

A NEW PECULIAR *MYRMICA* SPECIES (HYMENOPTERA, FORMICIDAE) FROM THE NORTH CAUCASUS

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Abstract.— A new species, *Myrmica elbrusi* sp. nov., is described from the North Caucasus (Kabardino-Balkaria, Russia). Its main diagnostic features are: the scape smoothly curved at the base, with no trace of lobe or carina; the frontal carinae very feebly curved, merging with the rugae that extend to the posterior margin, not curved outwards and not merged with the rugae surrounding antennal sockets; the frontal lobes not extended; the anterior clypeal margin distinctly prominent, narrowly rounded, not notched medially. Based on the above characters, *M. elbrusi* well differs from any other known Euro-Caucasian *Myrmica* species with smoothly curved scape [e.g. *M. rubra* (L.), *M. ruginodis* Nyl., *M. gallienii* Bondr., *M. bergi* Ruzs.], but fits well either to the *rugosa*- or *dshungarica* species-groups (*sensu* Radchenko and Elmes 2010). Unfortunately, until males of *M. elbrusi* are found, this question cannot be resolved.



Key words.— Ants, Formicidae, *Myrmica elbrusi*, new species, North Caucasus, taxonomy, zoogeography.

INTRODUCTION

A hundred and forty-two extant *Myrmica* good species were recognized in the Old World in the latest comprehensive monographic revision of this genus (Radchenko and Elmes 2010). As the authors predicted might happen, since the publication of this book three new *Myrmica* species have been described from Himalaya (Bharti and Sharma 2011a, 2011b, Bharti 2012a, 2012b), and about 10 as yet undescribed species have been collected in Himalaya and southern China (Bharti, pers. comm. and the authors' unpublished data).

Seventeen *Myrmica* species-groups were recognized in the Old World, many of which are endemic for different regions of Eurasia, mainly for the Himalaya, South and South-West China, South-East Asia, and mountains of Middle Asia (Radchenko and Elmes

2010). Even though no groups appear to be endemic to the Mediterranean Region, Asia Minor and Transcaucasus, there are many endemic species in these regions. Moreover, two endemic species from the latter two regions are quite unusual. The first of them is *M. jennyae* Elmes *et al.*, which was described from east Anatolia and Dagestan; this species combines such unusual features of workers and males that the authors could not place it to any of species-groups, distinguished by them. The second species is *M. tamarae* Elmes *et al.* from East Anatolia. It belongs to the *excelsa*-complex of the *lobicornis*-group and all other related species are distributed from East Siberia to Japan.

The new species, *M. elbrusi* sp. n., described below, is also remarkably unusual compared to any other Euro-Caucasian species and seems to be related to some Himalayan and Middle Asian species.

MATERIAL AND METHODS

The new species is described based on 21 workers and one queen, collected in the North Caucasus (Kabardino-Balkaria, Russia). The studied material is preserved in the following collections:

ZMMU – Zoological Museums of the Moscow State University, Moscow, Russia;

IEMT – Institute of Ecology of Mountain Territories, Kabardino-Balkarian Scientific Centre, Russian Academy of Sciences, Nalchik, Russia;

SIZK – Schmalhausen Institute of Zoology, National Ukrainian Academy of Sciences, Kiev, Ukraine.

Original photos were made in the Museum and Institute of Zoology PAS (Warsaw) using the Leica MZ16 stereomicroscope, connected to the camera IC 3D.

The following measurements of specimens (taken to the closest 0.01 mm) were made for both castes:

