

A new species of the ant genus *Aphaenogaster* Mayr (Hymenoptera: Formicidae) from Iran

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ABSTRACT. A new species, *Aphaenogaster iranica* Kiran et Alipanah, **sp. nov.**, is described from Iran. This species, belonging to the *rothneyi* group, is measured, illustrated and compared with other species of the group. Additionally, a key to workers of *Aphaenogaster* species from Iran is prepared.

Keywords: ants, Formicidae, *Aphaenogaster*, taxonomy, Iran, new species.

INTRODUCTION

Aphaenogaster is a speciose genus found everywhere except the Afrotropics. The genus has 214 extant and 19 extinct species in the world, of which 121 species and 23 subspecies are found in the Palaearctic Region (Collingwood 1961, Cagniant 1996, Bolton *et al.* 2007, Bolton 2011). Early literature suggests species-groups for the genus *Aphaenogaster* (Santschi 1932). Schulz (1994) defined six species groups: *obsidiana*, *gibbosa*, *subterranea*, *pallida*, *splendida* and *rothneyi*. His grouping did not include all known Palaearctic species but can be considered a useful first classification (Kiran *et al.* 2008).

The *rothneyi* group, which probably has a Himalayan origin, is distributed in the southern part of the Palaearctic Region – the Himalayas, Taiwan, Korea, Japan, Turkmenistan and Tadjikistan (Forel 1902, 1913; Arnoldi 1968, 1976) – and in the Oriental Region – Central India (Forel 1913). It includes five species (*A. rothneyi* (Forel), *A. tipuna* Forel, *A. fabulosa* Arnoldi, *A. januschevi* Arnoldi, and *A. cristata* (Forel)). Species of this group resemble the *splendida* group in the shape of mesonotum, which rises above the pronotum (seen in profile). Workers of

the *splendida* group and *rothneyi* group can be identified at first glance by their slender bodies and long extremities, their elongated heads and fine sculpture. On the other hand, species of the *rothneyi* group differ from the *splendida* group by their funicular segments which are three times longer than broad (maximum two times longer than broad in *splendida* group), and by the more-or-less parallel sides of the head in full-face view (oval in *splendida* group) (Schulz 1994).

Although a checklist of the ant fauna of Iran has recently been published, and other species have been recorded (Paknia *et al.* 2008, 2010; Ghahari, *et al.* 2009; Radchenko & Paknia 2010; Firouzi *et al.* 2011), the ant fauna of Iran has received relatively little study and there are few publications in this regard, in which only four *Aphaenogaster* species, *A. gibbosa* (Latreille), *A. kurdica* Ruzsky, *A. obsidiana* (Mayr) and *A. syriaca* Emery, have been reported from the country.

With this article we describe a new *Aphaenogaster* species from northeast Iran.

MATERIALS AND METHODS

Material was collected from northeast Iran. Collection details are given with the description.

Illustrations were prepared as line drawings and as Extended Focus (Z-stack) Images (EFIs). Line drawings were prepared using a Wacom Intuos3 Pen Tablet; EFI illustrations were prepared using a Nikon D70s digital SLR camera with 105mm macro lens and 2x teleconverter, and CombineZ software.

Measurements of specimens were made using an Olympus SZ51 stereomicroscope at 80× magnification and an Olympus U-OCMC 10/100XY stage micrometer, and these were used to calculate various indices.

Morphometrics

HL – length of head in dorsal view, measured in a straight line from the anterior point of median clypeal margin to mid-point of the occipital margin; **HW** – maximum width of head in dorsal view behind the eyes; **FW** – minimum width of frons between the frontal lobes; **FLW** – maximum width between external borders of the frontal lobes; **SL** – maximum straight-line length of antennal scape as seen in profile; **AL** – diagonal length of the mesosoma seen in profile, from the neck shield to the posterior margin of metapleural lobes; **HTL** – length of tibia of hind leg; **PNW** – maximum width of pronotum from above in dorsal view; **PL** – maximum length of petiole from above; **PPL** – maximum length of postpetiole from above; **PW** – maximum width of petiole from above; **PPW** – maximum width of postpetiole from above; **PH** – maximum height of petiole in profile; **PPH** – maximum height of postpetiole in profile; **ESL** – maximum length of propodeal spine in profile; **ESD** – distance between tips of propodeal spine from above.

