

Two new species in the ant genus *Aphaenogaster* Mayr (Hymenoptera: Formicidae: Myrmicinae) from China

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Abstract: Two new species in the ant genus *Aphaenogaster* Mayr, 1853 are described from China. *A. bicolor* **sp. nov.** is similar to *A. exasperata* Wheeler, 1921, but differs in sides of pronotum longitudinally rugose, mesopleura and metapleural mostly smooth, dorsum of propodeum smooth, propodeal spines about 1.2 times as long as its basal width, and body bicolored. *A. transversa* **sp. nov.** is close to *A. pumilopuncta* Zhou, 2001, but differs in posterior 1/3 of head dorsum and mesosoma transversely rugose, scapes have dense subdecumbent hairs and dense decumbent pubescence, propodeal spines extremely long and curved posteriorly, and body black.

Key words: Formicoidea; ant; taxonomy

中国盘腹蚁属二新种记述 (膜翅目: 蚁科: 切叶蚁亚科)

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摘要: 本文记述中国盘腹蚁属 2 新种。双色盘腹蚁新种 *A. bicolor* **sp. nov.** 与雕刻盘腹蚁 *A. exasperata* Wheeler, 1921 接近, 但是新种前胸背板两侧具纵皱纹, 中胸侧板和后胸侧板大部光滑, 并胸腹节背面光滑, 并胸腹节刺长约为其基部宽的 1.2 倍, 身体二色; 横纹盘腹蚁新种 *A. transversa* **sp. nov.** 与小刺盘腹蚁 *A. pumilopuncta* Zhou, 2001 接近, 但是新种头后部 1/3 和胸部具横皱纹, 柄节具密集亚倾斜立毛和密集倾斜绒毛被, 并胸腹节刺很长且弯向后方, 身体黑色。

关键词: 蚁总科; 蚂蚁; 分类

Introduction

Aphaenogaster Mayr, established by Mayr (1853) and based on the type-species *Aphaenogaster sardoa* Mayr, 1853, is a large genus of ants with 224 valid species and 12 fossil species recorded in the world (Bolton 2023). This genus is widely distributed in tropical and subtropical regions and is also present in temperate regions (AntWiki 2023). This widespread diversity is attributed to the presence of its diverse individual monophyletic species-groups (Schifani *et al.* 2022). The taxonomic status of this genus has undergone various complex combinations due to the longevity of its establishment. The genus was, shortly after its establishment, considered by Smith (1858) as a junior synonym of *Atta*

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Fabricius, and later by Emery (1895) as a subgenus of *Stenamamma* Westwood, and later revived to genus rank by Emery (1908).

In China, a total of 25 species in this genus are known to have been recorded, but species richness is probably greater (Guénard & Dunn 2012). Taxonomic studies involving this genus began early in China. The earliest study was the establishment of the subspecies *A. lobulifera fraterna* Ruzsky, 1905, which, although initially assigned to *Aphaenogaster*, was later combined with *Messor* Forel (Ruzsky 1905; Emery 1921). The study of Chinese *Aphaenogaster* began with the taxonomy of the Chinese ants by Wheeler (1921) and the description of two new species, *A. exasperata* and *A. geei*, which gradually expanded with the participation of more studies (e.g., Viehmeyer 1922; Wheeler 1928; Donisthorpe 1929). Study by Chinese researchers came relatively later (e.g., Wu & Wang 1992; Wang & Zheng 1997). Comprehensive taxonomic studies lingered for many years, with only some sporadic publications. Although Wu & Wang (1995) and Zhou (2001) have provided more systematic studies with related taxonomic keys, most species still await better classification analysis. In this paper, two new species of this genus are described from Yunnan, China.

Material and methods

Type specimens of these two new species were collected by hand. Specimens were observed under a stereomicroscope with a micrometer. Morphological analysis and measurements were performed under HAYEAR software with a HY-800B digital camera connected to a 0745 lens. Multi-focus photographs were taken with a Nikon D3000 digital camera attached to a Phenix Plan 4x microscope objective, and images were processed with Helicon Focus 7 and Adobe Photoshop 2021 software. The terminology used in the paper is as below: morphological description (Bolton 1994), sculptural description (Harris 1979) and pilosity description (Wilson 1955).

