

***Meranoplus bicolor* (Guérin-Méneville, 1844) and related species in Thailand (Hymenoptera: Formicidae)**

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Abstract

Meranoplus Smith, 1853 is distributed in the Old World tropics, from Africa, Asia, New Guinea to Australia. Two similar species, *Meranoplus bicolor* (Guérin-Méneville, 1844) and *M. laeviventris* Emery, 1889 are reported in the present paper. Worker diagnosis of the two species and a queen description of *M. bicolor* are provided. Distributions of these species are discussed and a distribution map of *M. bicolor* and *M. laeviventris* is presented.

Keywords

Asia, distribution, habitat, taxonomy

Introduction

The ant genus *Meranoplus* Smith, 1853 is distributed in the Old World tropics from Africa, Asia to Australia (Antmaps, 2024). Members of the genus nest in the soil, in rotten wood, or under stones (Bolton, 1981; Jaitrong *et al.*, 2020) and are known to be active both day and night (Gross *et al.*, 1991). Currently, 88 valid species of the genus are listed (Bolton, 2024). Among them, over 55 species were recorded from Australia and New Guinea, 20 species from Asia (Antweb, 2024; Bolton, 2024), and only four species: *Meranoplus bicolor* (Guérin-Méneville, 1844); *Meranoplus castaneus* Smith, 1857; *Meranoplus laeviventris* Emery, 1889; and *Meranoplus mucronatus* Smith, 1857 have been known from Thailand (Jaitrong and Nabhitabhata, 2005; Jaitrong *et al.*, 2020; Khachonpisitsak *et al.*, 2020). *Meranoplus bicolor* is a common species that can be found throughout Thailand. It has many ecological roles, as omnivores, scavengers, granivores, and it interacts with hemipterans by tending for honeydew (Brown, 2000; Andersen, 2006). This species is similar to *M. laeviventris* in having a medium size and general appearance. We have examined the specimens of *M. bicolor* and *M. laeviventris* from Thailand and concluded that *M. bicolor* is distributed in

disturbed areas throughout Thailand, while *M. laeviventris* is restricted to highland in the north and west. In the present paper, we provide a diagnosis of the two species and a queen description of *M. bicolor*. The distributions of these species are discussed and mapped.

Materials and Methods

This study was mainly based on the specimens deposited in the Natural History Museum of the National Science Museum, Thailand. Almost 400 specimens of *M. bicolor* and *M. laeviventris* were examined. Additional new specimens of *M. bicolor* were collected from the Songkhram River Basin (Nong Kha, Sakon Nakhon, Udon Thani, Bueng Kan, and Nakhon Phanom Provinces). The specimens were compared with the images of type specimens of *M. bicolor* and *M. laeviventris* available on AntWeb (2024).

Most morphological observations were made with a ZEISS Discovery V12 stereoscope. Multi-focused montage images were produced using NIS-Elements-D from a series of source images taken by a Nikon Digital Sight-R1 camera attached to a Nikon AZ100M stereoscope. Specimens for each species were measured for the following parts using a micrometer on a ZEISS Discovery V12 stereoscope. All measurements are given in millimeters and recorded to the second decimal place.

The abbreviations for the measurements and indices used are as follows: (edited from Bolton, 1981; Hölldobler and Wilson, 1990; Schödl, 1998):

- HL** Head length, straight-line length of head in full-face view, measured from the mid-point of the anterior clypeal margin to the midpoint of the posterior margin. In species where one or both of these margins are concave, the measurement is taken from the mid-point of a transverse line that spans the apices of the projecting portions.
- HW** Head width, maximum width of head in full-face view, excluding the eyes.
- ML** Mesosomal length, the diagonal length of the mesosoma in profile from the point at which the pronotum meets the cervical shield to the posterior basal angle of the metapleuron.
- PML** Length of mesosomal shield, measured from anterior mid-point of pronotum behind collar that is the mid-point of a virtual line, where the anterior pronotal margins meet, to mid-point of behind margin of mesonotum above propodeum.
- PW** Pronotal width, measured right behind base of anterolateral pronotal projection (angle) in dorsal view.
- SL** Scape length, straight-line length of the antennal scape, excluding the basal constriction or neck.
- TL** Total length, total outstretched length of the individual, from the mandibular apex to the gastral apex.
- CI** Cephalic index, $HW/HL \times 100$.
- PMI** Pronotum index, $PW/PML \times 100$.
- SI** Scape index, $SL/HW \times 100$.

Abbreviations of the ant collections are as follows:

- AMK** Ant Museum, Faculty of Forestry, Kasetsart University, Thailand
- MCZC** Museum of Comparative Zoology, Cambridge, U.S.A.
- MHNG** Muséum d'Histoire Naturelle, Geneva, Switzerland
- MNHN** Muséum National d'Histoire Naturelle, Paris, France

MSNG Museo Civico di Storia Naturale, Genoa, Italy

NHMW Naturhistorisches Museum Wien, Vienna, Austria

THNHM Natural History Museum of the National Science Museum, Thailand

For general terminology in the worker caste of ants, see Schödl (1998); Bolton (1994); Antwiki (2024).

This research was approved by the Institutional Animal Care and Use Committee, Mahidol University, certificate number FTM–ACUC 001/2024E.

Taxonomy

Meranoplus Smith, 1853

Meranoplus Smith, 1853: 224. Type-species: *Cryptocerus bicolor*, by subsequent designation of Bingham, 1903: 166.

Tricytarus Donisthorpe, 1947: 187. Type-species: *Tricytarus parviumgulatus*, by original designation. Junior synonym of *Meranoplus* by Boudinot, 2014: 96.

