

***Myrmica afghanica* (Hymenoptera: Formicidae), a new ant species from Afghanistan**

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Abstract

Myrmica afghanica **sp. nov.** is described and its taxonomic position is discussed in relation to the unique *Myrmica* fauna of the Himalayan region. The type specimens were taken in Afghanistan, north of Jäläläbad, in 1948. Based on three workers and a queen, it is most similar to the species of the *rubra*-group.

Key words: taxonomy, Palearctic Region, Himalaya, Hindu Kush, *M. tibetana*

Introduction

The genus *Myrmica* is widespread in the temperate regions of the Holarctic. Currently it comprises about 150 species, although this number will surely rise when the fauna of China is better known and the Nearctic fauna is fully revised (A. Francoeur *pers. comm.*). Twenty-seven of the 30 species of *Myrmica* recorded from the south-western slopes of the Himalaya (including Afghanistan) are endemic to that region, with many species having unique and unusual combinations of morphological characters (Radchenko and Elmes 2001; see also Radchenko and Elmes 1998, 1999). The three non-endemic species were *Myrmica kozlovi* Ruzsky, *Myrmica tibetana* Mayr and *Myrmica tenuispina* Ruzsky. *M. kozlovi* has been found in Sikkim, Nepal and Tibet where it often lives at very high altitudes; we speculated that its altitude tolerance might have enabled it to cross to the western Himalaya from Tibet (Radchenko and Elmes 2001). We also confirmed that the record of *M. tenuispina* from Afghanistan was valid despite most records being from the mountains of “Middle Asia” (i.e. Turkmenistan, Uzbekistan, Kirgizstan and Tadzhikistan), from where it probably penetrated into Afghanistan.

On the other hand, *M. tibetana* was described by Mayr (1889) from Tibet and until Collingwood (1961) identified it among Afghan material, owned by the University Museum, Copenhagen, Denmark, it was known only from the Tibetan region (Ruzsky 1905, 1915; Emery, 1908, 1921; Weber 1947; Radchenko 1994a). Unfortunately, the Afghan specimens were not available when we were preparing our revision of the Himalayan *Myrmica* (Radchenko and Elmes 2001); the collection was being re-organized. Therefore we included *M. tibetana* in the south-western Himalayan fauna although we doubted whether it could have crossed the high Himalaya. We considered that most probably it was a misidentification of *M. tenuispina*. Recently the curator, Dr. Lars Vilhelmsen, found the specimens in question and we determined that they are neither *M. tibetana* nor *M. tenuispina*, but a previously undescribed species, belonging to a different species-group and well differing from all other Central Asian species. Here we describe these specimens as *Myrmica afghanica* **sp. nov.** and discuss the new taxon's position in relation to similar species of *Myrmica*.

Material and methods

This study is based on examination of the type and non-type material of *Myrmica* species from the following Museums: University Museum, Copenhagen (types of *M. afghanica*), Museum für Naturkunde der Humboldt-Universität, Berlin, Germany (lectotype of *M. tibetana*, see Radchenko and Elmes 2001); Zoological Museum of the Moscow State University, Moscow, Russia (types and non-type material of *M. dshungarica* Ruzsky, *M. juglandeti* Arnoldi, *M. kryzhanovskii* Arnoldi; see also Radchenko 1994c); Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia (syntypes of *M. tenuispina* Forel and *M. tibetana* var. *furva* Ruzsky; see also Radchenko 1994c); Institute of Zoology of the Ukrainian National Academy of Sciences, Kiev, Ukraine (syntypes of *M. ferganensis* Karavaiev).

As in our previous publications we used the following measurements and indices:

Measurements:

- 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 seen in profile.
- AL diagonal length of the alitrunk seen in profile, from the neck shield to the posterior margin of metapleural lobes (workers) and from the antero-dorsal point of alitrunk to posterior margin of metapleural lobes (queen).
- HTL length of tibia of hind leg.
- PNW maximum width of pronotum from above in dorsal view (workers)

- 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. Seen from the side, the base of the spine is estimated to be the point of inflection between its inward curve towards the propodeum and the outward curve as it merges into the propodeum; this usually coincides with a tangential projection from the curve made between the base of the spine and the metapleural lobe.
 ESD distance between tips of propodeal spines from above.
 SCW maximum width of scutum from above (queen).
 SCL length of scutum+scutellum from above (queen).
 AH height of alitrunk, measured from upper level of mesonotum perpendicularly to the level of lower margin of mesopleurae (queen).