Standard measurements and indices are as defined in Bolton (1976) with supplements to ED, PL, PH, DPW, PPL, PPH and PPW as outlined below: TL — Total Length: total outstretched length of the individual, from the mandibular apex to the gastral end; HL — Head Length: 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 — Head Width: maximum width of head in full-face view, excluding the eyes; CI — Cephalic Index = $HW \times 100 / HL$; SL — Scape Length: straight-line length of the antennal scape, excluding the basal constriction or neck; SI — Scape Index = $SL \times 100 / HW$; ED — Eye Diameter: maximum diameter of eye; PW — Pronotal Width: maximum width of pronotum measured in dorsal view; WL — Weber's length (= Alitrunk Length): the diagonal length of the mesosoma (= alitrunk) in profile from the point at which the pronotum meets the cervical shield to the posterior base of the metapleuron; PL — Petiole Length: length of petiole measured in lateral view from the anterior articulation to the posterior articulation of petiole. PH — Petiole Height: height of petiole measured in lateral view from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsal most point of the node; DPW — Dorsal Petiole Width: maximum width of petiole in dorsal view; PPL — Postpetiole Length: length

of postpetiole measured in lateral view from the anterior articulation to the posterior articulation of postpetiole; PH — Postpetiole Height: height of postpetiole measured in lateral view from the apex of the ventral (subpetiolar) process vertically to a line intersecting the dorsal most point of the node; PPW — Postpetiole Width: maximum width of postpetiole in dorsal view. All measurements are expressed in millimeters (mm).

The type specimens of the new species are deposited at Kunming Nature History Museum of Zoology, Kunming Institute of Zoology, Chinese Academy of Sciences (KIZ).

Taxonomy

1. *Aphaenogaster bicolor* sp. nov. (Figs 1, 2)

Holotype worker. TL 5.8, HL 1.27, HW 1.00, CI 79, SL 1.56, SI 156, ED 0.23, PW0.76, WL 1.89, PL 0.57, PH 0.34, DPW 0.26, PPL 0.42, PPH 0.37, PPW 0.36.

In full-face view, head nearly rectangular and weakly elongate posteriorly, longer than broad, posterior margin straight, posterior corners broadly rounded, lateral margins moderately convex. Mandibles triangular, masticatory margin with three apical teeth followed by five small denticles. Dorsum of clypeus weakly convex, anterior margin moderately convex. Frontal carinae relatively short, reaching to eye level. Frontal lobes relatively large and suberect, concealing half of antennal socket. Antennae long, 12-segmented, apex of scape surpassing posterior head margin by 1/3 of its length, flagella filiform, antennal club 4-segmented. Eyes convex, located at midpoint of lateral head margin and occupying 1/6 of lateral margin.

In lateral view head weakly elongate and narrowing posteriorly. Promesonotum high, dorsum of pronotum weakly convex, promesonotal suture slightly impressed. Dorsum of mesonotum nearly straight and sloping down posteriorly, anterodorsal corner convex and bluntly angled. Metanotal groove deeply impressed. Propodeum low, dorsum straight and horizontal, propodeal spines short and acute, posterodorsally pointing, slightly longer than its basal width; declivity moderately concave, about half length of dorsum; propodeal lobes small and rounded apically; propodeal spiracle high on the side, close to dorsal margin. Anterior peduncle about as long as petiolar node; petiolar node roughly conical and erect, dorsum narrowly rounded, anterior and posterior margins nearly straight; ventral margin of petiole weakly concave. Postpetiole slightly higher than petiole, the node roughly triangular and slightly inclined posteriorly, dorsum narrowly rounded, anterior margin gently sloping, posterior margin steeply sloping, ventral margin weakly concave. Gaster nearly elliptical.

In dorsal view, pronotum broadest, lateral margins moderately convex, humeral corners broadly rounded. Promesonotal suture distinct. Mesothorax significantly constricting and narrow, mesonotum roughly triangular and narrowing posteriorly. Metanotal groove distinctly impressed. Propodeum nearly trapezoidal and widening posteriorly, lateral margins almost straight; propodeal spines acute, posterolaterally pointing. Petiolar peduncle narrower than the node, the node roughly elliptical. Postpetiole about 1.4 times as wide as petiole, distinctly widening posteriorly and roughly trapezoidal, lateral margins almost straight, posterolateral corners bluntly angled. Gaster oval.