Diagnosis of worker. Bolton (1981) and Sharaf *et al.* (2014) defined characteristics of this genus as follows: 1) worker is distinctly monomorphic; 2) antennae 9-segmented, with threeapical segments forming a club; 3) frontal scrobes distinct, deep, and long; 4) palp formula 5,3; 5) masticatory margin of mandibles with 4–5 teeth; 6) eyes present, usually strongly convex, located below antennal scrobes; 7) pronotal spines present, dentiform; 8) mesonotal spines present; 9) mesosomal dorsum fused to form a shield; 10) propodeal spines present; 11) petiolar spines present or absent; 12) with dense long erect hairs on body surface.

Meranoplus bicolor (Guérin-Méneville, 1844)

Figs. 1A, 1C, 2A, 2C, 3A–C.

Cryptocerus bicolor Guérin-Méneville, 1844: 425 (worker). Type locality: India (Puducherry), deposited in MNHN. Combination in *Meranoplus*: Smith, 1853: 224.

Meranoplus dimicans Walker, 1859: 375 (worker). Type locality: Sri Lanka, deposited in BMNH (AntWeb image examined, CASENT0902027). Junior synonym of *M. bicolor*: Smith, 1871: 334.

Meranoplus bicolor var. *fuscescens* Wheeler, 1930: 101 (workers). Type locality: Taiwan, deposited in MCZC. Junior synonym of *M. bicolor*: Schödl, 1998: 372.

Meranoplus bicolor var. *lucida* Forel, 1903: 706 (workers). Type locality: Myanmar, India, deposited in MHNG (AntWeb image examined, CASENT0908934). Junior synonym of *M. bicolor*: Schödl, 1998: 372.

Myrmica tarda Jerdon, 1851: 115 (workers). Type locality: India (Karnataka/Kerala) (no type material is known to exist). Junior synonym of *M. bicolor*: Emery, 1892: 166.

Meranoplus villosus Motschoulsky, 1860: 115 (queen). Type locality: Sri Lanka, deposited in ZMUM. Junior synonym of *M. bicolor*: Roger, 1863: 39.

Meranoplus bicolor: Terayama, 2009: 186; Pfeiffer *et al.*, 2011: 47; Guénard and Dunn, 2012: 44; Bharti and Akbar, 2014: 814 (in key); Bharti *et al.*, 2016: 38; Jaitrong *et al.*, 2016: 36; Rasheed *et al.*, 2019: 432; Dias *et al.*, 2020: 75; Khachonpisitsak *et al.*, 2020: 99.

Non-type material examined. LAOS. Central: 4 workers (THNHM-I-00027253, THNHM), Vientiane Province, Naxaythong District, Sivilay Village, Plantation, 9.VI.2010, W. Jaitrong leg.; 2 workers (THNHM-I-00027254, THNHM), same locality and date, Sk. Yamane leg., LA10-SKY-038. **THAILAND. Northern:** 1 worker (THNHM-I-00027255,

THNHM), Lampang Province, Ngao District, secondary forest, 31.V.2004, W. Jaitrong leg., general collection.; 6 workers (THNHM-I-00028945, THNHM), Payao Province, Chiang Kan District, Nammin forest park, 19.447778°N, 100.440278°E, 29.VII.2017, W. Jaitrong leg. **Western:** 5 workers (THNHM-I-00027256, THNHM), Kanchanaburi Province, Thong Pha Phum District, Huai Kayeng Subdistrict, Phu Iyara Resort, 14.626389°N, 98.571111°E, 7.IV.2022, W. Jaitrong leg., TH22-WJT-101 ; 8 workers (THNHM-I-00027257, THNHM), Ratchaburi Province, Pak Tho District, Ban Wang Muang, 13.341389°N, 99.842222°E, 24.V.2022, W. Jaitrong leg., TH22-WJT-243; 1 queen (THNHM-I-00027258, THNHM) and 6 workers (THNHM-I-00027259, THNHM), Ratchaburi Province, Mueang District, Ban Huar Sapan, 13.122500°N, 99.886944°E, 24.V.2022, W. Jaitrong leg., TH22-WJT-242; 8 workers (THNHM-I-00027260, THNHM), Prachuap Khirikhan Province, Kuiburi District, Had Kham Subdistrict, 12.102778°N, 99.852778°E, 24.V.2022, W. Jaitrong leg., TH22-WJT-241; 4 workers (THNHM-I-00027261, THNHM), Prachuap Khirikhan Province, Bang Sapan Noi District, Roadside, 11.225556°N, 99.424722°E, 18.V.2022, W. Jaitrong leg., TH22-WJT-150; 6 workers (THNHM-I-00027262, THNHM), Prachuap Khiri Khan Province, Tab Sakae District, Ban Huai Yang, Forestry Camp, 3.III.1019, W. Jaitrong leg., WJT030319-07. **Northeastern:** 10 workers (THNHM-I-00027263, THNHM), Kalasin Province, Agricultural Area near Phu Sithan W.S., 6.IX.2007, P. Kosonpanyapiwat leg., honey baiting traps; 1 worker (THNHM-I-00027264, THNHM), Nakhon Ratchasima Province, Wang Nam Khiao District, Sakaerat Environmental Research Station, dry evergreen forest, 18.V.1998, D. Wiwatwitaya leg., general collection; 7 workers (THNHM-I-00027265, THNHM), Nakhon Ratchasima Province, Pak Chong District, Nong Sarai Subdistrict, Lamtakong Point View, 14.836111°N, 101.551111°E, 15.V.2022, W. Jaitrong leg., WJT150522-01; 5 workers (THNHM-I-00027266, THNHM), Nakhon Ratchasima Province, Pak Chong District, Klang Dong, Suwan Farm, 14.652222°N, 101.311111°E, 14.V.2022, W. Jaitrong leg., WJT10522-04; 9 workers (THNHM-I-00028946, THNHM), Nakhon Ratchasima Province, Mueang Nakhon Ratchasima District, Ban Pho Subdistrict, open lawn at gas station, 15.06541°N, 102.18692°E, 30.VII.2023, K. Yodprasit leg.; 2 workers (THNHM-I-00027267, THNHM), Chaiyaphum Province, Bamnet Narong District, Ban Nong Waeng, 15.42638889°N, 101.68111111°E, 14.V.2022, W. Jaitrong leg., WJT140522-01; 10 workers (THNHM-I-00028947, THNHM), Khon Kaen Province, Non Sila District, Non Sila Subdistrict, open lawn, 15.97707°N, 102.69435°E, 30.VII.2023, K. Yodprasit leg.; 5 workers (THNHM-I-00028964, THNHM), Khon Kaen Province, Ban Phai District, Hau Nong Subdistrict, 16.02244°N, 102.70878°E, 6.VIII.2023, K. Yodprasit leg.; 4 workers (THNHM-I-00028948, THNHM), Sakon Nakhon Province, Mueang Sakon Nakhon District, Chiang Khrua Subdistrict, open land at Ban Nong Hoi school, 17.28820°N, 104.08368°E, 30.VII.2023, K. Yodprasit leg.; 4 workers (THNHM-I-00028958, THNHM), Sakon Nakhon Province, Akat Amnuai District, Tha Kon Subdistrict, 17.77686°N, 103.96245°E, 3.VIII.2023, K. Yodprasit leg.; 2 workers (THNHM-I-00028959, THNHM), Sakon Nakhon Province, Ban Muang District, Ban Muang Subdistrict, 17.85412°N, 103.57506°E, 3.VIII.2023, K. Yodprasit leg.; 8 workers (THNHM-I-00028960, THNHM), Sakon Nakhon Province, Ban Muang District, Dong Mo Thong Tai Subdistrict, 17.97621°N, 103.43012°E, 4.VIII.2023, K. Yodprasit leg.; 12 workers (THNHM-I-00028949, THNHM), Nakhon Phanom Province, Tha Uthen District, Chai Buri Subdistrict, open lawn, 17.65311°N, 104.46405°E, 31.VII.2023, K. Yodprasit leg.; 8 workers

