

## New data on the distribution and ecology of *Myrmica ravasinii* Finzi, 1923 (Hymenoptera, Formicidae)

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**ABSTRACT.** *Myrmica ravasinii* Finzi, 1923 was formerly recorded from Balkans, Greece, Turkey, and Transcaucasia. We report the first records of this species from the North Caucasus (North Ossetia-Alania and South Ossetia). The taxonomic position, morphological characteristic, modern distribution and ecology of *M. ravasinii* are discussed.

**Keywords:** Ants, fauna, taxonomy, morphology, North Caucasus, ecology

### INTRODUCTION

*Myrmica* is predominately a Holarctic genus, but many species are also found in the mountains of the Oriental Region (Himalaya, Taiwan, Southern China, Vietnam, Burma, Thailand and Indonesia) and the Neotropics (Mexico), though most of the species are known from the Palaearctic. In the latest monographic revision of this genus (Radchenko & Elmes 2010) 142 extant *Myrmica* species were recorded from the Old World, and only about 30 – from the North America. However, after 2010 seventeen new *Myrmica* species were described from Europe (Seifert et al. 2014), Himalaya (Bharti & Sharma, 2011 a, b, c, 2013, Bharti 2012 a, b), and China (Ma & Xu 2011, Chen et al. 2016).

The modern concept of the species-groups in the genus *Myrmica* was proposed by Radchenko (1994 a) and further improved by Radchenko & Elmes (2010). These authors recognized 17 groups of the Old World *Myrmica*

and placed *M. ravasinii* to the *schencki*-group (see also Radchenko 1994 a, b, Seifert 2003, Radchenko et al. 2006).

*Myrmica ravasinii* was described by Finzi (1923) based on many workers from Albania (Tomor) and for a long time it was known only from the type series until Zhizhilashvili (1967, 1974) found this species in Georgia. Later, it was recorded also for Turkey, Yugoslavia, Armenia and Greece (Agosti & Collingwood 1987, Arakelyan 1989, Petrov & Collingwood 1992, Seifert 2003, Radchenko et al. 2006, Radchenko & Elmes 2010, Kiran & Karaman 2012).

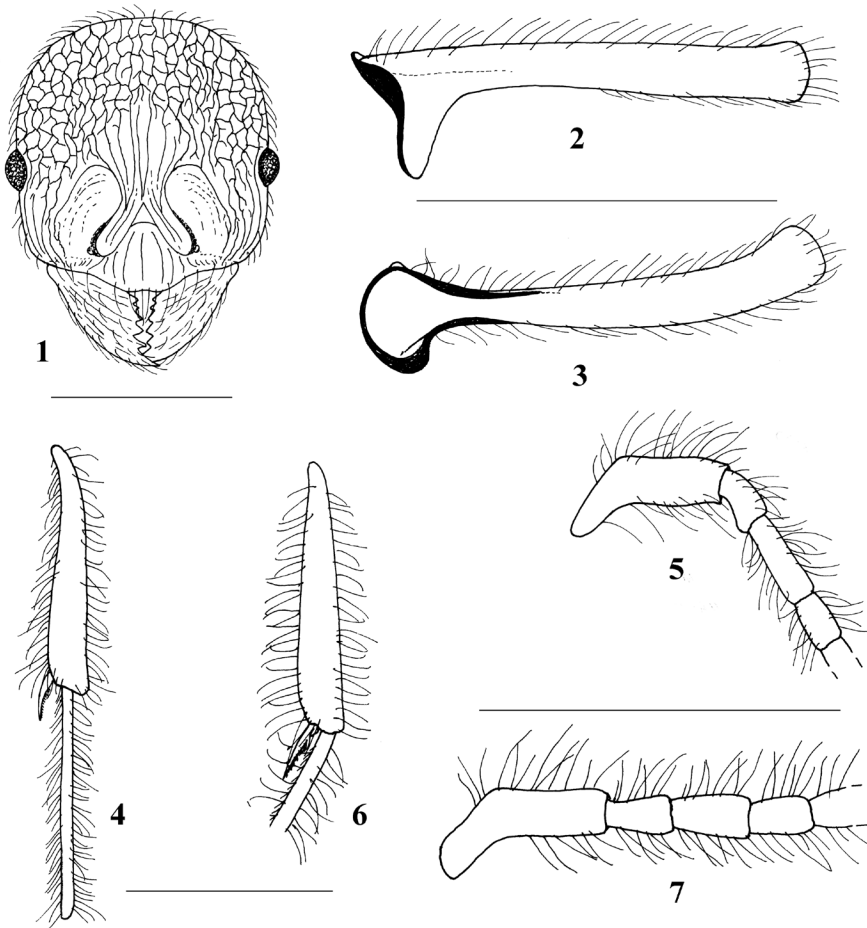
Somewhat unexpectedly, *M. ravasinii* was found recently by one of the authors of this paper (YuK) in the North Caucasus – in North Ossetia-Alania (Russia) and in South Ossetia (Georgia) that are currently the northernmost and easternmost known localities of this species. Here, we discuss morphological peculiarities, taxonomic position, character of distribution, and ecology of *M. ravasinii*