Figure 1. Holotype worker of *Aphaenogaster bicolor* sp. nov. Head, full-face view.

Mandibles longitudinally striated. Head loosely reticulate, interface smooth. Mesosoma longitudinally rugose, longitudinal central strip of promesonotum, most part of mesopleura, most part of metapleural and dorsum of propodeum smooth and shiny. Petiole, postpetiole and gaster smooth and shiny. Body dorsum with abundant suberect to subdecumbent hairs and abundant decumbent short pubescence. Scapes with dense decumbent hairs and dense depressing pubescence, tibiae with dense depressing pubescence. Body color brownish red, head and gaster black, antennae blackish brown.

Paratype workers ($n = 5$). TL 5.6–5.9 (5.7), HL 1.12–1.22 (1.17), HW 0.94–1.01 (0.98), CI 82–84 (83), SL 1.41–1.52 (1.48), SI 149–157 (152), ED 0.20–0.23 (0.21), PW 0.71–0.76 (0.73), WL 1.76–1.87 (1.81), PL 0.46–0.56 (0.52), PH 0.29–0.35 (0.32), DPW 0.24–0.27 (0.26), PPL 0.41–0.43 (0.42), PPH 0.32–0.37 (0.36), PPW 0.33–0.38 (0.36); mean values in parentheses. Same as holotype, but sometimes with shallower transverse rugose sculpture on pronotum, more smooth and shining; with narrower and longer propodeal spines; and with smaller body.

Queen and Male. Unknown.

Holotype. Worker, **China**, Yunnan, Lijiang City, Yongsheng County, Huangniaba Baobao Mountain, 26°54'14"N, 100°30'06"E, 3000 m alt., 20-V-2022, Yuhua GU leg., KIZ0132774 (KIZ). **Paratypes.** 5 workers, with same data as holotype, KIZ0132775, KIZ0132776, KIZ0132777, KIZ0132778, KIZ0132779 (KIZ).

Etymology. The Latin specific epithet "bicolor" is composed of "bi-" (= twice) + "color" and refers to the bicolored body.

Diagnosis. This new species is similar to *A. exasperata* Wheeler, 1921, but in this new species, sides of pronotum longitudinally rugose, mesopleura mostly smooth, dorsum of propodeum smooth, propodeal spines about 1.2 times as long as its basal width, and body bicolored; while in *A. exasperata*, sides of pronotum smooth and shiny, mesopleura and metapleura finely reticulate, dorsum of propodeum with transverse rugae, and body unicolored.



Figure 2. Holotype worker of *Aphaenogaster bicolor* sp. nov. A. Body, lateral view; B. Body, dorsal view.

2. *Aphaenogaster transversa* sp. nov. (Figs 3, 4)

Holotype worker. TL 7.5, HL 1.70, HW 1.21, CI 71, SL 2.30, SI 190, ED 0.29, PW 0.90, WL 2.61, PL 0.79, PH 0.42, DPW 0.28, PPL 0.46, PPH 0.41, PPW 0.33.

In full-face view, head nearly elliptical, distinctly elongate and narrowing posteriorly, longer than broad, posterior margin weakly convex, posterior corners indistinct, lateral margins moderately convex. Mandibles triangular, masticatory margin with three large apical teeth followed by a series of small irregular denticles. Dorsum of clypeus weakly convex, anterior margin slightly convex. Frontal carinae absent. Frontal lobes relatively large and suberect, concealing half of antennal socket. Antennae long, 12-segmented, apex of scape surpassing posterior head margin by $\frac{2}{5}$ of its length, flagella filiform, antennal club 4-segmented. Eyes convex, located slightly before midpoint of lateral head margin and occupying $\frac{1}{7}$ of lateral margin.