(THNHM-I-00028950, THNHM), Nakhon Phanom Province, Tha Uthen District, Chai Buri Subdistrict, open lawn, 17.65335°N, 104.46404°E, 31.VII.2023, K. Yodprasit leg.; 13 workers (THNHM-I-00028951, THNHM), Nakhon Phanom Province, Tha Uthen District, Chai Buri Subdistrict, open lawn, 17.65357°N, 104.46461°E, 31.VII.2023, K. Yodprasit leg.; 2 workers (THNHM-I-00028952, THNHM), Nakhon Phanom Province, Si Songkhram District, Na Kham Subdistrict, ridge of rice field, 17.61576°N, 104.38441°E, 31.VII.2023, K. Yodprasit leg.; 3 workers (THNHM-I-00028953, THNHM), Nakhon Phanom Province, Si Songkhram District, Si Songkhram Subdistrict, 17.62243°N, 104.24881°E, 1.VIII.2023, K. Yodprasit leg.; 3 workers (THNHM-I-00028954, THNHM), Nakhon Phanom Province, Si Songkhram District, Si Songkhram Subdistrict, 17.64624°N, 104.22595°E, 1.VIII.2023, K. Yodprasit leg.; 6 workers (THNHM-I-00028955, THNHM), Nakhon Phanom Province, Nathom District, Nathom Subdistrict, 17.81006°N, 104.01781°E, 1.VIII.2023, K. Yodprasit leg.; 7 workers (THNHM-I-00028956, THNHM), Nakhon Phanom Province, Nathom District, Nathom Subdistrict, 17.81005°N, 104.01785°E, 1.VIII.2023, K. Yodprasit leg.; 13 workers (THNHM-I-00028957, THNHM), Bueng Kan Province, Seka District, Tha Sa-At Subdistrict, 17.95066°N, 103.76609°E, 2.VIII.2023, K. Yodprasit leg.; 5 workers (THNHM-I-00028961, THNHM), Udon Thani Province, Chai Wan District, Nong Waeng Kaem Hom Subdistrict, 17.30982°N, 103.24333°E, 5.VIII.2023, K. Yodprasit leg.; 1 queen, 2 workers (THNHM-I-00028962, THNHM), Udon Thani Province, Chai Wan District, Nong Waeng Kaem Hom Subdistrict, ridge of rice field, 17.30968°N, 103.24336°E, 5.VIII.2023, K. Yodprasit leg.; 8 workers (THNHM-I-00028963, THNHM), Udon Thani Province, Chai Wan District, Nong Waeng Kaem Hom Subdistrict, ridge of rice field, 17.30982°N, 103.24333°E, 5.VIII.2023, K. Yodprasit leg. **Central:** 12 workers (THNHM-I-00027268, THNHM), Pranakon Si Ayutthaya Province, Wang Noi District, Payom Subdistrict, 14.186389°N, 100.656667°E, 1.IV.2022, W. Jaitrong leg., WJT010422-01; 7 workers (THNHM-I-00027269, THNHM), Pranakon Si Ayutthaya Province, Mueang Pranakon Si Ayutthaya District, nr. Chai Mongkol Temple, 14.337778°N, 100.594722°E, 13.III.2022, W. Jaitrong leg., TH22-WJT-112; 5 workers (THNHM-I-00027270, THNHM), Pathum Thani Province, Khlong Luang District, Khlong Ha, National Science Museum, 13.VII.2008, N. Kuamsub leg., agricultural area (AG), general collection; 17 workers (THNHM-I-00027271, THNHM), same locality and collector, 5.VII.2008; 13 workers (THNHM-I-00027272, THNHM), same locality and collector, 3.VII.2008; 22 workers (THNHM-I-00027273, THNHM), same locality and collector, 24.VII.2008, GA-General Collection; 16 workers (THNHM-I-00027274, THNHM), same locality, 16.VIII.2007, P. Jeenthong leg., GA (= Agricultural area); 9 workers (THNHM-I-00027275, THNHM), Pathum Thani Province, Khlong Luang District, Khlong Sam, Pruksa 13 Village, 24.IV.2022, W. Jaitrong leg., TH22-WJT-133; 8 workers (THNHM-I-00027276, THNHM), Nakhon Pathom Province, Kampangsean District, Kasetsart University, Kampangsean Campus, 14.014167°N, 99.973333°E, 4.IV.2022, W. Jaitrong leg., TH22-WJT-100; 11 workers (THNHM-I-00027277, THNHM), Samut Prakan Province, Prapradang District, Ban Trongkanong, 8.I.2016., W. Jaitrong leg., WJT080116-7; 6 workers (THNHM-I-00027278, THNHM), Samut Prakan Province, Mueang Samut Prakan District, Khlong Klung Subdistrict, 13.361389°N, 99.946111°E, 24.V.2022, W. Jaitrong leg., TH22-WJT-245; 1 worker (THNHM-I-00027279, THNHM), Samut Prakan Province, Bang Sao Thong District, Bang Sao Thong Subdistrict, 13.701944°N, 100.823611°E, 24.V.2022, W. Jaitrong leg., general