## MATERIAL AND METHODS

We examined material both collected by us and by our colleagues in Armenia, North Caucasus, Greece and Turkey, and preserved in various museums and institutions: Shmalhausen Institute of Zoology of the National Academy of Sciences of Ukraine, Kiev, Ukraine (SIZK), Zoological Museum of the Moscow State University, Moscow, Russia (ZMMU), Museum and Institute of Zoology of the Polish Academy of Sciences, Warsaw, Poland (MIZ), Museo Civico di Storia Naturale “Giacomo Doria”, Genoa, Italy (MSNG), and private collection of G. W. Elmes (ELMES), Wareham, UK. Newly collected material from the North Caucasus is preserved in Tembotov

Institute of Ecology of Mountain Territories of the Kabardino-Balkarian Scientific Centre of the Russian Academy of Science, Nalchik, Russia (IEMT) and in SIZK.

Measurements used in this paper are: frons width – the minimal distance between frontal carinae; scape length – the maximum straight-line length of scape from its apex to the articulation with condylar bulb; head width – maximum width of head in dorsal view behind (above) the eyes; head length – maximum length of head in dorsal view, measured in a straight line from the anterior point of clypeus to the mid-point of occipital margin (see also Radchenko & Elmes 2010).



**Figs 1 – 7.** Details of structure of *Myrmica ravasini* (1-3, worker, syntypes; 4, 5, male) and *M. caucasicola* (6, 7, male). 1 – head, dorsal view; 2 – antennal scape, lateral view; 3 – antennal scape, dorsal view; 4, 6 – hind tibia and basitarsus; 5, 7 – antennal scape and three basal funicular segments. Scale bars – 1 mm (draw by A. Radchenko).

## RESULTS

### Taxonomic position and morphological peculiarities of *M. ravasinii*

As mentioned above, *Myrmica ravasinii* belongs to the *schencki* species-group, female castes of which have antennal scape strongly angled at the base and with vertical lobe or dent; the lobe or dent always forms shield-like plate along the short (vertical) surface of scape; additionally, anterior clypeal margin widely rounded and notched medially. Males have short scape (ratio of the head length / scape length < 0.50) (Radchenko 1994 a, b, Seifert 2003, Radchenko et al. 2006, Radchenko & Elmes 2010).

Although it can be quite difficult to discriminate between some *Myrmica* species (see keys in Radchenko & Elmes 2010) since many of them show considerable variation in their important diagnostic characters, *M. ravasinii* is one of the most distinctive species that practically cannot be confused with any other member of this genus either from the Euro-Caucasian region or worldwide. Its workers have the narrowest frons among all known *Myrmica* species (ratio of frons width / head width < 0.19, mean  $0.17 \pm 0.015$ ). Such narrow frons biomechanically seems to be a result of development of the extraordinarily enlarged lobe at the scape bent, which is also the biggest among all known *Myrmica* species (Figs 1-3). These features appear to be quite stable morphologically over the species range.

