The genus *Myrmica* Latreille, 1804 (Hymenoptera: Formicidae) in Romania: distribution of species and key for their identification

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Summary: Genus *Myrmica* is one of the largest ant genera in Romania with 18 species distributed across the entire country. In the frame of this study we present the distribution data of all Romanian *Myrmica* species: *M. bergi*, *M. constricta*, *M. gallienii*, *M. hellenica*, *M. lobicornis*, *M. lonae*, *M. karavajevi*, *M. rubra*, *M. ruginodis*, *M. rugulosa*, *M. sabuleti*, *M. salina, M. scabrinodis*, *M. schencki*, *M. slovaca*, *M. specioides*, *M. sulcinodis* and *M. vandeli.* Four species are reported for the first time in the Romanian fauna: *M. bergi*, *M. constricta*, *M. gallienii* and *M. karavajevi*, while the occurrence of several species is probable. These species are listed separately. In addition, a key to the worker caste of *Myrmica* (with the use of male characters for some species) is provided, including species with likely occurrence in Romania.

Key words: ants, fauna, *Myrmica bergi*, *Myrmica constricta*, *Myrmica gallienii*, *Myrmica karavajevi*, new records

Introduction

The genus *Myrmica* Latreille, 1804 is one the largest ant genera in the Old World containing more than 150 described extant species (Radchenko and Elmes 2010, Bharti and Sharma 2011a, b, Bharti 2012, Bharti and Sharma 2013). *Myrmica* species live mostly in the temperate zones from the steppe/forest steppe region to boreal pine forests, but a considerable number of species also live in warmer regions (e.g. Mediterranean), and some even in the tropics (Radchenko and Elmes 2003, 2010). Most of the species nest in the ground, moss tussocks, decaying wood, etc. They are, generally, omnivorous ants. Facultative aphid tending has also been observed, and recently the pollenivory of several *Myrmica* species has been documented (Czechowski *et al.* 2008, Czechowski *et al.* 2011). The genus contains a wide variety of socially parasitic species (Radchenko and Elmes 2010), but *Myrmica* species also serve as hosts to a number of other parasites, such as fungi (e.g. Tartally *et al.* 2007, Csata *et al.* 2013), nematodes (Csősz and Majoros 2009), caterpillars of the endangered *Phengaris* Doherty (= *Maculinea* van Eecke) butterflies (e.g. Tartally and Varga 2008, Tartally *et al.* 2008a, b), but also to other organisms.

The *Myrmica* species of Central and East Europe are relatively well known, the number of occurring species is stable: 18 in Austria (Steiner *et al.* 2002, Seifert 2007), 14 in Bulgaria (Lapeva-Gjonova *et al.* 2010), 13 in Croatia (Bračko 2006), 16 in the Czech Republic (Werner and Wiezik 2007), 18 in Germany (Seifert 2007), 15 in Hungary (Csősz *et al.* 2011), 6 in F.Y.R. of Macedonia (Bračko *et al.* in press), 9 in Montenegro (Karaman 2004), 18 in Poland (Czechowski *et al.* 2012), 14 in Serbia (Petrov 2006), 15 in Slovakia (Werner and Wiezik 2007), 14 in Slovenia (Bračko 2007) and 20 in Ukraine (Radchenko, unpubl. data).

The earliest faunistic reports on *Myrmica* species in the current territory of Romania are from the 19th century (e.g. Mayr 1853, Fuss 1855, Frivaldszky 1869, 1871, Mocsáry 1876, 1879). These sporadic records mostly refer to the western part of present-day Romania, while data on southern Romania are available only as of the beginning of the 20th century (e.g. Forel 1906, Montandon and Santschi 1910). As of the 1950s, there has been a growing amount of data on the distribution and ecology of *Myrmica* species in Romania (e.g. Paraschivescu 1961, 1962a, b, 1968, 1972a,b, 1975a-d, 1976a,b, 1978a,b, Csősz *et al.* 2001). The recent checklist of Romanian ants (Markó *et al.* 2006) reports 14 valid *Myrmica* species for Romania (one with questionable occurrence), but since its publication four more species have been identified. We give here the complete list of published localities for all known Romanian *Myrmica* species including new findings. Problematic species and species with probable occurrence in Romania are listed separately. In addition, we also provide a key to the worker caste of *Myrmica* species known to occur or with probable occurrence in Romania.