collection; 3 workers (THNHM-I-27280, THNHM), Samut Prakan Province, Phra Pradaeng District, Bang Kra Sob Subdistrict, 9.I.2016, W. Jaitrong leg. **Eastern:** 1 worker (THNHM-I-00027281, THNHM), Chonburi Province, Sattahip District, Samaesan Subdistrict, dry evergreen forest, 16.V.2015, W. Jaitrong leg.; 1 worker (THNHM-I-00027282, THNHM), Chonburi Province, Sriracha District, near building, 20.IV.2003, A. Suwanasri leg., general collection; 12 workers (THNHM-I-00028944, THNHM), Chonburi Province, Bangsan District, Burapa University, 17.XII.2022, S. Boonchuelue leg.; 2 workers (THNHM-I-00027283, THNHM), Rayong Province, Klaeng District, Ko Man Nok, secondary forest, 19.IX.2007, P. Kosonpanyapiwat leg., general collection; 2 workers (THNHM-I-00027284, THNHM), same locality and collector, 21.IX.2007; 5 workers (THNHM-I-00027285, THNHM), Rayong Province, Klaeng District, Ko Man Nai, 17.VI.2008, W. Jaitrong leg., general collection; 3 workers (THNHM-I-00027286, THNHM), Rayong Province, Lam Sing District, Ban Lam, mangrove forest, 13.V.2008, W. Jaitrong leg., general collection; 1 worker (THNHM-I-00027287, THNHM), Rayong Province, Klaeng District, Ko Man Nok, 18.VI.2008, W. Jaitrong leg., general collection; 4 queens (THNHM-I-00027290, THNHM), Rayong Province, Sri Raman, dry evergreen forest, 6.IV.2004, W. Jaitrong leg., general collection; 5 workers (THNHM-I-00027288, THNHM), Chachoengsao Province, Tha Takiab District, 27.II.2003, W. Jaitrong leg., WJT270403-01; 1 worker (THNHM-I-00027289, THNHM), same locality and collector, 29.IV.2003. **Southern:** 5 workers (THNHM-I-00027291, THNHM), Chumphon Province, Sawi District, Na Pho Subdistrict, Highway 41 Road, 10.197778°N, 99.107222°E, 24.V.2022, W. Jaitrong leg. TH22-WJT-240; 5 workers (THNHM-I-00027292, THNHM, THNHM), Surat Thani Province, Phunphin District, Maluan Subdistrict, Highway 41 Road, 9.166111°N, 99.096111°E, 24.V.2022, W. Jaitrong leg., TH22-WJT-238; 8 workers (THNHM-I-00027293, THNHM), Satun Province, La-ngu District, Ban Khao Noi Subdistrict, Khao Stratigraphic Type Area, 6.976389°N, 99.772222°E, 22.V.2022, W. Jaitrong leg., TH22-WJT201; 8 workers (THNHM-I-00027294, THNHM), same locality, date and collector, TH22-WJT-200; 3 workers (THNHM-I-00027295, THNHM), Satun Province, La-ngu District, Kamphaeng Subdistrict, La-ngu Phupha Resort, 6.897500°N, 99.791111°E, 20.V.2022, W. Jaitrong leg., TH22-WJT-183; 6 workers (THNHM-I-00027296, THNHM), Satun Province, La-ngu District, Kamphaeng Subdistrict, near Khao Dang (Geopark), 6.890556°N, 99.790278°E, 21.V.2022, W. Jaitrong leg., TH22-WJT-194; 1 queen (THNHM-I-00027297, THNHM) and 9 workers (THNHM-I-00027298, THNHM), Satun Province, Manang District, Khao Banthad W.S., Phu Pha Phet Station, 17.II.2022, W. Jaitrong leg., TH22-WJT-031; 9 workers (THNHM-I-00027299, THNHM), Krabi Province, Lanta District, Lanta Yai Subdistrict, Lanta Islands, 2.V.2013, W. Jaitrong leg., WJT020513-3; 2 workers (THNHM-I-00027300, THNHM), Trang Province, Palian District, Lam Yong Star resort, beach forest, 18.IV.1999, W. Jaitrong leg., general collection; 10 workers (THNHM-I-00027301, THNHM), Trang Province, Palian District, Li Phang Subdistrict, near Khao Ting Cave, 7.159722°N, 99.800278°E, 19.V.2022, W. Jaitrong leg., TH22-WJT-154; 7 workers (THNHM-I-00027302, THNHM), Songkhla Province, Hat Yai District, Prince of Songkhla University, 8.V.2022, P. Onrthammarat leg., PO080522-01.