Males of *M. ravasinii* most resemble those of *M. caucasicola* Arnoldi, 1934 particularly by the presence of very long semi-erect to erect hairs on the middle and hind tibiae (Figs 4, 6) (where they are known, the males of all other species of this group have short subdecumbent pilosity on the hind tibia). Formerly Radchenko et al. (2006) could not separate *M. ravasinii* and *M. caucasicola* in their key for males and placed them in the same couplet. After re-investigation of the corresponding material, we have found that they can be separated by the length of second funicular segment: it is ca. twice longer than the third one in *M. ravasinii*, and not more than 1.5 times longer than the third one in *M. caucasicola* (Figs 5, 7).

### New material examined and geographical distribution

Twelve workers of *M. ravasinii* were recently collected by one of the co-author of this paper (YuK) using pitfall traps in four localities in the North Caucasus:

- 1) North Ossetia-Alania (Russia): Alagir Distr., Tsejsky gorge, 42°47' N, 43°54' E, 18.VI.2014, 1 worker, (IEMT);
- 2) North Ossetia-Alania (Russia): Alagir Distr., 50 km E of vil. Tibsli, Narsky gorge, 42°41' N, 43°59' E, 28.VII.2015, 5 workers (IEMT, ZISK);
- 3) South Ossetia (Georgia): Malo-Liakhvsky gorge, S slope, 1 km NE from vil. Atsritskhev, 42°17' N, 44°13' E, 2 and 3.X.2014, 5 workers (IEMT, ZISK);
- 4) South Ossetia (Georgia): 1 km NW of Tskhinval, 42°13' N, 43°58' E, 2.X.2014, 1 worker (IEMT).

Furthermore, we examined both the syntypes specimens from Albania: “Tomor”, “Albania 1922, Ravasini, Lona”, “4011 Coll. Karawajewi”, “*M. ravasinii* F. cotype det. Finzi”, 1 worker, (SIZK); “Tomor”, “Albania 1922, Ravasini, Lona”, “*M. ravasinii* F. cotype det. Finzi”, 2 workers, (ZMMU), 1 worker with the same labels (MIZ); “Tomor, Albania, 7.22”, “*M. ravasinii* cotipi”, 2 workers (MSNG), and the quite rich non-type material (totally > 100 workers, 5 gynes/queens, 27 males) from the following localities: Greece: Tsoumerka Mts., leg. Agosti, 1 worker; Turkey: Sivrihasar, Kirka, leg. Collingwood, 5 workers; Küre, Grae, alt. 2000 m a.s.l., leg. Collingwood, 1 worker; SW Turkey, Konya Province, Medesiz Dag, ca 15 km SW Ulukişla, nr. Yeniyildiz, alt. 1860 m a.s.l., leg. Elmes, 95 workers, 4 gynes/queens, 26 males; SW Turkey, Konya Province, Bolkar Dağı, ca 10 km SW Ulukişla alt. 1800 m a.s.l., leg. Radchenko, 35 workers; Georgia: Tsagveri, alt. 1200 m a.s.l.; Zekarsky Pass, alt. 2150 m a.s.l., leg. T. Zhizhilashvili, 2 workers; Armenia: Razdan Distr., vil. Arzakan, alt. 1750 m a.s.l., leg. Arakelyan, 3 workers 1 gyne, 1 male).