- HL – maximum length of head in dorsal view, measured in a straight line from the most anterior point of clypeus (including any carina or ruga, if they protrude beyond the anterior margin) to the mid-point of occipital margin.
- HW – maximum width of head in dorsal view behind (above) the eyes,
- FW – minimum width of frons between the frontal carinae,
- FLW – maximum distance between the outer borders of the frontal lobes,
- SL – maximum straight-line length of scape from its apex to the articulation with condylar bulb,
- AL – diagonal length of the alitrunk (seen in profile) from anterior end of the neck shield to the posterior margin of propodeal lobes (workers), and from the most anterodorsal point of alitrunk to posterior margin of propodeal lobes (queens),
- AH – height of alitrunk, measured from upper level of mesonotum perpendicularly to the level of the lower margin of mesopleuron (queens),
- SCW – maximum width of scutum in dorsal view (queens),
- SCL – length of scutum + scutellum in dorsal view (queens),
- HTL – maximum length of hind tibia, measured from the junction with femur to the junction with the first tarsal joint,
- PNW – maximum width of pronotum in dorsal view (workers),
- PL – maximum length of petiole in dorsal view, measured from the posterodorsal margin of petiole to the articulation with propodeum; the petiole should be positioned so that measured points lay on the same plane,
- PW – maximum width of petiole in dorsal view,

PH – maximum height of petiole in profile, measured from the uppermost point of the petiolar node perpendicularly to the imaginary line between the anteroventral (just behind the subpetiolar process) and posteroventral points of petiole,

PPL – maximum length of postpetiole in dorsal view between its visible anterior and posterior margins,

PPW – maximum width of postpetiole in dorsal view,

PPH – maximum height of postpetiole in profile from the uppermost to the lowermost point, measured perpendicularly to the tergo-sternal suture,

ESL – maximum length of propodeal spine in profile, measured along the spine from its tip to the deepest point of the propodeal constriction at the base of the spine,

ESD – distance between the tips of propodeal spine in dorsal view.

The morphometrics were used to calculate various indices:

CI = HL/HW, FI = FW/HW, FLI = FLW/FW, SI₁ = SL/HL, SI₂ = SL/HW, PI₁ = PL/PH, PI₂ = PL/HW, PPI₁ = PPL/PPH, PPI₂ = PPH/PPW, PPI₃ = PPW/PW, PPI₄ = PPW/HW, ESLI = ESL/HW, ESDI = ESD/ESL, HTI = HTL/HW, AI = AL/AH, SCI = SCL/SCW.

TAXONOMY

Myrmica elbrusi sp. nov. (Figs 1–9)

Etymology. Name derived from the mountain region of Elbrus, where the species was found.