Measurements and indices. Workers (n = 10): Measurements and indices. Worker: HL 0.72–0.94, HW 0.70–0.93, ML 0.78–1.10, PML 0.46–0.61, PW 0.69–0.94, SL 0.53–0.73, TL 3.20–4.63, CI 94–99, PMI 139–153, SI 62–90. Queens (n = 5): HL 1.20–1.25, HW 1.15–1.23,

ML 2.10–2.25, PML 1.95–2.00, PW 1.53–1.65, SL 0.80–0.85, TL 7.75–8.08, CI 92–103, PMI 78–85, SI 66–74.

Diagnosis of worker (Figures 1A, 1C, 2A, 2C). Masticatory margin of mandible with four teeth; eyes distinctly convex; in dorsal view anterolateral corners of mesosomal shield acutely angulated; propodeal spines long and sharp, clearly longer than width at base; in profile propodeal declivity spines slender and acute, distinctly shorter than propodeal spines; in profile petiole subtriangular; postpetiole round without posterodorsal tooth; in full-face view anterior half of head longitudinally carinate to rugulose, while posterior half reticulate with shagreened interspaces; mesosomal shield and postpetiole entirely reticulate-rugulose; petiole smooth and shiny; first gastral tergite densely punctate; dorsa head, mesosoma and first gastral tergite with dense short suberect hairs mixed with dense long erect hairs (0.3–0.6 mm); head and mesosoma and waist reddish brown; gaster dark brown (in some specimens body entirely dark brown).

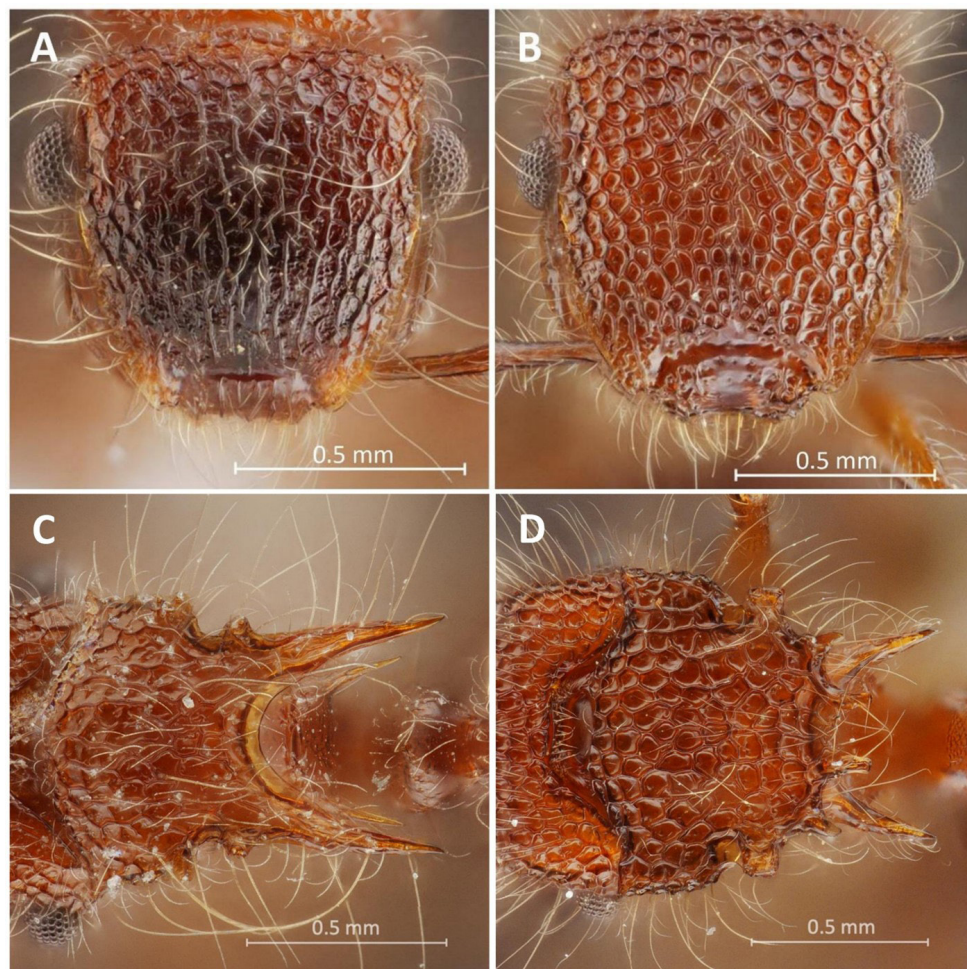


Figure 1. *Meranoplus bicolor* (non-type worker, THNHM-I-00027270) and *Meranoplus laeviventris* (non-type worker, THNHM-I-00027329). A, C, *M. bicolor*; B, D, *M. laeviventris*; A, B, head in full-face view; C, D, mesosomal shield in profile.