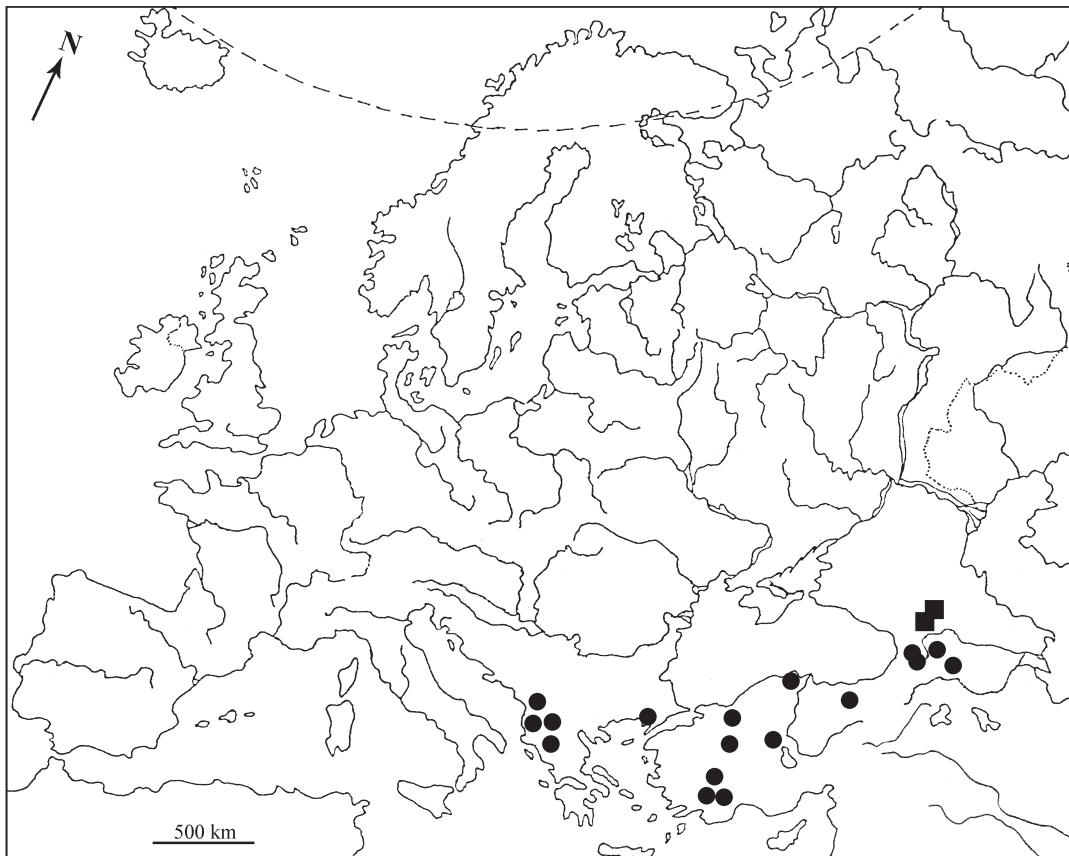
Additionally (and not examined by us), *M. ravasinii* has been recorded from Georgia (Patara-Tsemi, alt. 1370 m a.s.l.; Aspindza Distr., vicinity of Ota) by Zhizhilashvili (1967, 1974),

from Trace (European part of Turkey) (Agosti & Collingwood 1987), from Armenia (Razdan Distr., vil. Ahkavnadzor) by Arakelyan (1989), and from Greece (25 km ENE Mestovo, alt. 1600 m a.s.l.) and Turkey (Anatolia) (20 km E Refahiye, alt. 1800 m a.s.l.; Tepeleci; Bolu Distr., Abhant Gölü) by Seifert (2003).

Agosti & Collingwood (1987) and Seifert (1988) reported *M. ravasinii* from “Yugoslavia” (“S Yugoslavia” in Seifert 1988) without giving a specific locality. Later these data were simply repeated without any additional information or corrections by many subsequent authors (Arakelyan 1989, Petrov & Collingwood 1992, Radchenko 1994 b, 2013; Radchenko et al. 2006, Radchenko & Elmes 2010). Similarly, Borowiec & Salata (2012) have recorded it from Serbia and Montenegro, and Borowiec (2014) recorded it from Serbia.

Because of the absence of concrete locality data and not seeing the corresponding material the presence of *M. ravasinii* in former Yugoslavian countries has never been confirmed. Consequently it is not recorded in the latest check-lists from Croatia (Bračko 2006), Slovenia (Bračko 2007), Montenegro (Karaman 2004, 2011, Petrov 2008), Macedonia (Karaman 2009, Bračko et al. 2014) and Bosnia and Herzegovina (Vesnić 2011). Moreover, the finding of this species in “Yugoslavia” (more correctly – in Serbia and Montenegro) was not confirmed in the more recent publications of Petrov (2000, 2006).

