

A New Species of the Genus *Prenolepis* (Hymenoptera: Formicidae) from Japan

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Abstract A new species of the ant genus *Prenolepis*, *P. tosa* sp. nov., is described based on the worker and female castes from Japan. This is the first arboreal species in this genus.

The ant genus *Prenolepis* Mayr, 1861, belonging to the subfamily Formicinae, is represented by 13 species distributed from Europe to Asia, and North America, but the genus reaches its highest species diversity levels in southern China and southeastern Asia (11 species; Bolton, 2017; Williams & LaPolla, 2016). This genus is distinguished from the other genera in this subfamily by the following combination of characteristics; 1) mandibles triangular, with 5–7 teeth on the masticatory margin, 2) antennae 12-segmented, 3) compound eyes situated behind the mid-length of the sides of the head, 4) alitrunk with a strong mesonotal constriction, 5) mesonotal and metanotal sutures absent or incomplete, 6) mesothoracic spiracles situated on the dorsal face of the sclerite, 7) propodeal spiracles subcircular, 8) petiolar node forward-incline and wedge-shaped. *Prenolepis* species nests under stones, in soil and found on trees, fallen trunks and on ground (Bharti & Wachkoo, 2012). Some species are mostly collected by beating on vegetation, indicating that those are arboreal foragers (Widodo *et al.*, 2004; Bharti & Wachkoo, 2012). North American *Prenolepis*, *P. imparis*, is known as winter-active ant (Talbot, 1943a, b; Tschinkel, 1987).

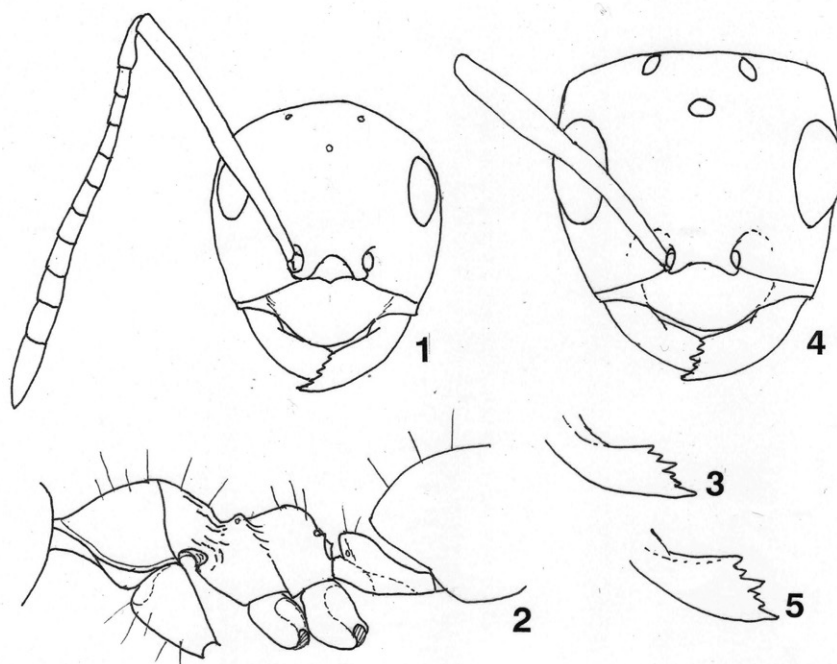
Seven genera are recognized in the *Prenolepis* genus-group: *Prenolepis*, *Euprenolepis*, *Nylanderia*,

Paraparatrechina, *Paratrechina*, *Pseudolasius*, and *Zatania* (LaPolla *et al.*, 2012; LaPolla & Fisher, 2014). LaPolla *et al.* (2010) carried out a significant work on phylogeny and taxonomy of the *Prenolepis* genus-group using DNA sequence data. It is suggested that the genus *Prenolepis* has sister relationship with the other 5 genera, and the Caribbean *Prenolepis* representing a separate lineage within the genus *Prenolepis* (= *Zatania* in current condition). The phylogenetic analysis using morphological data indicated that *Prenolepis* is monophyly, and *Prenolepis* and *Zatania* form a clade that is sister to *Paraparatrechina* (Williams & LaPolla, 2016). The diagnosis of the genus *Prenolepis* is shown in Williams & LaPolla (2014).

Recently, one of the authors (K. K.) collected ants of the genus *Prenolepis* from Cape Ashizuri of Kochi Prefecture in Japan. After careful examination, we have concluded that this is new to science, and will describe herein.