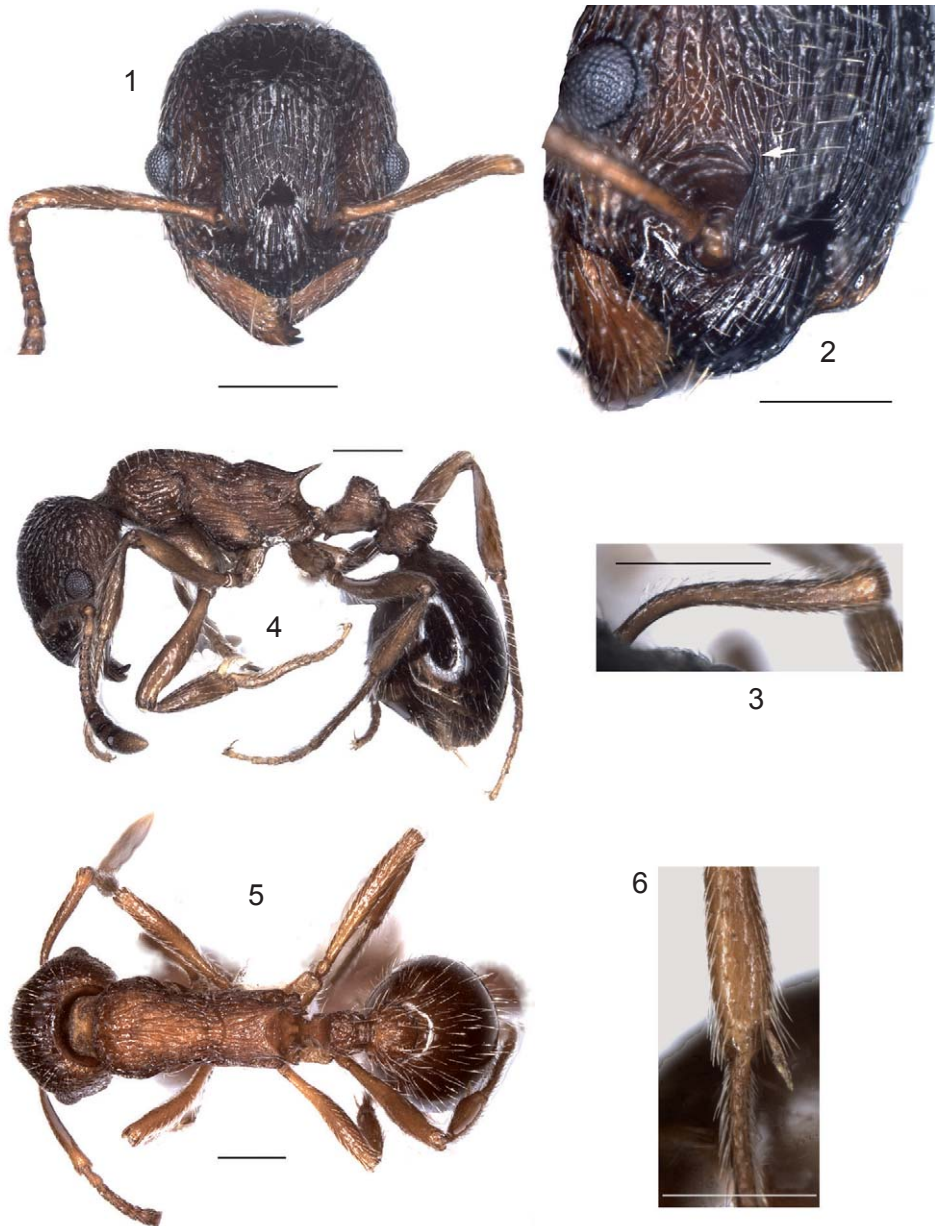
Material examined. **Holotype** worker, North Caucasus, Russia, Kabardino-Balkaria, basin of river Chegem, gorge of river Bashil' – Auzusu, right bank of river Basil', 43°20'N, 42°98'E, alt. 2070 m a.s.l., No. 29, 22.06.2009, leg. Z. Yusupov, on ground (ZMMU); **paratypes:** 9 workers, 1 queen, same label as holotype; 3 workers, North Caucasus, Russia, Kabardino-Balkaria, basin of river Chegem, gorge of river Bashil' – Auzusu, flood-lands, pitfall traps, 43°21'N, 42°98'E, alt. 2103 m a.s.l., No. 36, 22.06.2009, leg. A. Ayidov; 7 workers, North Caucasus, Russia, Kabardino-Balkaria, basin of river Chegem, gorge of river Bashil' – Auzusu, right bank of river Basil', 43°20'N, 42°98'E, alt. 2080 m a.s.l., No. 37, 22.06.2009, leg. Z. Yusupov, under stone; 1 worker, North Caucasus, Russia, Kabardino-Balkaria, gorge Adylsu, No. 34, 05.07.2003, subalpine meadow, leg. Z. Yusupov (IEMT, ZMMU, SIZK).

Description.

Workers (Figs 1–6). Head somewhat longer than broad, with distinctly convex sides, slightly convex occipital margin, and broadly rounded occipital corners; anterior clypeal margin distinctly prominent, narrowly

rounded, not notched medially. Upper lateroventral corners of head rounded, not pointed (seen in profile). Eyes situate somewhat in front of the midlength of sides of head. Mandibles with 6–7 teeth. Frontal carinae very feebly curved, merged with rugae that extend to posterior margin, not curved outwards and not merged with the rugae that surround antennal sockets; frons wide, frontal lobes not extended. Scape relatively short, shorter than head width, smoothly curved at the base with no trace of lobe or carina.

Mesosoma with slightly convex promesonotal dorsum (seen in profile), promesonotal suture indistinct (seen from above). Metanotal groove distinct. Propodeal lobes rounded apically. Propodeal spines of moderate length, very feebly widened at the base, straight, thin and sharply pointed at the tips. Petiole with distinct peduncle, longer than high, its anterior surface strongly concave and quite steep; node dorsum sharply truncated, with distinct, slightly declined posteriorly dorsal plate; postpetiole distinctly higher than long.