Materials and methods

The current list of species was prepared on the basis of each publication containing data on *Myrmica* species from the territory of present-day Romania, irrespective of the article's original focus (faunistic, ecology, etc.). Additionally, the collection of the Hungarian Natural History Museum (Budapest, Hungary) was also investigated for unpublished data. The results of recent field surveys carried out by the authors are also included, these materials are deposited in the collections of the Babeş-Bolyai University, Cluj-Napoca, Romania (BBU), Hungarian Natural History Museum, Budapest, Hungary (HNHM), Museum and Institute of Zoology of the Polish Academy of Sciences, Warsaw, Poland (MIZ) and Natural History Museum of Sibiu, Romania (NHMS).

The list of names was created on the basis of the exhaustive monograph of Radchenko and Elmes (2010). In addition to the valid name of each species we also list the erroneous names that were published in the literature regarding Romanian *Myrmica* species. The faunistic data are the same in two of Mocsáry's (1897, 1918) and Markó's studies (1997a, 1998a); thus we cite only the earlier publications in both cases. Collecting sites are listed according to their larger regional administrative entities (counties), which are abbreviated as follows: AB – Alba; AR – Arad; B – Bucharest; BC – Bacău; BH – Bihor; BN – Bistriţa-Năsăud; BV – Braşov; CJ – Cluj; CL – Călăraşi; CS – Caraş-Severin; CT – Constanţa; CV – Covasna; DB – Dîmboviţa; DJ – Dolj; GJ – Gorj; GR – Giurgiu; IF – Ilfov; IL – Ialomiţa; IS – Iaşi; HD – Hunedoara; HR – Harghita; MH – Mehedinţi; MM – Maramureş; MS – Mureş; NT – Neamţ; PH – Prahova; SB – Sibiu; SJ – Sălaj; SM – Satu Mare; SV – Suceava; TL – Tulcea; TM – Timiş; VN – Vrancea; VS – Vaslui. In some cases, collecting sites could not be precisely identified, as only larger areas, mountains or river valleys were mentioned in the publications. Such collecting sites are listed under the category of Unknown Locations (UL) along with the county where these belong to, while the distribution maps of species do not feature these locations. New, hitherto unpublished data are also presented separately. The caste of individuals is also given as follows: w = workers, q = gynes, m = males.

Morphometric measurements (accurate to 0.01 mm) and indices used in the keys are:

HL – maximum length of head in dorsal view, measured in a straight line from the 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;

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;

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;

PW – maximum width of petiole in dorsal view;

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.

We use several indices (ratio of one measurement to another) in the Key, but, for convenience, we do not refer to their abbreviations within the text, rather give their *in extenso* form (i.e. HW/FW instead of FI) (for more details see Radchenko and Elmes 2010).

List of reported species

Altogether at the moment 18 *Myrmica* species have been documented in Romania. Four of these species are new records for the myrmecofauna: *M. bergi*, *M. constricta*, *M. gallienii* and *M. karavajevi*. There are at least five additional species that are expected to occur in Romania. These are also listed at the end of the survey. *M. turcica* Santschi, 1931 was recorded for Romania by Seifert (2002), but since this name is considered now as a junior synonym of *M. specioides*, we deleted *M. turcica* from the list of Romanian species.

Myrmica bergi Ruzsky, 1902

The *Myrmica bergi* inhabits the Steppe Zone between the Danube Delta and the Altai Mts., the Transcaucasus, north-eastern Iran, and plains and mountains of Middle Asia. Typically, it prefers salt marshes, riverbanks or seashores, where it may be very abundant. Colonies may contain several thousand workers, and nests sometimes develop into polycalic systems (Bondar *et al.* 1998, Bondar and Rusina 2003, Radchenko and Elmes 2010). It is a new species for Romania. It has only been documented in salt marshes at the Black Sea shore in the Danube

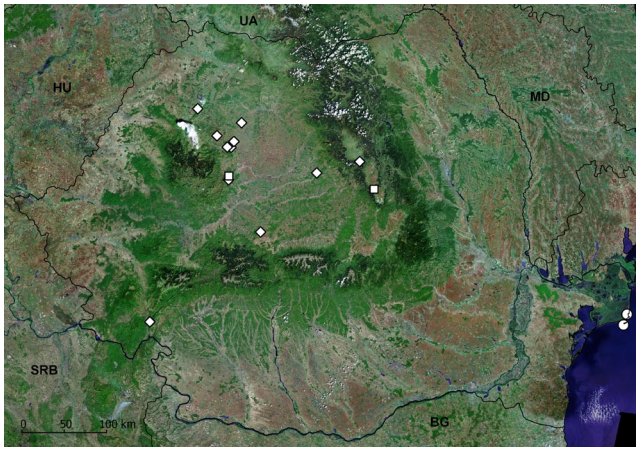


Fig. 1. Distribution of *Myrmica bergi* (circles), *M. gallieni* (diamonds) and *M. karavajevi* (squares) in Romania (white symbols - new collections.