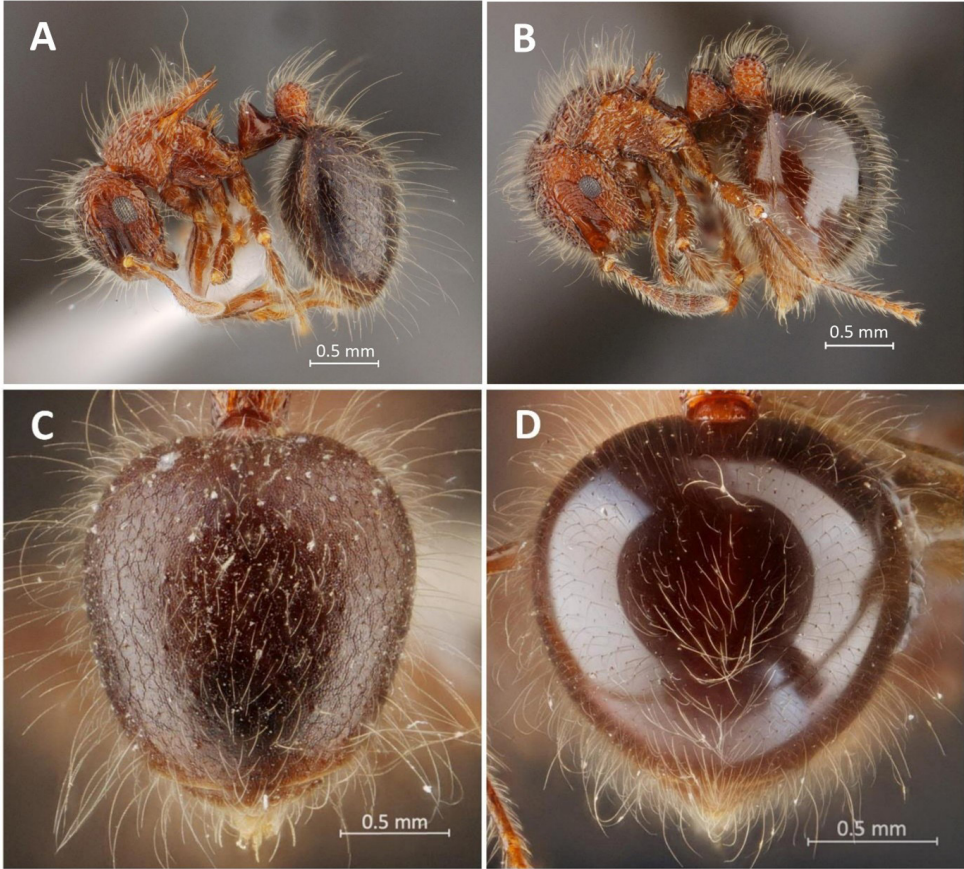


Figure 2. *Meranoplus bicolor* (non-type worker, THNHM-I-00027270) and *Meranoplus laeviventris* (non-type worker, THNHM-I-00027329). A, C, *M. bicolor*; B, D, *M. laeviventris*; A, B, body in profile; C, D, first gastral tergite in dorsal view.

Description of queen (Figures 3A–C). Body size distinctly larger than worker. **Head** in full-face view almost as long as broad with weakly convex sides and posterior margin; ventral part of head (below antennal scrobes) distinctly broader than upper part (above antennal scrobes), genae distinctly protruding and visible from above. Clypeus sub-rectangular, slightly shorter than broad, anterior margin feebly concave, posterior margin roundly convex. Mandible triangular, masticatory margin with four teeth. Antennal scapes same condition as in worker; eyes relatively large and distinctly convex, located posterior to mid-length of head; ocelli present; distance between lateral ocelli slightly longer than distances between median ocellus and lateral ocelli.

Mesosoma stout, about 2 times larger than head; in profile pronotum slightly convex dorsal outline and located lower than mesoscutum; mesopleuron broad, anepisternum clearly demarcated from katepisternum by oblique mesopleural sulcus; propodeal spines short but acute apex, almost as long as width at base; propodeal declivity shallowly concave, without spines; in dorsal view mesoscutum trapezoidal, weakly convex, almost as long as broad, anterior margin clearly convex, demarcated from mesoscutellum and pronotum by deep sutures; parapsidal lines present but indistinct, straight and running anteriorly to midlength



Figure 3. *Meranoplus bicolor* (non-type queen, THNHM-I-00027190, THNHM). A, B0dy in profile view; B) Head in full face view, C) Body in dorsal view.

of mesoscutum; mesoscutellum distinctly convex, shorter than broad; metanotum very short, separated from mesoscutellum and propodeum by deep grooves.

Petiole in profile view sessile, relatively short, subtriangular, almost as long as high, its anterior margin slightly longer than posterior margin, when viewed from behind, highest in middle, crest round; subpetiolar process absent. **Postpetiole** in profile nodiform, shorter than high, convex dorsal outline. **Gaster** larger than mesosoma and larger than in worker.



Figure 4. Habitats of *Meranoplus bicolor*. A, B, Open lands; C, park; D, roadside; E, F, disturbed areas.

Sculpture. Mandibles and clypeus striate but shiny. Antennal scapes shiny. Dorsum of head, mesosomal, postpetiole reticulate; middle and lateral portions of mesoscutum longitudinally carinulate-rugulose; anepisternum rugose-reticulate; katepisternum strigate or costulate; metapleuron and lateral face of propodeum transversely carinulate. Procoxae confused-rugulose but mesocoxae and metacoxae somewhat smooth. Propodeal declivity smooth and shiny, somewhat carinulate at uppermost portion. Lateral face of petiole punctate; anterior and posterior faces smooth and shiny. First gastral tergite puncto-reticulate.

Pilosity and Coloration. Dorsa of head, mesosoma, postpetiole, gaster with dense short suberect hairs mixed with dense longer erect hairs; antennae and mandibles with dense suberect hairs; legs with sparse long hairs; laterally of mesosoma with sparse decumbent-suberect. Dorsum of petiole with sparse short erect hair. Head, mesosoma, legs, petiole and postpetiole yellowish brown to reddish brown; gaster dark brown.