Indices

Cephalic Index $CI = HL/HW \times 100$; Frontal Index $FI = FW/HW \times 100$; Frontal Lobe Index $FLI = FLW/FW \times 100$; Scape Index₁ $SI_1 = SL/HL \times 100$; Scape Index₂ $SI_2 = SL/HW \times 100$; Petiole Index $PI = PL/PH \times 100$; Postpetiole Index $PPI = PPL/PPH \times 100$; Spine-length Index $ESLI = ESL/HW \times 100$; Spine Distance Index $ESDI = ESD/ESL \times 100$; Hind-tibia Index $HTI = HTL/HW \times 100$.

DESCRIPTION

Aphaenogaster iranica Kiran et Alipanah, sp. nov. (Figs 1-2)

WORKER

Measurements: HL 1.15-1.43 (1.43); HW 0.81-0.98 (0.95); FW 0.20-0.26 (0.26); FLW 0.28-0.31 (0.30); SL 1.58-1.79 (1.79); AL 1.75-2.13 (2.13); HTL 1.25-1.67 (1.67); PNW 0.54-0.70 (0.70); PL 0.46-0.58 (0.51); PPL 0.30-0.35 (0.34); PW 0.18-0.22 (0.22); PPW 0.25-0.30 (0.30); PH 0.26-0.33 (0.30); PPH 0.25-0.30 (0.30); ESL 0.10-0.15 (0.10); ESD 0.18-0.24 (0.22); CI 143-150 (150); FI 25-27 (27); FLI 119-127 (119); SI_1 126-132 (126); SI_2 188-191 (188); PI 167-184 (168); PPI 112-121 (112); ESLI 10-15 (10); ESDI 157-225 (225); HTI 153-176 (176) (n=4; all measurements are in mm. Measurements of holotype are shown in brackets.)

Head distinctly longer than broad in full-face view, almost oval, broadest in front of eyes and with almost parallel sides here; behind eye sides gradually curving to the occipital margin, occipital corners indistinct. Frontal carina short, barely reaching anterior level of eyes. Anterior margin of the clypeus with shallow median notch. Eyes relatively small, situated at the middle of the head. Mandibles elongate-triangular, longitudinally striated, masticatory margin with 7 uneven teeth. Scape long, surpassing occipital margin by 1/3 of its length. Funicular segments 2–6, nearly 3 times longer than broad, antennal club indistinct.

Head surface shiny, dorsum of head weakly sculptured anteriorly, sculpture gradually reduced towards occiput, which is completely smooth and shiny. Genae with fine longitudinal striae, running to the upper level of eyes. Frontal triangle dull, with 2 longitudinal striae. Central part of clypeus delineated by very weak and sparse longitudinal striae.

Mesosoma long and slender. Mesonotum distinctly rises above the level of pronotum in profile, metanotal groove shallow. Propodeal spines stout, widest at the base; length 2/5 the distance between their tips. Pronotum smooth

and shiny. Mesonotum shiny, mesopleuron punctate. Mesonotum with antero-dorsal part smooth, postero-dorsal part with a few irregular longitudinal striae. Antero-dorsal surface of propodeum with a few weak transverse striae, the rest of propodeum smooth. Petiole low, with long peduncle, its node narrower than postpetiole, postpetiole only a little longer than broad. Anterior surface of petiole concave in profile, posterior one convex, these two surfaces merge into a distinct antero-dorsal edge. Both petiole and postpetiole smooth and quite shiny. Base of first gastral tergite longitudinally striate; the rest of gaster smooth and shiny.