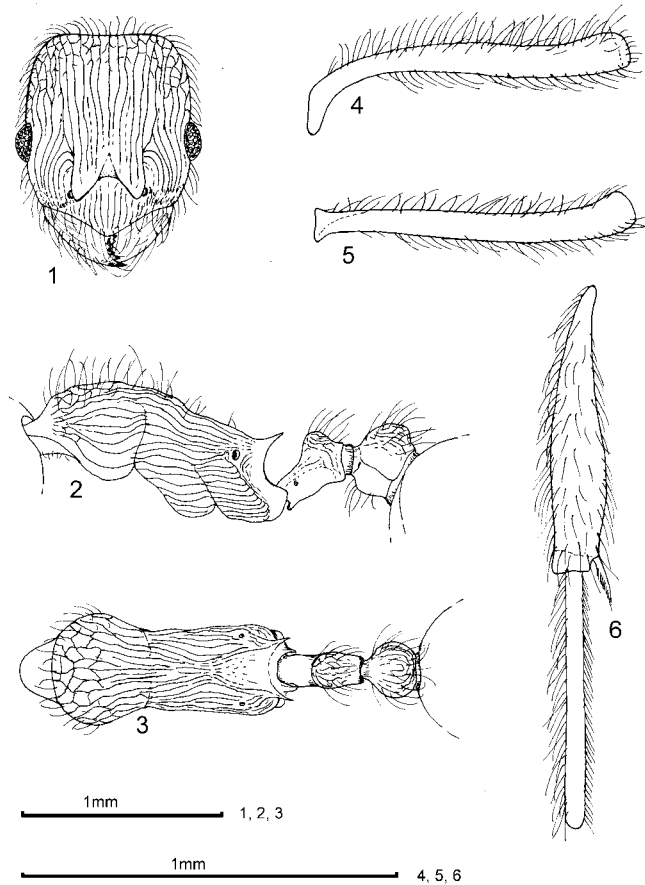
Indices:

Cephalic	CI = HL / HW
Frontal	FI = FW / HW
Frontal lobe	FLI = FLW / FW
Scape (1)	SI ₁ = SL / HL
Scape (2)	SI ₂ = SL / HW
Petiole (1)	PI ₁ = PL / PH
Petiole (2)	PI ₂ = PL / HW
Postpetiole (1)	PPI ₁ = PPL / PPH
Postpetiole (2)	PPI ₂ = PPH / PPW
Postpetiole (3)	PPI ₃ = PPW / PW
Postpetiole (4)	PPI ₄ = PPW / HW
Spine-length	ESLI = ESL / HW
Spine-width	ESDI = ESD / ESL
Hind-tibia	HTI = HTL / HW
Alitrunk	AI = AL / AH
Scutum	SCI = SCL / SCW

***Myrmica afghanica*, sp. nov.**

= *M. tibetana*: Collingwood 1961: 36, 6w, 1q, Afghanistan, Pashki Nuristan, 6.iv. (sic!), [19]48, leg. K. Paludan, **misidentification**, not Mayr, 1889: 279 et al.

Material examined. Holotype worker, “Afghanistan, Pashki Nuristan, 6.vi. (sic!) 48, leg. K. Paludan”; paratypes: 2 workers and 1 queen (dealate, specimen without postpetiole and gaster), same labels as holotype (University Museum Copenhagen).



FIGURES 1–6. *M. afghanica* (holotype, worker): 1—head, frontal view, 2—alitrunk and waist in profile, 3—alitrunk and waist from above, 4—antennal scape in profile, 5—antennal scape from above, 6—tibia and first tarsal joint of hind leg.

Description

Workers (Figs 1–6): Head long, with parallel sides, straight or very feebly concave occipital margin, and narrowly rounded occipital corners. Anterior clypeal margin prominent and pointed medially. Frontal carinae short, almost straight, not curving outwards to merge with the rugae, which surround antennal sockets. Frons wide, frontal lobes relatively narrow (see indices below). Antennal scape long and slender, very feebly curved at the base, without trace of angle or carina. Alitrunk dorsum feebly convex, metanotal groove very shallow. Propodeal spines short but sharp, projected backwards and upwards (at an angle about 45°). Petiole with long anterior peduncle, in profile petiolar node dorsum broadly rounded and postpetiole sub-globular.

Head dorsum having mostly a relatively coarse, longitudinal rugulosity, only the lateral parts and occiput having reticulation. Frons between frontal carinae level with the

eyes with less than 13 rugae. Surfaces between rugae appearing shiny, being at most very finely, superficially sculptured. Promesonotal dorsum mostly longitudinally rugose, only anterior half of pronotum with coarse reticulation; sculpture on propodeal dorsum partly reduced; sides of alitrunk with longitudinal, slightly sinuous rugae. Petiolar and postpetiolar nodes with longitudinally-concentric rugae. Tibiae of hind and middle legs with well developed, pectinate spur. Quite hairy species. Antennal scape and legs with very abundant and long hairs that are almost erect on scape and sub-erect on legs; the longest hairs on antennal scape distinctly longer than maximal diameter of the scape. Body colour light brown to black, appendages yellowish brown.