In lateral view head distinctly elongate and narrowing posteriorly. Promesonotum high, strongly convex. Promesonotal suture obvious but not impressed. Dorsum of mesonotum sloping down posteriorly, weakly concave centrally and weakly convex posteriorly. Metanotal groove deeply notched. Propodeum low, dorsum nearly straight and horizontal;

propodeal spines long, slightly longer and declivous, stout basally and sharp apically, posteriorly pointing; declivity nearly straight, about 1/3 length of dorsum; propodeal lobes small and rounded apically; propodeal spiracle high on the side, close to dorsal margin. Anterior peduncle as long as petiolar node; petiolar node roughly conical and erect, dorsum narrowly rounded, anterior and posterior margins slightly convex; ventral margin of petiole nearly straight. Postpetiole as high as petiole, anterior peduncle about 1/2 length of postpetiolar node; the node roughly triangular and erect, the top bluntly angled, anterior and posterior margins straight, ventral margin straight. Gaster nearly oval.

In dorsal view, pronotum broadest, roughly trapezoidal and widening posteriorly, lateral margins moderately convex, humeral corners indistinct. Promesonotal suture visible but not impressed. Mesothorax significantly constricting anteriorly and narrow, mesonotum roughly trapezoidal and widening posteriorly, lateral margins nearly straight. Metanotal groove deeply impressed. Propodeum nearly trapezoidal and widening posteriorly, lateral margins weakly convex; propodeal spines long and acute, curving inward apically. Petiolar peduncle slender and narrower than the node, the node roughly circular. Postpetiole about 1.3 times as wide as petiole, distinctly widening posteriorly and roughly trapezoidal, lateral margins weakly convex, posterolateral corners bluntly angled. Gaster oval.

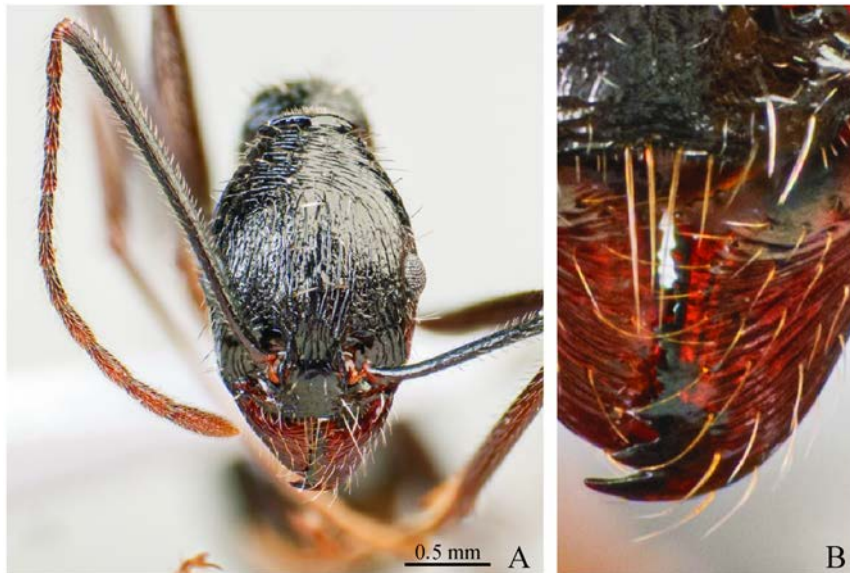


Figure 3. Holotype worker of *Aphaenogaster transversa* **sp. nov.** A. Head, full-face view; B. Mandible, dorsal view.

Mandibles longitudinally striate. Anterior 2/3 of head dorsum longitudinally rugose and posterior 1/3 transversely rugose, clypeus smooth. Mesosoma transversely rugose, posterodorsal portion of propodeal sides smooth and shiny. Petiole, postpetiole and gaster smooth and shiny. Body dorsum with abundant suberect to subdecumbent hairs and abundant decumbent short pubescence; scapes with dense subdecumbent hairs and dense decumbent pubescence, tibiae with dense depressing pubescence. Body color black; mandibles, flagella and legs blackish brown.