All smooth parts of head, mesosoma and anterior part of first gastral tergite with fine superficial reticulation (can be seen only with 80x magnification).

Except for apical funicular segments body without pubescence. Hairs on the body very sparse, long and white. Scape and tibia with decumbent hairs. Gaster with 4-5 long hairs, only at the posterior margins of each segment. Colour yellowish brown to reddish brown, head and mesosoma somewhat darker, scape and legs lighter.

Queens and males are unknown.

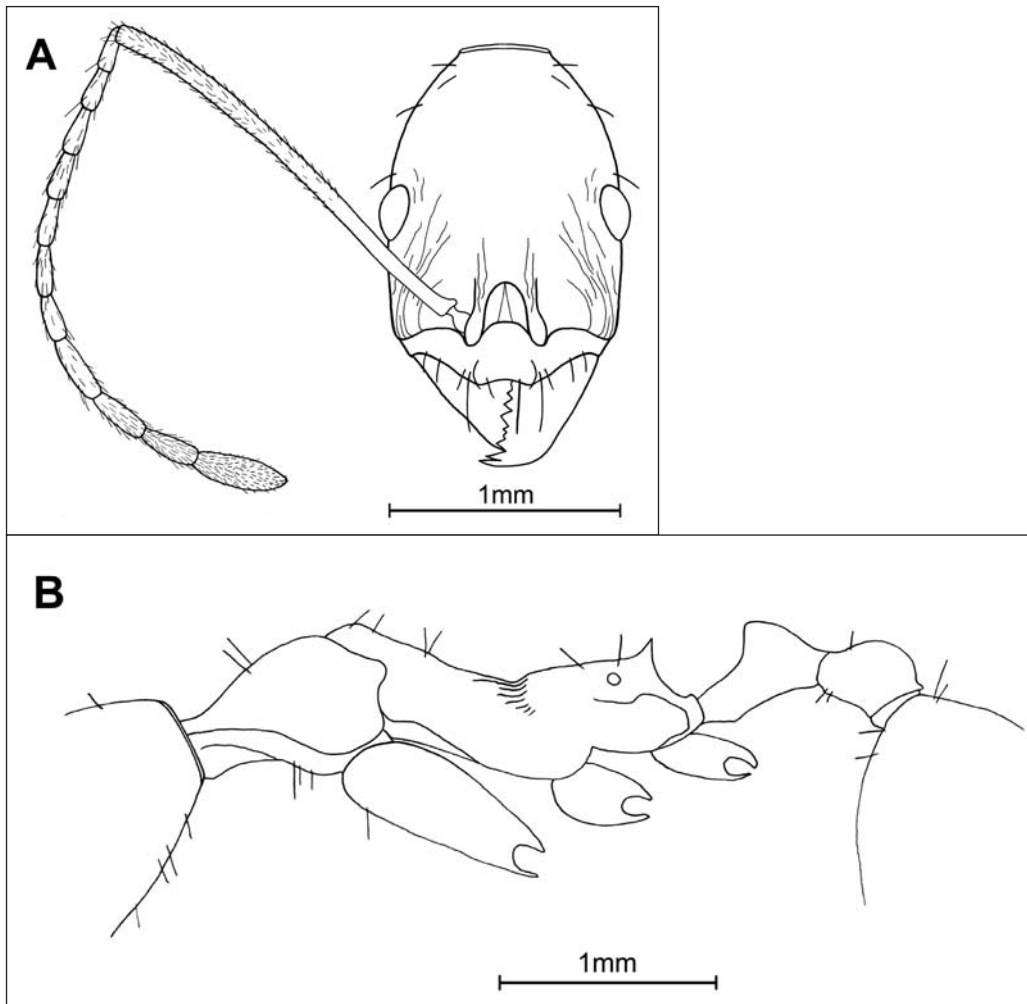


Fig. 1. Line drawings of holotype *Aphaenogaster iranica*, (A) Head, frontal view; (B) Mesosoma and waist, lateral view.