Measurements, indices, and their abbreviations used in this paper for description follow those in Williams & LaPolla (2016).

Prenolepis tosa sp. nov.
(Figs. 1–10)



Figs. 1–5. *Prenolepis tosa* sp. nov.; 1–3, worker; 4, 5, female. 1, 4, Head, full-face view; 2, alitrunk and petiole, lateral view; 3, 5, light mandible.

Diagnosis. This species especially in worker resembles *P. fisheri* Bharti & Wachkoo, 2012 from India in the presence of three small ocelli, subtriangular petiolar node, and the dark brown to black body. However *P. tosa* is separated from the latter by the smooth head (lightly reticulated in *P. fisheri*) and the convex ventral margin of petiole (almost straight in *P. fisheri*).

Description. Holotype. Worker (Figs. 1–3, 6–8). Structure: Head subtriangular, almost as long as wide, widest at posterior 2/5, with almost straight posterior margin and convex sides in full-face view; posterodorsal corner rounded, not forming an angle. Mandible subtriangular, masticatory margin with 6 teeth of which anterior-most one is longest and anterior 4th longer than other 4 teeth. Clypeus with weakly convex anterior margin and median longitudinal carina. Antenna long and slender: scape exceeding posterior margin of head by ca. 1/2 its length; 2nd segment 2.5 times as long as wide, 3rd slightly longer than wide, 4th to 11th segments each longer than wide, the ratio of 2nd to 5th segments about 2 : 3 : 3 : 3 in length from the base; terminal segment 3.0 times as long as wide, with acute apex. Eye convex, 0.19 mm in maximum diameter, and situated posterior 2/5 of head. Three small ocelli present, forming obtuse triangle.

Dorsal outline of pro- and mesonotum broad reversed V-shaped; in dorsal view pronotal disc 0.35 mm in maximum width, with convex anterior margin and sides; anterolateral corner not forming an angle. Dorsal outline of propodeum straight; posterolateral corner rounded, not forming an angle.

Petiole longer, 1.8 times as long as high, with round anterodorsal margin, straight posterodorsal margin, and weakly convex ventral margin. Gaster oval; 1st gastral tergite 0.63 mm in maximum width in dorsal view.

Sculpture: Frons and vertex of head smooth and shining; maler space and genal area smooth and shining. Mandible smooth and shining. Antenna weakly microreticulate. Alitrunk smooth and shining excepting (anterior and posterior portions weakly striate; propodeum with many transverse striae). Petiole smooth and shining. Gaster smooth and shining. Legs smooth.

Pilosity: Dorsum of head scattered with short erect pubescences; frons with a pair of long erect setae which are ca. 0.25 mm in length. Dorsa of pronotum and mesonotum with 2 pairs of long erect setae respectively; propodeal dorsum with 8 erect setae. Petiolar node with short decumbent pubescences and without distinct setae. Dorsum of terga scattered with long erect or suberect setae. Antenna and legs moderately abundant suberect setae.

Color: Head, alitrunk and petiole blackish brown; gaster black; legs blackish brown excepting tarsi brown; mandible and antenna brown.

Measurements (mm) and indices: CMC 20; EL 0.17; EW 0.14; HL 0.62; HLA 0.29; HLP 0.20; HW 0.57; IOD 0.38; LF1 0.14; LF2 0.06; LHT 0.68; MMC 4; MTW 0.31; MW 0.18; PDH 0.24; PMC 4; PrCL 0.26; PrCW 0.18; PrFL 0.55; PrFW 0.14; PTH 0.16; PTL 0.30; PTW 0.14; PW 0.36; SL 0.66; TL 2.2; WF1 0.13; WF2 0.04; WL 0.90; BLI 158; CI 93; EPI 135; FLI 233; HTI 119; PetHI 67; PetWI 46; PrCI 69; PrFI 25; REL 28; REL2 30; REL3 45; SI 116.

Female (Figs. 4, 5, 9, 10). Structure: Head wide, 0.89 times as long as wide, widest at posterior end, with straight posterior margin in full face view; sides tapering to the anterior end; posterodorsal corner forming an angle. Mandible subtriangular, dorsal margin with 6 teeth of which anterior-most one is longest and anterior 4th longer than other 4 teeth. Compound eye convex, 0.35 mm in maximum diameter. Ocelli forming obtuse triangle; distance between posterior ocelli: distance between the anterior ocellus and a posterior ocellus = 7 : 4; distance from a posterior ocellus to nearest eye margin 0.6 times distance across and including posterior ocelli; anterior ocellus relatively large, 0.10 mm in diameter.