Distribution in Thailand: Lampang, Payao, Kanchanaburi, Ratchaburi, Prachuap Khiri Khan, Kalasin, Nakhon Ratchasima, Chaiyaphum, Khon Kaen, Sakon Nakhon, Nakhon Phanom, Bueng Kan, Udon Thani, Pranakhon Si Ayutthaya, Pathum Thani, Nakhon Pathom, Samut Prakan, Chonburi, Rayong, Chachoengsao, Chumphon, Surat Thani, Satun, Krabi, Trang, Songkhla (Jaitrong and Nabhitabhata, 2005; Khachonpisitsak *et al.*, 2020, Figure 5).

***Meranoplus laeviventris* Emery, 1889**

Figures 1B, 1D, 2B, 2D.

Meranoplus laeviventris Emery, 1889: 506, pl. 10, fig. 16 (workers). Type locality: Myanmar, deposited in MSNG (lectotype, AntWeb image examined, CASENT0904684); NHMW (paralectotype).

Meranoplus laeviventris var. *punctulata* Emery, 1895: 472 (workers). Type locality: Myanmar, deposited in MSNG (lectotype, AntWeb image examined, CASENT0904685); MSNG, NHMW (paralectotypes). Junior synonym of *M. laeviventris*: Schödl, 1998: 380.

Meranoplus laeviventris: Bolton, 1995: 251; Wu and Wang, 1995: 79; Schödl, 1998: 380 (redescription); Mathew and Tiwari, 2000: 333; Jaitrong and Nabhitabhata, 2005: 27; Guénard and Dunn, 2012: 44; Bharti and Akbar, 2014: 814 (in key); Bharti *et al.*, 2016: 38; Jaitrong *et al.*, 2016: 36; Khachonpisitsak *et al.*, 2020: 100.

Non-type material examined. THAILAND. Northern: 4 workers (THNHM-I-00027326, THNHM), Chiang Mai Province, Fang District, Doi Ang Khang, 22.IX.2013, W. Jaitrong leg., WJT220913-8; 6 workers (THNHM-I-00027327, THNHM), Chiang Mai Province, Mueang District, natural forest, 1400–1500 m a.s.l., beating method, 8–12.XI.2004, S. Sonthichai leg.; 7 workers (THNHM-I-00027328, THNHM), Chiang Mai Province, Mueang District, secondary forest, sifting method, VII.2008, S. Sonthichai leg.; 5 workers (THNHM-I-00027329, THNHM), Chiang Mai Province, Samoeng District, hill evergreen forest, 14.VII.2019 leg., WJT140719-028; 1 worker (THNHM-I-00027330, THNHM), Chiang Mai Province, Fang District, 27.V.2008, W. Jaitrong leg.; 3 workers (THNHM-I-00027331, THNHM), Nan Province, Puar District, a village near Doi Phuka N.P., 1300 m a.s.l., secondary forest, 29.V.2004, W. Jaitrong leg., WJT290504-001. **Western:** 10 workers (THNHM-I-00027332, THNHM), Tak Province, Umphang District, Thung Yai Naresuan East W.S., Head quarter, 21.IX.2014, W. Jaitrong leg., WJT210914-27; 1 worker (THNHM-I-00027333, THNHM), Tak Province, Umphang District, Thung Yai Naresuan East W.S., Kangae Sod Ranger Station, 19.II.2015, W. Jaitrong leg., general coll.

Measurements and indices. Workers (n = 5): HL 1.02–1.17, HW 0.94–1.05, ML 1.05–1.20, PML 0.67–0.80, PW 0.98–1.04, SL 0.75–0.85, TL 4.62–5.10, CI 82–93, PMI 129–156, SI 79–83.

Diagnosis of workers. Masticatory margin of mandible with four teeth; eyes distinctly convex; in dorsal view anterolateral corners of mesosomal shield acutely angulated; with fenestra near lateral margin of mesosomal shield; lateral margins with 2 distinct teeth posteriorly; propodeal spines with blunt apex; in profile propodeal declivity spines slender and acute, distinctly longer than propodeal spines; petiole distinctly truncate, in profile and dorsal view quadrangular; postpetiole round, without posterodorsal spine; dorsa of head and