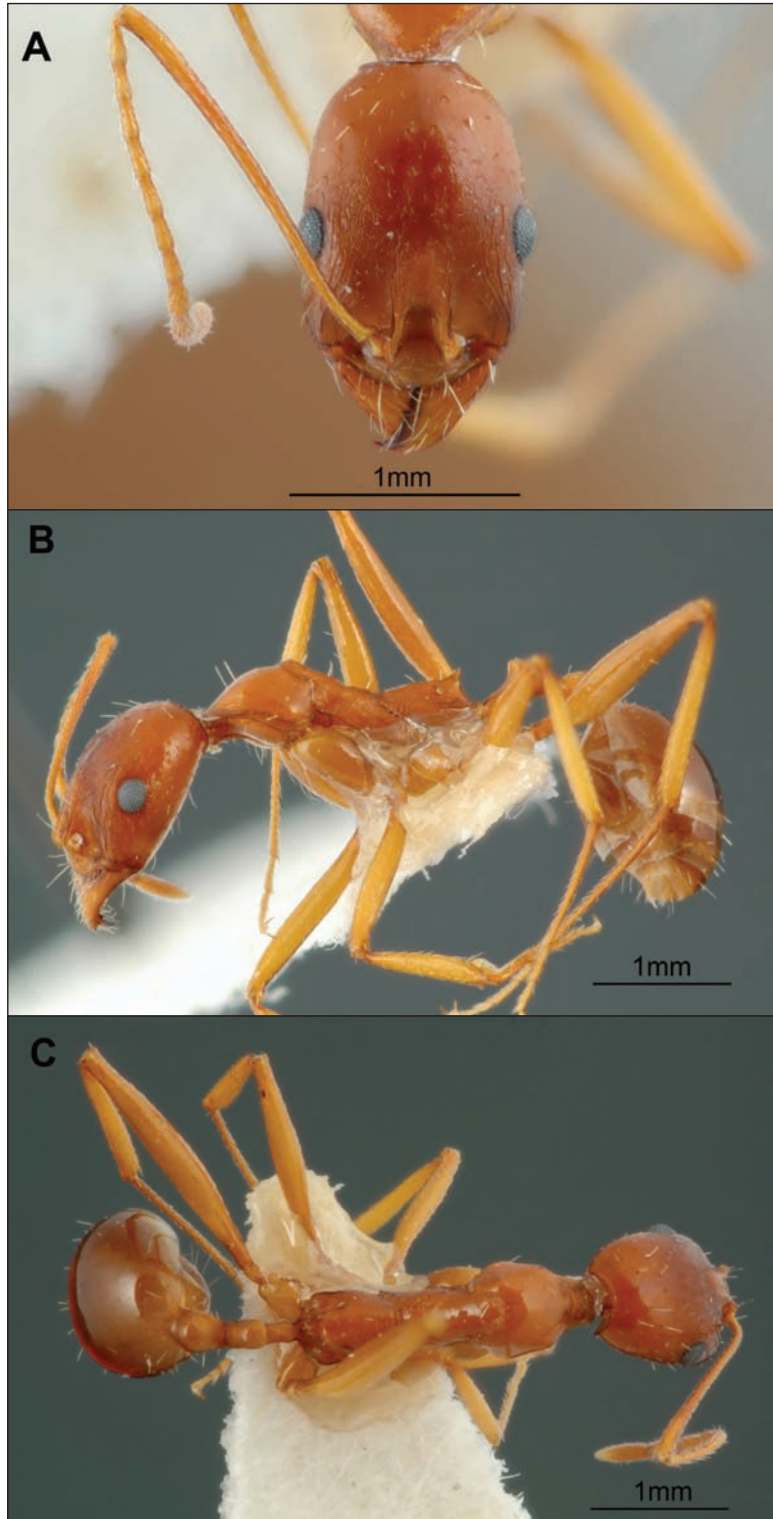


Fig. 2. EFI pictures of holotype of *Aphaenogaster iranica*: (A) Head, frontal view; (B) Mesosoma and waist, lateral view; (C) Whole body, dorsal view.