Figures 1–6. *Myrmica elbrusi* sp. nov., worker, holotype; 1 – head, dorsal view; 2 – antenna socket and frontal carinae, dorso-lateral view; 3 – antennal scape, lateral view; 4 – body, lateral view; 5 – body, dorsal view; 6 – end on hind tibia and tibial spur. Scale bars – 0.5 mm.

Spurs on middle and hind tibiae well developed and pectinate.

Frons with not numerous, quite coarse and somewhat sinuous longitudinal rugae, their number between frontal carinae level with the eyes less than 20; remaining parts of head dorsum with coarse sinuous rugosity and reticulation, clypeus with quite coarse longitudinal rugae. Surface of head between rugae appearing shiny; frontal triangle smooth and shiny; mandibles longitudinally rugulose.

Pronotal dorsum with longitudinal sinuous rugae and reticulation; mesonotal and propodeal dorsum with almost straight longitudinal rugae; sides of pronotum, mesopleura and sides of propodeum with almost straight longitudinal rugae. Surface between rugae appears shiny. Petiolar node dorsum with short sinuous rugae and reticulation, dorsum of postpetiole with longitudinal rugosity, surface between rugae appears shiny. Gaster smooth and shiny. Occipital and lateral margins of head with suberect hairs of moderate length. Mesosoma and waist with long erect and suberect hairs. Scape and tibiae with subdecumbent pilosity.

Mesosoma and waist brownish-red, head dorsum brown, gaster dark brown; appendages reddish.

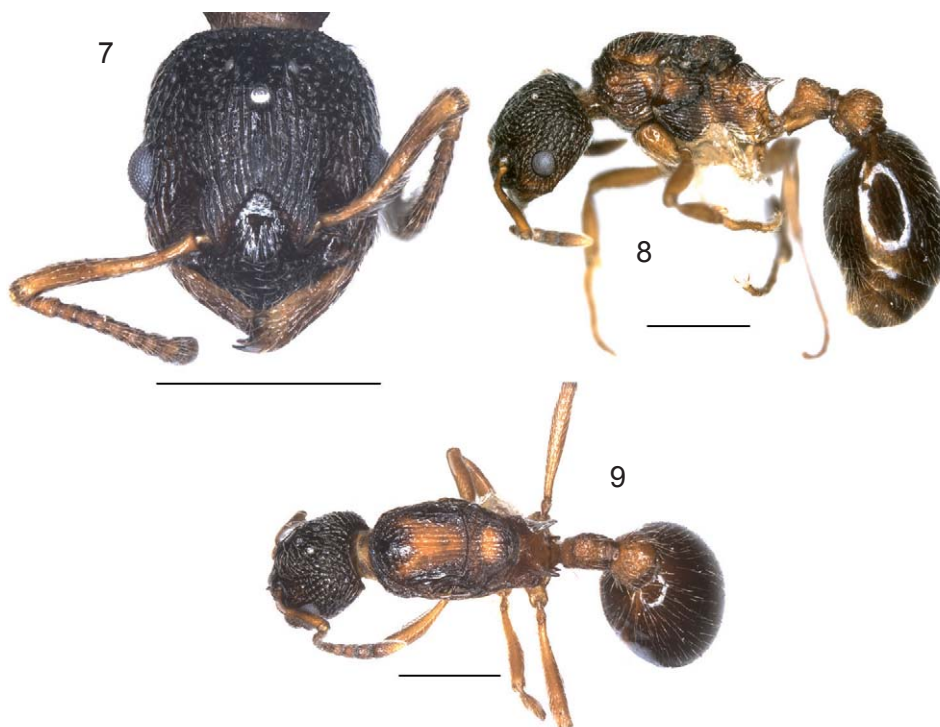
Queen (Figs 7–9). Generally like worker, except for its larger size (ca. 20%), structure of the alitrunk, presence of ocelli and much shorter propodeal spines.