Measurements (mm) and indices (data for holotype in parenthesis): **HL** 1.02–1.12 (1.06), **HW** 0.82–0.88 (0.84), **FW** 0.35–0.39 (0.36), **FLW** 0.37–0.40 (0.39), **SL** 0.82–0.86 (0.86), **AL** 1.42–1.52 (1.50), **HTL** 0.74–0.82 (0.76), **PNW** 0.60–0.63 (0.60), **PL** 0.40–0.41 (0.40), **PW** 0.23–0.24 (0.24), **PH** 0.30–0.33 (0.31), **PPL** 0.32–0.33 (0.33), **PPW** 0.36 (0.36), **PPH** 0.36–0.39 (0.36), **ESL** 0.19–0.23 (0.19), **ESD** 0.34 (0.34);

CI 1.24–1.27 (1.26), **FI** 0.43–0.44 (0.43), **FLI** 1.03–1.06 (1.06), **SI₁** 0.75–0.81 (0.81), **SI₂** 0.95–1.02 (1.02), **PI₁** 1.24–1.33 (1.32), **PI₂** 0.47–0.49 (0.49), **PPI₁** 0.85–0.92 (0.92), **PPI₂** 1.00–1.08 (1.00), **PPI₃** 1.50–1.56 (1.50), **PPI₄** 0.41–0.44 (0.43), **ESLI** 0.23–0.26 (0.23), **ESDI** 1.48–1.79 (1.79), **HTI** 0.45–0.47 (0.45).

Queen (specimen without postpetiole and gaster) (Figs 7-12): Relatively small compared to queens of many *Myrmica* species but proportionately larger than the workers (about 25% larger on both HW and AL). Otherwise the general features of shape, sculpture and pilosity are very similar to the workers. It differs from the workers by the slightly convex lateral margins of the head, and the following details of the body sculpture: just longitudinal rugae present on the head dorsum and alitrunk with no reticulation; only the petiolar node dorsum has any reticulation. Postpetiole and gaster most probably also very similar to those of workers.

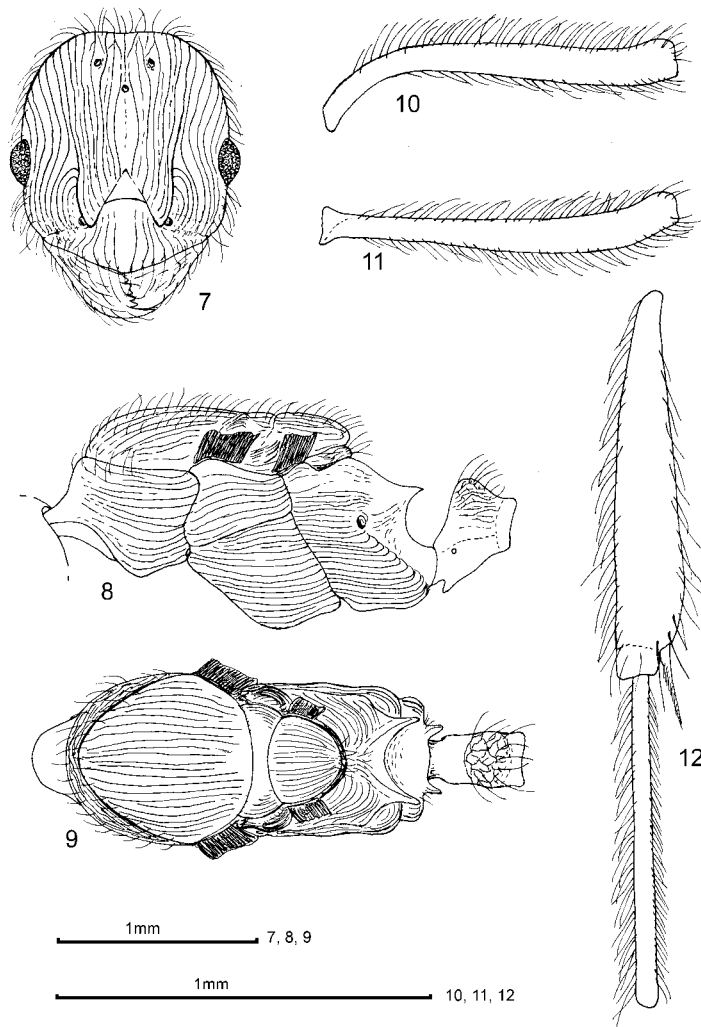
Measurements (mm) and indices: **HL** 1.26, **HW** 1.06, **FW** 0.45, **FLW** 0.47, **SL** 1.00, **AL** 1.88, **HTL** 1.00, **PL** 0.51, **PW** 0.33, **PH** 0.43, **ESL** 0.19, **ESD** 0.42;

CI 1.19, **FI** 0.42, **FLI** 1.04, **SI₁** 0.75, **SI₂** 0.94, **PI₁** 1.55, **PI₂** 0.48, **ESLI** 0.18, **ESDI** 2.21, **HTI** 0.47, **AI** 1.59, **SCI** 1.62.