Material examined. Holotype-worker: Iran, Khorāsān-e Razavi Province, Mashhad, Shāndiz, 985m a.s.l., N 36° 24', E 59° 19', 15.V.1999, No: 29-22 (leg. M. Ghāsemi). Holotype was found in mixed pome fruit orchards (apple and pear) and observed on the bark of an apple tree. **Paratypes:** 4 workers, Iran, Semnan Province, Khoshyeylāgh, Beh-Cheshmeh station, 1554m a.s.l., N 36° 43' 30.14", E 55° 22' 30.09", 09.VI.2007, No: 1954 and 1978 (leg. O. Paknia). All paratypes were collected in morning before sunrise by hand from arid areas around human habitations.

The holotype is deposited in the Collection of the Biological Department of the Trakya University, Edirne, Turkey (TU); one paratype is deposited in the National Museum of Natural History, Tehran, Iran. Three paratypes are deposited in the private collection of the last author (OP).

Etymology. Named after Iran, where it was found.

Key to workers of *Aphaenogaster* species from Iran

1. Scape surpassing occiput by more than one-fifth of its length (Fig. 1A, 2A)2
— Scape surpassing occiput by less than one-fifth of its length (Fig. 3)4
2. Body colour dark brown to black, occipital corners more-or-less distinct in full-face view, promesonotum evenly convex in profile (Fig. 4)*gibbosa*
— Body colour light, occipital corners indistinct in full-face view, mesonotum rises above the level of pronotum in profile (mesonotum distinctly raised, domed to angular in profile) (Fig. 1B, 2B)3
3. Sides of head parallel in full-face view, funicular segments 2-6 nearly 3 times as long as broad, gaster without dark band ...*iranica*
— Sides of head oval in full-face view, funicular segments 2-6 at most 2 times as long as broad, gaster with a dark band*syriaca*
4. Whole body rugulose, body colour black*obsidiana*
— Body sculpture finer, body colour light reddish brown*kurdica*

DISCUSSION

We have placed *Aphaenogaster iranica* in the *rothneyi* species-group based on the following features: its slender body, elongated head with almost parallel sides in front of the eyes, length of funicular segments (segments 2–6 nearly 3 times longer than broad), and generally reduced body sculpture. In detail, *A. iranica* differs from other known species from Iran (see key) and from other species in the *rothneyi* group by the following

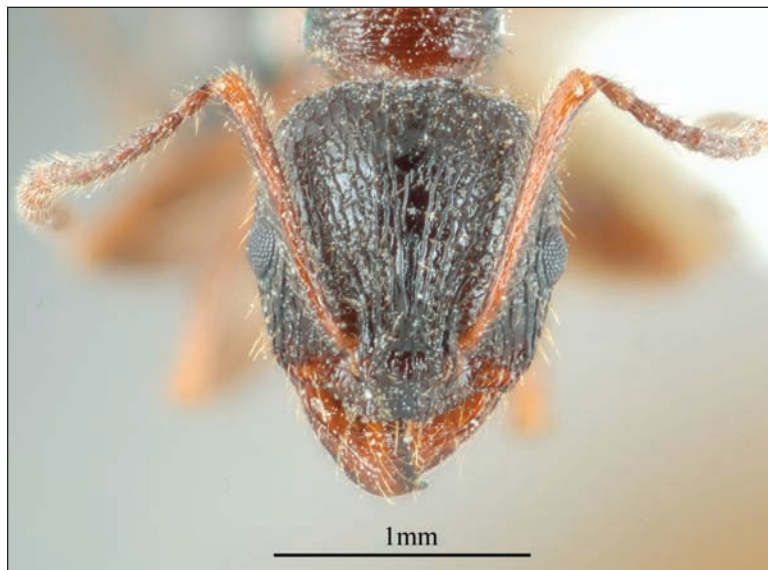


Fig. 3. Head of *Aphaenogaster obsidiana*, frontal view (From Trabzon-Uzungöl, Turkey, leg. and det. K.Kiran).