Alitrunk in profile, with ratio to length to height 53 : 29; dorsal outline moderately convex, from anterior portion of pronotum to axilla; propodeal dorsum straight; posterodorsal corner forming dull angle. In dorsal view, pronotum 0.93 mm in maximum width, with convex anterior margin; propodeum rectangular, 0.81 mm in maximum length, and 0.40 times as long as wide. Forewing 4.2 mm long.

Petiole small, longer than high, 1.5 times as long as high; dorsal margin straight in posterior view. Gaster oval; 1st gastral tergite 1.33 mm in maximum width in dorsal view.

Sculpture: Frons and vertex of head smooth and shining; maler space and genal area smooth and shining. Mandible smooth and shining. Antenna weakly microreticulate. Alitrunk smooth and shining excepting (anterior and posterior portions weakly striate; propodeum with many transverse striae). Petiole smooth and shining. Gaster microreticulate. Legs smooth.

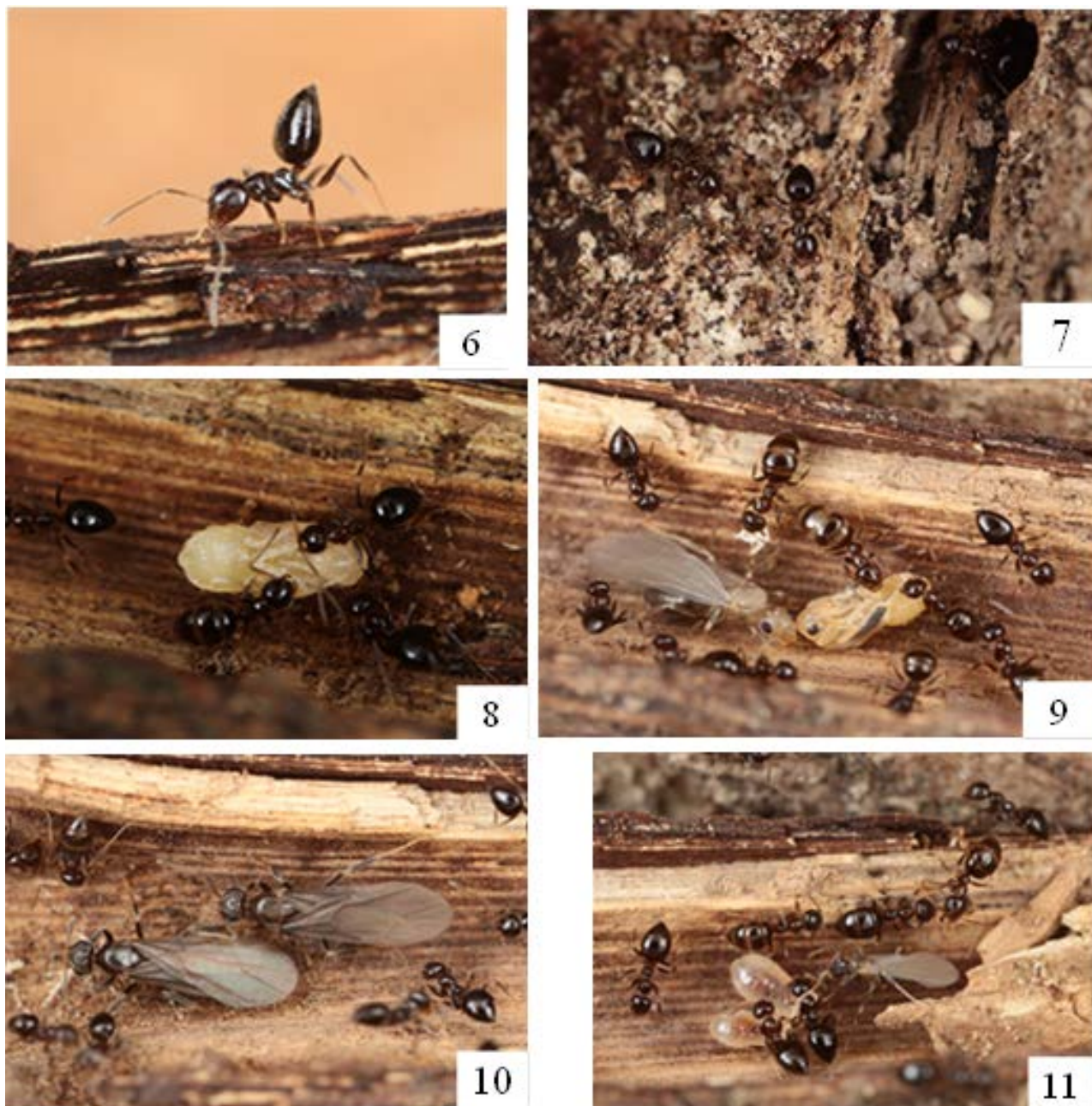
Pilosity: Head and alitrunk covered with pubescences; dorsum of alitrunk scattered with short erect setae. Petiolar node with short decumbent pubescences and without distinct setae. Gaster with moderately abundant pubescences. Antenna and legs with short pubescences.