Delta (Fig. 1). It is probably more abundant in this region.

New collecting sites: TL: Sacalin Island (18w, 05.05.2008, leg. Markó, coll. BBU), Sfântu Gheorghe (18w, 03-05.05.2008, leg. Markó, coll. BBU).

Myrmica constricta Karawajew, 1934

Present in Western, North, Central and East Europe, the *Myrmica constricta* has been documented in Austria, Bulgaria, Croatia, Czech Republic, Finland, Germany, Italy, Poland, Serbia-Montenegro, Switzerland and Ukraine (Seifert *et al*. 2009, Radchenko 2009, Radchenko and Elmes 2010, Czechowski *et al*. 2012). The species lives in superficially dry habitats – banks of stagnant waters, river terraces, exposed slopes – with sandy soils covered partially with vegetation. It nests in the ground, sometimes under stones. It has fairly big colonies. Large colonies tend to be polygynous. In Romania, the *M. constricta* has only been documented in Transylvania (Fig. 2).

Published records: BH: Crişul Repede strait (Markó 1997a, 1998b, Gallé *et al.* 2005); CJ: Cluj-Napoca (Fânaţele Clujului) (Markó 1998b); CV: Moacşa (Markó 1998b); MS: Sălard (Markó 1998b); SB: Sibiu (Guşteriţa) (Csősz and Markó 2005), Mediaş (Seifert *et al.* 2009).

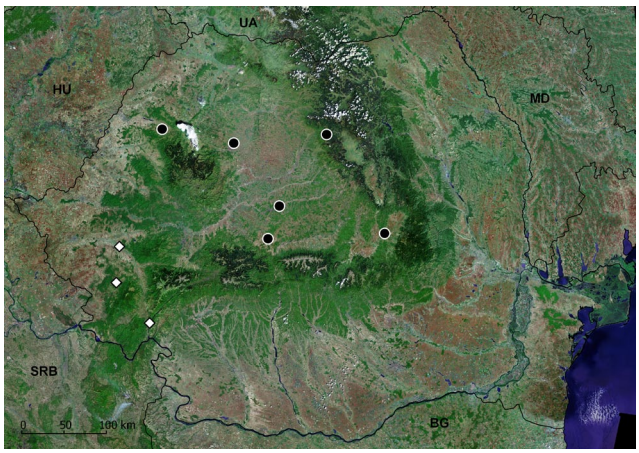


Fig. 2. Distribution of *Myrmica constricta* (circles) and *M. hellenica* (diamonds) in Romania (white symbols - new collections, black symbols - published data).

Note: Seifert *et al*. (2009) revived the name *Myrmica constricta* from synonymy of *M. hellenica* Finzi, 1926 claiming that the two are separate morphological entities that are also geographically separated. They proposed that *M. constricta* is a European species distributed from West to East Europe, while *M. hellenica* is a Ponto-Caucasian to East Mediterranean species found in the region stretching from the Balkans to the Caucasus and Turkey. The re-analysis of known *M. hellenica* material in Romania yielded the identification of *M. constricta* on the basis of the description of Seifert *et al.* (2009). Thus, currently *M. constricta* is known to occur in the Transylvanian part of Romania, which is indeed linked to the Central-European fauna, while *M. hellenica* occurs in Southern Romania , which has more in common with Ponto-Caucasian fauna.

Myrmica gallienii Bondroit, 1920

Myrmica gallienii has been documented in the region stretching from Central and East Europe to West Siberia, as well as from Sweden, Finland , and Bulgaria. It lives in moist meadows and swamps that are frequently saline. It builds shallow nests with a soil mound in moist habitats but deep nests in sandy habitats. It forms large colonies with thousands of individuals (Radchenko and Elmes 2010). It is a new species for the Romanian fauna, documented only in a few localities (Fig. 1), though it may well be more frequent than observation thus far has shown.

