petiole and postpetiole entirely reticulate except small area on dorsa smooth and shiny. Head and mesosoma dorsally with relatively dense standing hairs mixed with relatively dense decumbent hairs. Legs with dense long decumbent hairs. Mesosoma, petiole and postpetiole reddish-brown; head, antennal scape, gaster and legs yellowish-brown.

Etymology: The species name is after the type locality, Kodungallur.

Distribution: Known only from the type locality in Kerala.

Bionomics: So far, this species has been known only from Kodungallur.

Remarks: *Aenictus kodungallurensis* sp. nov. is collected from coastal area with loose coastal alluvium soil by handpicking method. *Aeniictus kodungallurensis* sp. nov. is smaller in size than *Aenictus malakkaparensis* sp nov. The antennal scape of *Aenictus malakkaparensis* sp nov. is shorter compared to *Aenictus kodungallurensis* sp. nov. The shape of subpetiolar process is also different, the ventral margine between corners is straight or feebly concave in *Aenictus kodungallurensis* sp. nov. but it is convex in *Aenictus malakkaparensis* sp. nov. Head and mesosome of *Aenictus kodungallurensis* sp. nov. is covered with dense hairs but in case of *Aenictus malakkaparensis* sp. nov. head and mesosome is only covered by sparse hairs.

Discussion

Aenictus kodungallurensis sp. nov. and *Aenictus malakkaparensis* sp. nov. are members of *A. ceylonicus* group, which is a unique group easily separated from the other groups by the following characteristics: mandible linear; a gap is present between mandibles and anterior margin of clypeus when mandibles are closed; anterior clypeal margin almost straight or feebly concave, lacking denticles. The *A. ceylonicus* group occurs in the Oriental, Indo-Australian and Australasian regions (Wilson 1964; Shattuck 2008; Jaitrong & Yamane 2011). *A. kodungallurensis* sp. nov. and *A. malakkaparensis* sp. nov. are the only members of *Aenictus ceylonicus* group reported from Kerala. Both the species are collected from ground by hand picking method. Major difference between both the species is in the structure of sub petiolar process and the promesonotum of *A. kodungallurensis* is covered with dense decumbent hairs. *A. kodungallurensis* sp. nov. is collected from a mixed vegetation area in coastal region with coastal alluvium soil whereas *Aenictus malakkaparensis* sp. nov. is collected from a hilly area with silty loam at an elevation of 1,016 m.

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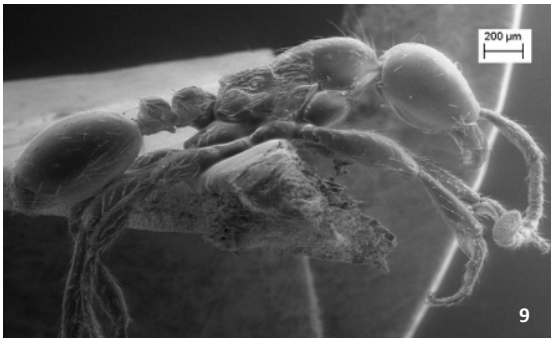