Color: Head, alitrunk and petiole blackish brown; gaster black; legs blackish brown excepting tarsi brown; mandible and antenna brown. Wings hyaline.

Measurements (mm) and indices: CMC 25; EL 0.35; EW 0.26; HL 0.80; HLA 0.28; HLP 0.20; HW 0.88; IOD 0.50; LF1 0.14; LF2 0.06; LHT 0.8; 8 MMC 30; MTW 0.88; MW 0.95; PDH 0.50; PMC 21; PrCL 0.38; PrCW 0.29; PrFL 0.88; PrFW 0.21; PTH 0.30; PTL 0.33; PTW 0.30; PW 0.75; SL 0.7; 8 TL 3.9; WF1 0.06; WF2 0.06; WL 1.33; BLI 154; CI 84; EPI 131; FLI 100; HTI 100; PetHI 60; PetWI 92; PrCI 132; PrFI 24; REL 44; REL2 40; REL3 70; SI 89.

Measurements (mm) and indices: Paratype workers (n=3); CMC 20–25; EL 0.17–0.18; EW 0.12–0.13; HL 0.61–0.62; HLA 0.27–0.29; HLP 0.18–0.19; HW 0.56–0.58; IOD 0.38–0.39; LF1 0.12–0.13; LF2 0.05; LHT 0.68–0.70 MMC 4 MTW 0.27–0.29; MW 0.18–0.20; PDH 0.23–0.24; PMC 4; PrCL 0.24–0.25; PrCW 0.21–0.22; PrFL 0.52–0.55; PrFW 0.15–0.18; PTH 0.16; PTL 0.27–0.28; PTW 0.12–0.14; PW 0.35–0.37; SL 0.64–0.65 TL 2.2–2.3 WF1 0.12–0.13; WF2 0.05; WL 0.75–0.83; BLI 133–143; CI 91–94; EPI 157–160; FLI 237–250; HTI 120–121; PetHI 63–65; PetWI 43–45; PrCI 80–89; PrFI 24–32; REL 28–29; REL2 30–32; REL3 46; SI 111–116.

Holotype. Worker, Tosashimizu-Shi (Cape Ashizuri),



Figs. 6–11. *Prenolepis tosa* sp. nov. 6, worker walking on the tree trunk; 7, workers near the nest entrance; 8, workers in the observation nest in a room; 9, carrow alate female and a female pupa; 10, alate females; 11, male, workers and larvae.

Kochi Prefecture, Japan, 24. v. 2014, K. Kinomura leg.

Paratypes. 5 workers, the same data as holotype; 1 female, same locality, 7. vii. 2014 (reared from a pupa).

Non-type material examined. 3 workers, the same locality as holotype, 18.vii. 2014 (reared specimens); 1 male, same data (reared from a pupa; the specimen body collapsed).

Type depository. Institute for Agro-Environmental Sciences, National Agriculture and Food Research Organization (NARO), Tsukuba, Japan.

Etymology. The name, Tosa, is derived from the old name of Kochi Prefecture, where the type specimen was collected in this time.

Remarks. The nest was found on the trunk of a broad-leaved tree, *Camellia japonica*. Two nest entrances were

found at high of approximately 80 cm and 120 cm from the surface of ground, respectively. Worker activities were found on the surface of trees, and no individuals were found on the ground. It is suggested that this species is arboreal.

20 workers and 15 larvae were brought in live condition, and were reared in a polystyrene observation nest in a room. Two females and two males were emerged from the larvae through pupae (Figs. 8, 9). Males were emerged in 22. June and 2. July 2014, and females in 16. July and 19. July.

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