New collecting sites: AB: Colţeşti (9w, 14.04.2012, leg. Markó *et al.*, coll. BBU); CJ: Aluniş (6w, 20.04.2012, leg. Markó *et al.*, coll. BBU), Cluj-Napoca (1w, 04.10.2004, leg. Sipos et Boros, coll. BBU), Cluj-Napoca (Fânaţele Clujului) (6w, 10.06.2010, leg. Markó *et al.*, coll. BBU), Cluj-Napoca (Hoia forest) (6 w, 14.07.2011, leg. Tăuşan *et al.*, coll. NHMS), Şardu (6w, 03.06.2011, leg. Markó *et al.*, coll. BBU); CS: Băile Herculane (6w, 09.05.2004, leg. Markó, coll. BBU); HR: Senetea (6w, 07-08.07.2010, leg. Markó *et al.*, coll. BBU); MS: Ghindari (1q, Makfalva, 28.08.1908, leg. Nagy, *Myrmica sulcinodis* Nyl. det. Somfai, coll. HNHM); SB: Ocna Sibiului (1 q, 01, 07. 2009 leg. Tăuşan, coll. NHMS); SJ: Zalău (1m, 08.09.1882, Zilah, leg. Anonymous, *Myrmica rugulosa* Nyl. det. Biró, coll. HNHM); UL: in the Harghita Mts. near Ciceu (Harghita County) (4w, Csicsói Hargita k. old. [1600 m], 15.07.1943, leg. Szent-Iványi, *Myrmica ruginodis* Nyl. det. Somfai, coll. HNHM)

Myrmica hellenica Finzi, 1926

Myrmica hellenica is present in Southern Europe (Bulgaria, Croatia, Greece, Italy, Serbia-Montenegro, Slovenia), southern Russia, Ukraine (Crimea),

and Turkey and the Caucasus (Seifert *et al*. 2009, Radchenko and Elmes 2010). It lives in superficially dry xerothermous habitats close to water, on sandy soil, that is partially covered with vegetation. It nests in soil, usually near plant roots. It has fairly big nests, and large colonies are polygynous. It has been documented in a few localities in the southern part of Romania (Fig. 2; see Note on *M. constricta*).

New collecting sites: CS: Băile Herculane (11w, 10.10.2011, leg. Markó *et al.*, coll. BBU), Reşiţa (7w, 10.10.2011, leg. Markó *et al.*, coll. BBU); TM: Lugoj (3w, 09.10.2011, leg. Markó *et al.*, coll. MIZ).

Myrmica karavajevi (Arnoldi, 1930)

Myrmica karavajevi is a widely distributed workerless socially parasitic species present in the Ukraine, the European part of Russia, Belarus, Moldova, Hungary, Estonia, Finland, Sweden, Norway, Poland, the Czech Republic, Germany, Belgium, Austria, Switzerland, England, Italy, France and Spain (Radchenko and Elmes 2010, Csősz *et al.* 2011). It lives in nests of the *M. scabrinodis*-group, species which live in warm and humid conditions. It is a new species for the Romanian fauna, documented only in a single site, a humid meadow (Fig. 1). It was caught by pitfall trap.

New collecting site: AB: Rimetea (1q, 29.09-06.10.2012, leg. Czekes *et al.*, coll. BBU) ; HR: Miercurea-Ciuc (3q, 23.07-02.08.2012, leg. Czekes *et al.*, coll. BBU).

Myrmica lobicornis Nylander, 1846

The species was also reported as *Myrmica labicornis* [sic] in Paraschivescu (1976a, 1978b).

Myrmica lobicornis is a boreo-mountain species, distributed in the planes of North Europe and of the northern part of Central Europe, in the mountains of Central and Southern Europe (absent in Iberian Peninsula), in the forest zone of East Europe, the Caucasus, West Siberia and north-east Kazakhstan, East Siberia, and Mongolia (stretching eastward until Transbaikalia). It lives in coniferous (sometimes mixed) forests, but also in meadows and pastures. It nests in the ground, leaf litter, and moss, and under stones, and in rock crevices, etc. Colonies are monogynous with a maximum of a few hundred workers. In Romania, although data is scarce, it seems to be widely distributed in hill and mountain regions (Fig. 3).