Males. Unknown.

Measurements (in mm): **Workers** (n = 18), ordered as: holotype (min-max) [mean \pm SD]: HL = 1.18 (1.08–1.27) [1.17 \pm 0.058], HW = 1.00 (0.88–1.07) [0.98 \pm 0.057], FW = 0.48 (0.41–0.49) [0.46 \pm 0.026], FLW = 0.50 (0.43–0.53) [0.49 \pm 0.033], SL = 0.90 (0.81–0.94) [0.88 \pm 0.043], AL = 1.65 (1.46–1.81) [1.62 \pm 0.109], PNW = 0.73 (0.62–0.77) [0.70 \pm 0.044], HTL = 0.90 (0.78–0.95) [0.87 \pm 0.053], PL = 0.50 (0.42–0.52) [0.47 \pm 0.035], PW = 0.32 (0.27–0.34) [0.31 \pm 0.022], PH = 0.40 (0.34–0.40) [0.38 \pm 0.025], PPL = 0.34 (0.31–0.38) [0.34 \pm 0.020], PPW = 0.47 (0.38–0.47) [0.44 \pm 0.035], PPH = 0.43 (0.38–0.46) [0.42 \pm 0.027], ESL = 0.28 (0.17–0.30) [0.25 \pm 0.039], ESD = 0.44 (0.36–0.47) [0.42 \pm 0.032].

Indices: CI = 1.18 (1.18–1.25) [1.20 \pm 0.020], FI = 0.48 (0.45–0.49) [0.47 \pm 0.011], FLI = 1.03 (1.03–1.10) [1.07 \pm 0.017], SI₁ = 0.77 (0.73–0.78) [0.75 \pm 0.013], SI₂ = 0.90 (0.88–0.92) [0.90 \pm 0.012], PI₁ = 1.25 (1.02–1.33) [1.26 \pm 0.038], PI₂ = 0.49 (0.44–0.51) [0.48 \pm 0.016], PPI₁ = 0.78 (0.77–0.86) [0.82 \pm 0.032], PPI₂ = 0.93 (0.92–1.00) [0.95 \pm 0.026], PPI₃ = 1.44 (1.33–1.48) [1.42 \pm 0.045], PPI₄ = 0.47 (0.42–0.47) [0.45 \pm 0.018], ESLI = 0.27 (0.18–0.29) [0.25 \pm 0.029], ESDI = 1.60 (1.50–2.15) [1.75 \pm 0.198], HTI = 0.90 (0.85–0.97) [0.89 \pm 0.025].

Queen (n = 1): HL = 1.26, HW = 1.05, FW = 0.49, FLW = 0.53, SL = 0.91, AL = 2.13, AH = 1.04, SCW =



Figures 7–9. *Myrmica elbrusi* sp. n., queen, paratype; 7 – head, dorsal view; 8 – body, lateral view; 9 – body, dorsal view. Scale bars – 1.0 mm.

0.92, SCL = 1.34, HTL = 0.94, PL = 0.61, PW = 0.36, PH = 0.46, PPL = 0.42, PPW = 0.57, PPH = 0.53, ESL = 0.21, ESD = 0.55; CI = 1.20, FI = 0.47, FLI = 1.07, SI₁ = 0.72, SI₂ = 0.86, PI₁ = 1.34, PI₂ = 0.58, PPI₁ = 0.78, PPI₂ = 0.93, PPI₃ = 1.58, PPI₄ = 0.54, ESLI = 0.20, ESDI = 2.63, AI = 2.05, SCI = 1.45.

Distribution. Known only from the type localities.

Ecology. Mountain species, found on subalpine meadows, on floodplains of rivers, on edges of mixed forests (pine, birch) at altitudes 2070–2130 m a.s.l. Nests were built in the soil, often under stones.