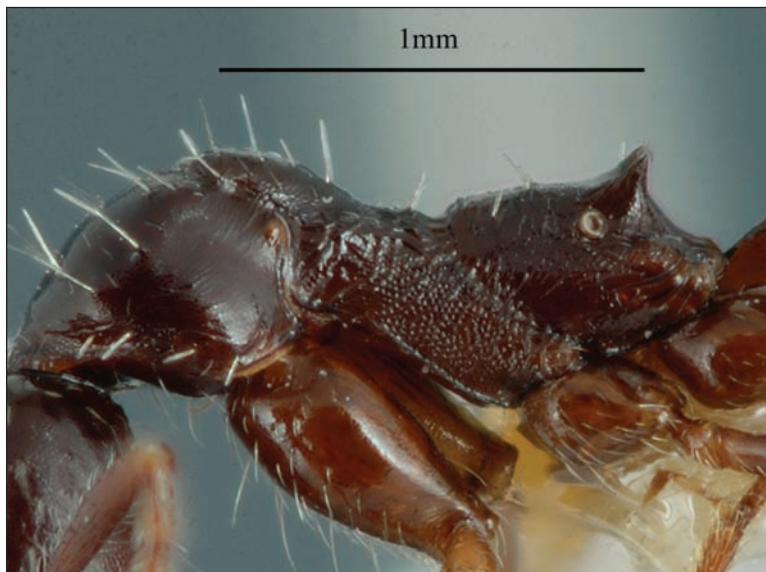


Fig. 4. Mesosoma of *Aphaenogaster gibbosa*, lateral view (From Brive, France, leg. and det. C. Galkowski).

features. The head of *A. iranica* is concolorous with the mesosoma. The mesosoma is generally smooth and shiny; only the sides of the mesosoma are distinctly punctate, and the propodeum has very fine transverse striation. Propodeal spines are short, the length only 2/5 of the distance between their tips, and directed mostly upwards; mesonotum anteriorly without tubercles; whole body without decumbent pilosity (present only on the four apical funicular joints). In contrast, the head of *A. rothneyi* is darker than the mesosoma; the whole mesosoma is subopaque, finely reticulated and striated, the propodeum coarsely transversely rugulose. The propodeal spines are quite long, as long as the distance between their tips, and directed backwards; the mesonotum anteriorly with tubercles; the whole body with sparse decumbent pilosity.

Aphaenogaster iranica resembles *A. cristata*. The mesonotum of *A. iranica* is raised above the level of pronotum in profile, and the postpetiole is only slightly longer than broad. In contrast the mesonotum of *A. cristata* has, in the middle of its anterior margin, a raised transverse crest-like pinched projection, and the postpetiole is almost twice as long as broad.

The other closely related species, *A. januschevi*, has a mesonotum only slightly raised above the level of the pronotum in profile, the dorsum of mesonotum with longitudinal

striae, and a deep metanotal groove, while the mesonotum of *A. iranica* is strongly raised above the level of pronotum in profile, the dorsum of the mesonotum has only a few posterior striae, and a shallow metanotal groove.

Aphaenogaster iranica also distinctly differs from *A. tipuna* and *A. fabulosa* by the distinctly longer funicular segments 2–6, which are nearly 3 times as long as broad (less than 2 times longer than broad in *A. tipuna*, and not more than 2.5 times in *A. fabulosa*). Additionally, the petiole and postpetiole of *A. iranica* are distinctly lower than in both these species.

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