Published records: DB: Rîul Alb (Fromunda *et al*. 1967); HD: Orăştie (Markó and Csősz 2002) HR: Lacul Dracului (Harghita Mts.) (Markó *et al*. 2004); MS: Stânceni – Gurghiu Mts. (Markó 1999c); PH: Sinaia (Paraschivescu 1976a); SB: Sadu Cînaia, Racoviţa (Tăuşan *et al*. 2012); UL: Bucegi Mts. (Knechtel 1956, Knechtel and Paraschivescu 1962a), Romanian Plain (Paraschivescu 1978b), Danube Delta, Dobrogea (Paraschivescu 1975), Cibin Mts. (Sibiu County) (Paraschivescu 1975).

New collecting sites: AB: Colţeşti (10w, 22.07.2004, Torockószentgyörgy, leg. Csősz, coll. HNHM); BN: Ineu Peak (Rodnei Mts.) (1q, 12.08.1911, Ünőkő, leg. Anonymous, *Myrmica lobicornis* Nyl., det. Somfai, coll. HNHM), HR: Frumoasa (1w, 16.07.2012, leg. Czekes *et al.*, coll. BBU), Senetea (6w, 08-09.07.2010, leg. Markó *et al.*, coll. BBU).

Myrmica lonae Finzi, 1926

The *Myrmica lonae* has been documented in the region stretching from Central and North Europe, South Europe (from north-western Italy to Bulgaria), East Europe, to Asia Minor, the Caucasus, West Siberia and northern Kazakhstan. It occurs in plain regions on humid grasslands and in mountain meadows. It nests in the ground, under stones or in moss. It has polygynous colonies with up to one-thousand workers or even more. Until now data regarding its occurrence has been scarce (Fig. 4).

Published records: BV: Tâmpa – Braşov (Markó and Csősz 2001, 2002); UL: Şerbota Valley, (Făgăraş Mts., Sibiu County) (Markó and Csősz 2001, 2002).

New collecting sites: HR: Suhardu Mic Peak

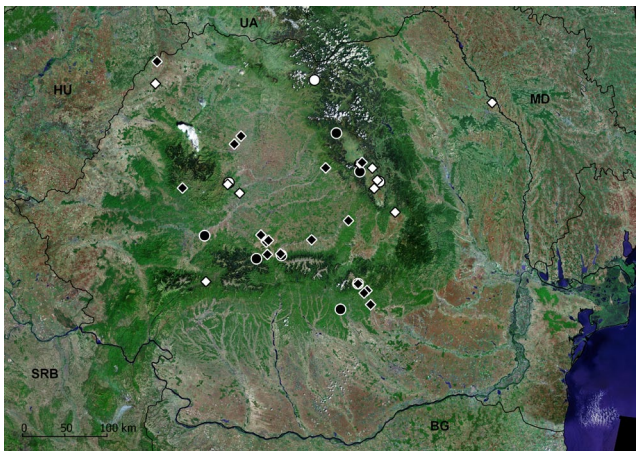


Fig. 3. Distribution of *Myrmica lobicornis* (circles) and *M. schencki* (diamonds) in Romania (white symbols - new collections, black symbols - published data).

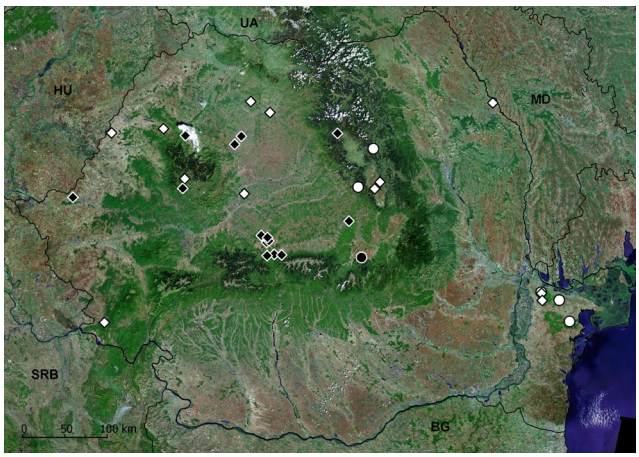


Fig. 4. Distribution of *Myrmica lonae* (circles) and *M. sabuleti* (diamonds) in Romania (white symbols - new collections, black symbols - published data).

(Hăşmaş Mts.) (7w, 27.07.2004, leg. Csősz, coll. HNHM), Vârghiş strait (2w, 1q, 27.07.2004, leg. Csősz, coll. HNHM); TL: Babadag (13w, 02.06.2005, leg. Csősz, coll. HNHM), Celic-Dere (30w, 31.05.2005, leg. Csősz, coll. HNHM), Valea Fagilor (Măcin Mts.) (25w, 30.05.2005, leg. Csősz, coll. HNHM).