Etymology. This species is named after Afghanistan where it is probably endemic.

Distribution and ecology. We cannot find Pashki Nuristan, but the most probable locality is Nūrestān (34°56' N, 70°22' E) located in a river valley of the Hindu Kush, about 60 km north of Jālālābad and 120 km northeast of Kabul. If we are correct and *M. afghanica* is a member of the *rubra* species-group (see below), then it might be distributed more widely in the Hindu Kush mountains of Afghanistan, northwards into the adjacent territories of Tadjikistan and the western slopes of the Pamirs. On the other hand, it could be a true Himalayan endemic belonging to the *smythiesii*-group (see below) either with a restricted local distribution or perhaps also living on the lower slopes of the Karakorum in Pakistan and northwest India. Nothing is known about its ecology but if we have truly

identified the type locality, then it probably lives at lower altitudes (1000–2000m) where it is should be associated with river valleys.



FIGURES 7–12. *M. afghanica* (paratype, queen): 7—head, frontal view, 8—alitrunk and waist in profile, 9—alitrunk and waist from above, 10—antennal scape in profile, 11—antennal scape from above, 12—tibia and first tarsal joint of hind leg.

Taxonomic position and discussion. Until the features of the males of *M. afghanica* are described it is impossible to place it, with any certainty, in known *Myrmica* species-groups (see Radchenko and Elmes 2001). Based on the female castes *M. afghanica* could belong to either the *rubra*-group or the *smythiesii*-group. It is most similar to the species of the *dshungarica*-complex of the *rubra* species-group, which are distributed in Central Asia, and therefore, like *M. tenuispina*, it might have invaded Afghanistan from the north. On the other hand if it belongs to the *smythiesii*-group it is probably a true endemic of the region.

Workers and queens of the species in the *rubra*- and *smythiesii*-groups are characterized by a long and slender antennal scape, which is gently curved at the base without any angle or carina, by their short, almost straight frontal carinae and wide frons (FI > 0.40) and quite narrow frontal lobes (FLI < 1.15). Males from these groups are characterized by a quite long antennal scape, but the scape of *rubra*-group males is even longer than that of the *smythiesii*-group (Radchenko and Elmes 2001). Workers and queens are relatively small, like many other species in the *rubra*-group.

With the current knowledge *M. afghanica* can no longer be confused with *M. tibetana* despite *M. tibetana* being placed in the *rubra*-group by Radchenko (1994a). We considered this earlier opinion wrong and proposed that *M. tibetana* characterizes its own species-group (Radchenko and Elmes 2001) because it appears to have more in common with species from the *scabrinodis*-group rather than species from either the *rubra*- or *smythiesii*-groups. For example, workers of the species belonging to the *tibetana*-group are characterized by frontal carinae curved at their anterior third and frontal lobes that are relatively wide and sub-square (FLI > 1.30 *versus* < 1.15), features typically seen in *scabrinodis*-group species. Also the males of *tibetana*-group species have a short antennal scape like those of the *scabrinodis*-group. However, the *scabrinodis*-group clearly differs from the *tibetana*-group by its S-shaped frontal carinae that are curved from their midlength.

If *M. afghanica* is a member of the *dshungarica*-complex (i.e. *M. dshungarica*, *M. juglandeti*, *M. ferganensis* and *M. kryzhanovskii* which mainly live in the Tien-Shan and Pamir Mountains - see Radchenko 1994a) then it most resembles *M. kryzhanovskii*. Both have long and abundant standing hairs on the legs and antennal scape but *M. afghanica* differs from *M. kryzhanovskii* by its prominent and medially-pointed anterior clypeal margin, by much shorter propodeal spines (ESLI 0.23–0.26 *versus* > 0.30) and by a relatively coarser longitudinal rugosity on the head dorsum (frons between frontal carinae level with the eyes with less than 13 rugae *versus* more than 15 in *M. kryzhanovskii*).

The other three species have much less abundant and shorter hairs on their legs and antennal scapes. *M. afghanica* also differs from *M. dshungarica* by the parallel sides of its head, as opposed to convex sides, by a much longer petiolar peduncle and by the distinctly concave anterior surface and rounded dorsum of the petiolar node, *versus* the steep anterior surface and distinctly flattened dorsum of the petiolar node seen in *M. dshungarica*. *M. afghanica*'s prominent and pointed anteromedian clypeal margin well separates it from both *M. juglandeti* and *M. ferganensis*, which have less prominent and broadly-rounded anteromedian clypeal margins (see also Arnoldi 1976; Tarbinsky 1976; Radchenko 1994b).

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