DISCUSSION

The main diagnostic features of workers and queens of *M. elbrusi* are: the scape smoothly curved at the base, with no trace of the lobe or carina; the frontal carinae very feebly curved, merging with the rugae that extend to the posterior margin, not curved outwards and not merged with the quite coarse rugae that surround antennal sockets; the anterior clypeal margin distinctly prominent, narrowly rounded and not-notched medially; the frontal carinae feebly curved, frons wide, and the frontal lobes not extended.

By the combination of these features, *M. elbrusi* does not fit to any species-groups of *Myrmica* (*sensu* Radchenko and Elmes 2010), known to occur in the Euro-Caucasian region, and it clearly differs from any *Myrmica* species from this region that have curved scapes. The structure of the frontal carinae well distinguishes *M. elbrusi* from *M. rubra* and *M. ruginodis* (*rubra* species-group); in the latter two species, the frontal carinae curve outwards and merge with the rugae that surround the antennal socket. *M. elbrusi* also differs from a set of species of the *scabrinodis*-group which have a curved scape with no additional structures on its bend (e.g. *M. gallieni*, *M. bergi*, *M. rugulosa* Nyl., *M. aloba* For., *M. constricta* Karaw.) by the much more coarse concentric rugae, surrounding antennal sockets, and especially by the distinctly prominent medially anterior clypeal margin. Finally, it also well differs from any species of the *lobicornis*-group, which have gradually curved scape, by the absence on the median notch on the anterior clypeal margin.

On the other hand, *M. elbrusi* shares diagnostic features with both the *rugosa*- and *dshungarica* species-groups (e.g. shape and structure of scape, frontal lobes, and clypeus). These two species-groups were formally separated by the characters of the males, particularly by the length of their scapes: males of the *dshungarica*-group have long antennal scapes (SI₂ > 1.0) while scapes of the *rugosa*-group males are much shorter (SI₂ < 0.6). As we have only workers and a queen of *M. elbrusi*, we can not place the newly

described species with certainty to either the *rugosa*-, or the *dshungarica*-groups. A similar problem occurred with *M. afghanica* (Radchenko and Elmes 2003).

However, based on the character of its sculpture, body size and general appearance, we think that *M. elbrusi* most probably belongs to the *rugosa*-group rather than to the *dshungarica*-group. The species of the latter group (e.g. *M. dshungarica* Ruzs., *M. ferganensis* Karaw., *M. juglandeti* Arn., and *M. kryzhanovskii* Arn.) are distributed in the mountains of Middle Asia and are smaller, have the finely sculptured body and lighter colour, etc. All species of the *rugosa*-group are distributed in Himalaya: the group is divided into two species-complexes – *rugosa*-complex and *cachmiriensis*-complex (Radchenko and Elmes 2001, 2010). The promesonotal dorsum in the species of the *cachmiriensis*-complex does not form a regular arch; the mesonotal dorsum is impressed transversely, often saddle-shaped and curves down abruptly to the propodeum to form deep and wide metanotal groove (seen in profile); the body sculpture is fairly coarse. These features well separate *M. elbrusi* from any species of this complex. On the other hand, the shape of the promesonotal dorsum and generally quite coarse body sculpture in *M. elbrusi* is comparable to the species of the *rugosa*-complex (ignoring the socially-parasitic species *M. ereptrix* Bolton and *M. nefaria* Bharti which have very characteristic and amazing morphology). Nevertheless, *M. elbrusi* differs from any of the free-living species of this complex, e.g. *M. rugosa* Mayr, *M. aimonissabaudiae* Men., *M. rupestris* For., *M. hecate* Weber, and *M. foreliana* Radchenko et Elmes by a complex of features, but the most obvious is the shape of petiolar node that have distinct, often somewhat inclined posteriorly, dorsal plate (similar to that in *M. scabrinodis* Nyl.) (for details see Radchenko and Elmes 2010; Bharti 2012a).

In conclusion, although one may make the definitive decision of the species-group position of *M. elbrusi* only when males of this species are found, we can state that it seems to be an “alien” element in the Caucasian fauna (especially in the North Caucasus), and most probably represents an ancient, Tertiary relicts in the Caucasian myrmecofauna. This discovery confirms the uniqueness and interest of the Caucasian fauna.

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