All the above authors are well experienced myrmecologists, who in our opinion are highly unlikely to miss or misidentify *M. ravasinii* if they had it in their own hands. Until more details of Agosti & Collingwood’s old record of *M. ravasinii* for “Yugoslavia” are found, we



**Fig. 8.** Map of distribution of *Myrmica ravasinii*; dots – formerly known localities, squares – new localities in the North Caucasus (draw by A. Radchenko)

might suppose that their material either was mislabelled, or probably that they found it perhaps in Macedonia. Anyway, the presence of this species in the former Yugoslavian countries needs confirmation. Note also that *M. ravašinii* has not been found in countries adjacent to Turkey, i.e. in Bulgaria (Lapeva-Gjonova et al. 2010) or in Iran (Paknia et al. 2008, 2010), although we think it probably lives there.

Thus, *M. ravašinii* seems to be Balkan-Caucasian species distributed from Albania through Greece, Turkey and Transcaucasia until North Caucasus, and its area lays between ca. 37-44° N and 20-44° E (Fig. 8).

### General ecology

The ecological characteristics of the North Caucasian localities of *M. ravašinii* are:

- 1) North Ossetia-Alania, Tsejsky gorge: the relatively sparse pine (*Pinus sosnowskyi*) forest on a steep scree slope (the steepness of about 45°) at an altitude 1895 m a.s.l. and ca. 200 m over the bottom of the gorge. Besides pine trees in this forest are growing birch and rowan trees, in the undergrowth grow raspberries, in the grass cover dominate moss, bilberries and cowberries.
- 2) North Ossetia-Alania, Narsky gorge: the southern slope with ruderal herbaceous vegetation at an altitude 1720 m a.s.l.
- 3) South Ossetia, Malo-Liakhvsky gorge: the dense mixed hornbeam (*Carpinus caucasica*) forest at altitudes 1280-1300 m a.s.l. The species composition of the forest include also oak (*Quercus iberica*), ash-tree (*Fraxinus excelsior*), linden (*Tilia cordata*), beech (*Fagus orientalis*), birch, cherry-plum, pear, apple-tree, dog-tree, dog-rose, elder-tree and some others. The average height of trees is 12-15 m, and crown density of forest stand of the first tier reaches 100%. The herbage includes cyclamen, hellebore, primula, fescue and various orchids.
- 4) South Ossetia, vicinity of Tskhinval: the oak (*Quercus robur*) forest, planted in 1940<sup>th</sup> at an altitude 830 m a.s.l. The average height of trees is 20 m, and crown density is about 90%. The herbage is very sparse (the projective cover is less than 15%) and includes

sporadic fescue, *Dorycnium* sp., cyclamen, and Solomon's Seal (*Polygonatum*).

Based on both our own, literature and collections' data it could be argued that *M. ravašinii* is generally a semi-xerophilous species, but it seems to be quite tolerant to various types of habitats. Although the regions where it distributed are very hot in summer, it lives in mountains at altitudes between 800 and 2150 m a.s.l. where temperature is significantly lower than in plains. Here *M. ravašinii* inhabits predominantly various types of fairly open forests (oak, pine, hornbeam, abies), but avoids both more cool and wet beech forests, and more hot and dry archa (*Juniper*) forests. In drier woods it is often associated with the edges of small gullies where the sub-soil may be a little moist. At the same time, it was also found on subalpine meadows. Nests are built in the soil, often under stones. In southwest Turkey sexuals were found in nests on 18<sup>th</sup> and 20<sup>th</sup> of August, but to the north, in Armenia, they were found on 30<sup>th</sup> of August (Arakelyan 1989, Seifert 2003, Radchenko et al. 2006, Radchenko & Elmes 2010, Elmes, personal communication 2015, Radchenko, unpublished data).

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