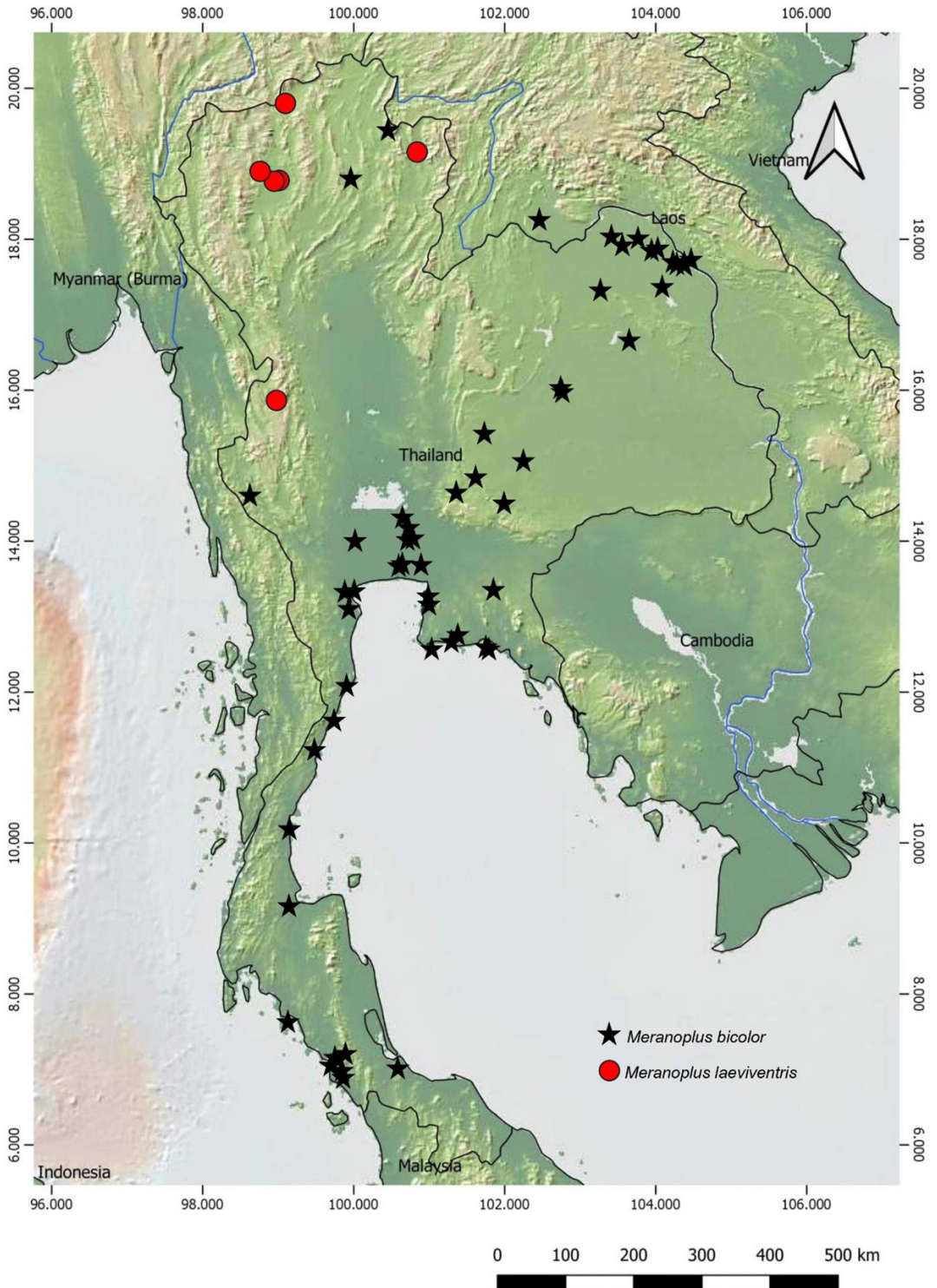


Figure 5. Distribution *Meranoplus bicolor* and *Meranoplus laeiventris* in Thailand and Laos.

mesosomal shield reticulate-rugulose; lateral and posterior faces of petiole rugulose-reticulate but anterior face smooth and shiny; postpetiole entirely reticulate; first gastral tergite smooth and shiny; dorsum of body entirely covered with dense erect hairs with sparse erect long hairs; head, mesosoma, waist and appendages reddish brown while gaster dark brown.

Distribution in Thailand. Chiang Mai, Nan, and Tak (Jaitrong and Nabhitabhata, 2005; Khachonpisitsak *et al.*, 2020, Figure 5).

Discussion

Meranoplus bicolor is most similar to *Meranoplus birmanus* Schödl, 1999 from northern Myanmar in having a medium size, general appearance, and the long propodeal spines. However, *M. bicolor* can be separated from *M. birmanus* by the following characteristics: 1) dorsal faces of head and mesosomal shield rugose to rugulose-reticulate (shiny, with rugae and costulate in *M. birmanus*); 2) petiole almost as long as high (distinctly shorter than high in *M. birmanus*); 3) mesosomal shield narrow, slightly longer than broad (almost as long as broad in *M. birmanus*). *Meranoplus bicolor* is also similar to *M. laeviventris* from Indochina, in having the medium size and general appearance, but it differs from *M. laeviventris* by 1) propodeal declivity spines longer propodeal spines (shorter in *M. laeviventris*, see Figures 2A and B for comparison); 2) petiole in profile subtriangular (sub-rectangular in *M. laeviventris*, see Figures 2A and B for comparison); 3) petiole entirely smooth and shiny (lateral and posterior face rugulose-reticulate in *M. laeviventris*, see Figures 2A and B for comparison); 4) first gastral tergite punctate (superficially reticulate with smooth and shining interspaces in *M. laeviventris*, see Figures 2CA and D for comparison).

Meranoplus bicolor is a common species of the genus in Asia (Jaitrong *et al.*, 2016; Khachonpisitsak *et al.*, 2020). Mohyuddin *et al.* (2020) with this species found in grasslands, field crops of maize and wheat, and apple orchards. Workers nest in the soil forage on the ground (Hasin and Tasen, 2020; Jaitrong *et al.*, 2016; Jaitrong *et al.*, 2020). In Thailand, we found *M. bicolor* in open areas, disturbed forest, agricultural areas, and urban areas or parks in the city areas (Figure 4A–F). This species seems to be distributed in lowland (0–600 m a.s.l.), throughout the country. However, the field survey is limited for northern and central parts (Figure 5). On the other hand, *M. laeviventris* was found in hill evergreen forest, forest edges, and plantations. In Thailand, this species is restricted to highlands (800–1500 m a.s.l.) in the north and the west (Figure 5). *Meranoplus laeviventris* was also found in highland (900–1000 m a.s.l.) in India, China, Myanmar, and Laos (Schödl, 1998; Bharti and Akbar, 2014; Jaitrong *et al.*, 2016; Liu *et al.*, 2015). Both species nested in the soil. We found *M. bicolor* carried seeds of weeds back to its nest (Figure 6).



Figure 6. *Meranoplus bicolor* carried seeds of weeds back to its nest.

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