Paratype workers ($n = 3$). TL 7.2–7.5 (7.4), HL 1.67–1.71 (1.69), HW 1.19–1.24 (1.22),

CI 70–74 (72), SL 2.24–2.39 (2.30), SI 183–193 (189), ED 0.26–0.29 (0.27), PW 0.87–0.88 (0.87), WL 2.42–2.55 (2.47), PL 0.61–0.70 (0.65), PH 0.37–0.43 (0.40), DPW 0.16–0.25 (0.20), PPL 0.42–0.49 (0.45), PPH 0.34–0.40 (0.37), PPW 0.29–0.32 (0.31); mean values in parentheses. Same as holotype, but sometimes accompanied by a smaller body with a more coarsely sculpted head and a more rounded clypeal anterior margin.

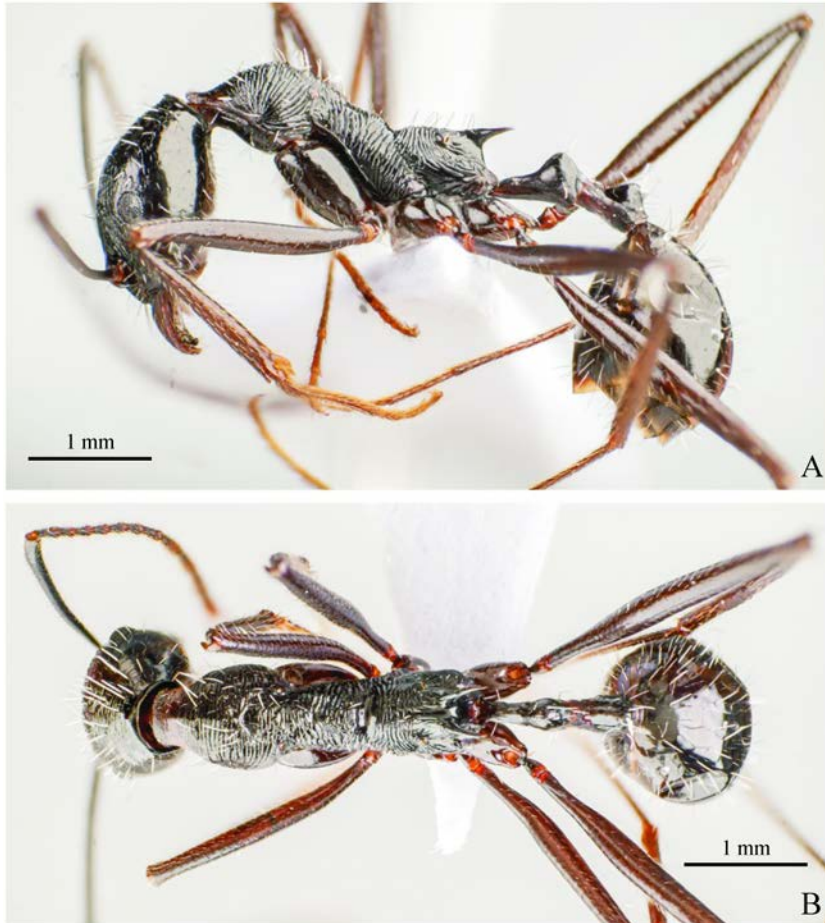


Figure 4. Holotype worker of *Aphaenogaster transversa* **sp. nov.** A. Body, lateral view; B. Body, dorsal view.

Queen and Male. Unknown.

Holotype. Worker, **China**, Yunnan, Lijiang City, Yongsheng County, Rabbit Mountain, about 26°54'N, 100°34'E, 2700–3200 m alt. (Exact data not available), V-2022, Jincai GU leg., KIZ0132770 (KIZ). **Paratypes.** 3 workers, with same data as holotype, KIZ0132771, KIZ0132772, KIZ0132773 (KIZ).

Etymology. The Latin specific epithet ‘transversa’ derives from the Latin “trānsversa (*fem.*)” meaning crosswise, and refers to the transverse rugose sculpture all over the head and mesosoma.

Diagnosis. This new species is similar to *A. pumilopuncta* Zhou, 2001, but in this new species, posterior 1/3 of head dorsum and mesosoma transversely rugose, scapes with dense

subdecumbent hairs and dense decumbent pubescence, propodeal spines extremely long and curved posteriorly, and body color black; while in *A. pumilopuncta* head and mesosoma reticulate, scapes with dense decumbent pubescence but without subdecumbent hairs, propodeal spines short and pointing posterodorsally, and body color black with head and gaster yellowish brown.

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