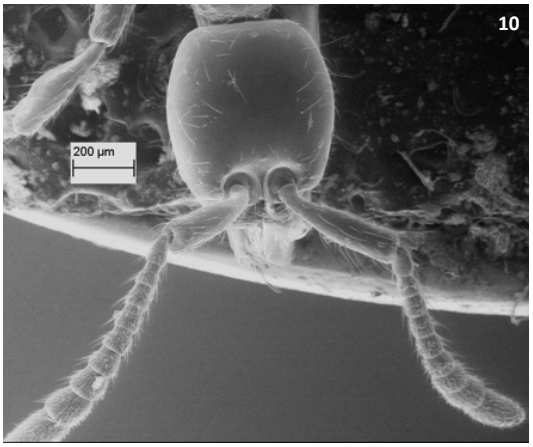

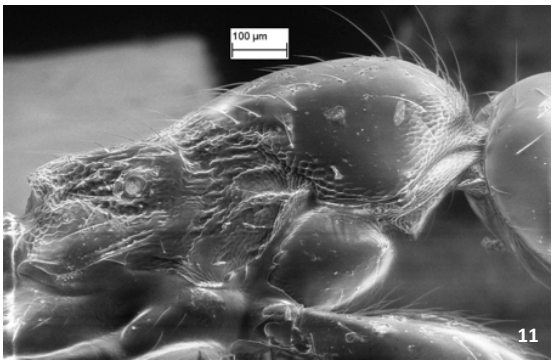

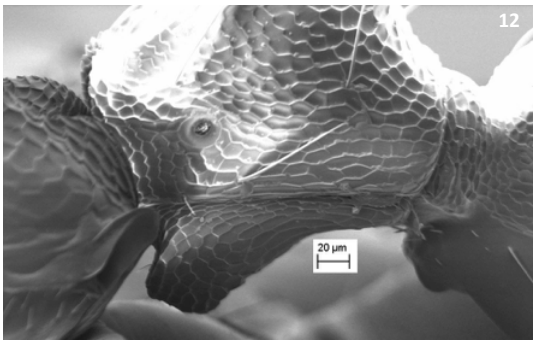

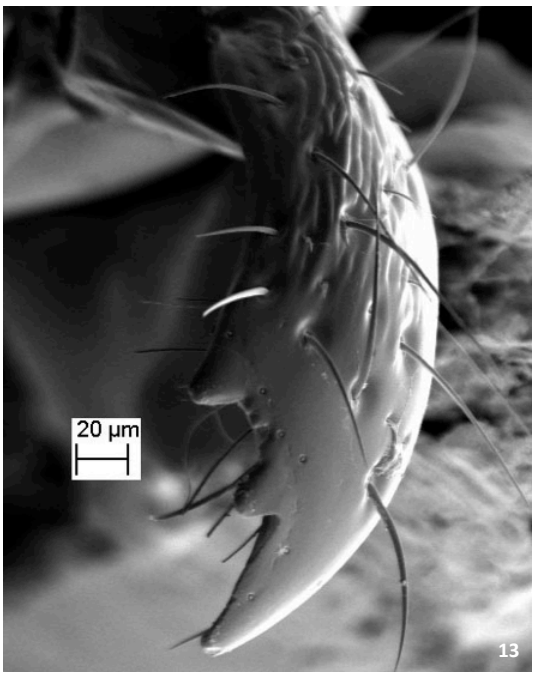

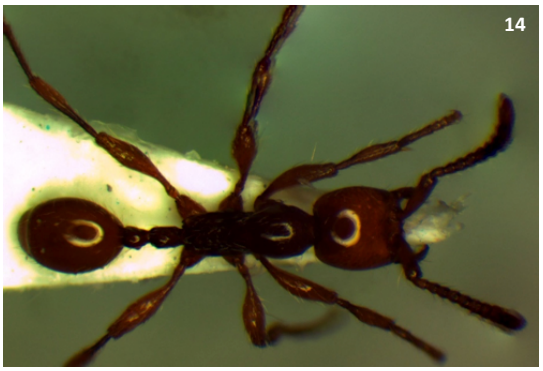

Images 9–16. ***Aenictus kodungallurensis*** **sp. nov. worker (SEM images): 9—lateral view of body | 10—front of head | 11—Mesonotum | 12—Subpetiolar process | 13—Mandible. Stereozoom Images | 14—dorsal view of body | 15—lateral view of body | 16—front of head.**

Key to *A. ceylonicus* group species based on the worker caste, modified and updated after the key of Jaitrong & Yamane (2013).

1. Mandible with 2–6 teeth/denticles between subapical and basal teeth (mandible with more than 4 teeth/denticles) 2
- Mandible with 0–1 tooth/denticle between subapical and basal teeth (mandible with 3–4 teeth/denticles) ..... Extralimitial

2. Vertex with sparse standing hairs and with a few short appressed hairs; promesonotum with few appressed hairs and a few decumbent hairs 3
- Vertex and promesonotum with dense standing or decumbent hairs 4

3. Vertex with two long standing hairs mixed with a few short appressed hairs (Sabah) .... ***A. appressipilosus* Jaitrong & Yamane, 2013**
- Vertex without two long standing hairs but with a few short appressed hairs (India) ..... ***A. malakkaparensis* sp. nov.**

4. Subpetiolar process subtriangular, its apex directed downward, anteroventrally not angulate; postpetiole elevated posteriorly; its posterior face much steeper than anterior face (Sumatra) ..... ***A. itoi* Jaitrong & Yamane, 2013**
- Subpetiolar process subrectangular or low, convex, straight or feebly concave in its ventral outline, anteroventrally always angulate; postpetiole with roundly convex dorsal outline 5

5. Dorsal outline of propodeum weakly convex; metapleural gland bulla weakly sculptured and shiny (Vietnam) .... ***A. eguchii* Jaitrong & Yamane, 2013**
- Dorsal outline of propodeum straight; metapleural gland bulla strongly sculptured (puncto-reticulate) and opaque 6

6. Posteroventral corner of subpetiolar process bluntly angulate (not spiniform) (India) ..... ***A. kodungallurensis* sp. nov.**

- Posteroventral corner of subpetiolar process acutely produced below (spiniform) ..... ***A. jawadwipa* Jaitrong & Yamane, 2013**

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