Myrmica rubra (Linnaeus, 1758)

Previously it was reported as *Myrmica laevinadis* [sic] (Paraschivescu 1976b) and also as *Myrmica laevinoidis* [sic] (Pogorevici 1947).

The *Myrmica rubra* is one of the most common and most widespread *Myrmica* species of the Palaearctic. It has been documented in the region stretching from Portugal to East Siberia (till Transbaikalia), and northern Greece to the forest-tundra natural zone. It was also introduced to North America, where it is considered a pest species (Groden *et al*. 2005, Wetterer and Radchenko 2011). It occurs in mesophilous to very wet habitats, frequently in areas with anthropogenic disturbance. It appears in large numbers in high ground water-level meadows. In forests it is often substituted by *M. ruginodis*. It nests in the ground, under stones, in rotting wood, under bark, and in grass or moss tussocks. Usually it has polygynous colonies with several thousand workers, occasionally forming polycalic systems. Recent investigations revealed that its microgyne form, previously considered a separate socially parasitic species, *M. microrubra* Seifert, 1993, is only a parasitic form, perhaps on its way to become a separate species (Steiner *et al*. 2006, Jansen *et al.* 2010). It is one of the most common *Myrmica* species in Romania (Fig. 5).

Published records: AB: Abrud, Câmpeni, Gârda (Paraschivescu 1982), Arieşeni, Gârda de Sus, Scărişoara, at confluence of Ariesul Mic with Ariesul Mare (Tăuşan 2009); AR: near Arieş river, Bezdin (Markó and Kiss 2002, Gallé *et al.* 2005), Munar (Gallé *et al.* 2005), Secusigiu (Gallé *et al.* 2005); BC: Slănic Moldova– Slănic-Dobru-Puful Valley, Târgu Ocna – Trotuş Valley (Paraschivescu 1963), Târgu Ocna (Paraschivescu 1972b); BH: Crişul Repede strait (Markó 1997a, Gallé *et al*. 2005), Şuncuiuş (Paraschivescu and Raicev Arcaşu 1976, Markó 1997a, Gallé *et al.* 2005); BV: Târnpa – Braşov (Markó and Csősz 2002), Voilă (Knechtel 1956); CJ: Baciu (Markó 1997b), Bologa (Markó 1997a, Gallé *et al.* 2005), Ciucea (Markó 1997a, Gallé *et al*. 2005), Cluj-Napoca (Pogorevici 1947, Markó and Kiss 2002), Poieni (Kiss and Mátis 2002), Şaula (Markó 1997a); CV: Apa Lentă (Nemira Mts.) (Markó *et al*. 2004), Covasna (Markó 1999c), Fagul Rotund (Nemira Mts.) (Markó *et al*. 2004); GJ: Tîrgu Jiu (Pogorevici 1947); IS: Ciric (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969), Negreşti (Cîrdei and Bulimar 1965); HD: Sălciva (Zam) (Gallé *et al.* 2005), surroundings of Gemene lakes (Retezat Mts.) (Paraschivescu 1972a, 1976a), Gura Zlata (Paraschivescu 1972a, 1976a), Haţeg (Paraschivescu 1972a, 1976a), Pietrele (Retezat Mts.) (Paraschivescu 1972a, 1976a), Subcetate (Paraschivescu 1972a, 1976b); HR: Lacul Dracului (Harghita Mts.) (Markó *et al*. 2004), Voşlobeni (Markó *et al*. 2004, Gallé *et al*. 2005); MM: Arduzel (Markó 1999a, Gallé *et al*. 2005), Borşa (Tăuşan 2010); MS: Ciobotani (Gallé *et al*. 2005), Corneşti Plateau – Tîrgu Mureş (Markó 1997b), Răstoliţa, Călimani Mts. (Markó 1999c), Şăulia (Gallé *et al*. 2005), Stânceni, Gurghiu Mts. (Markó 1999c); PH: Câmpina (Paraschivescu 1976a), Comarnic (Knechtel 1956, Paraschivescu 1976a), Secăria (Knechtel 1956), Sinaia (Knechtel 1956, Paraschivescu 1976a); SB: Dumbrava Sibiului – Sibiu (Tăuşan and Markó 2009), Guşteriţa – Sibiu (Tăuşan and Markó 2009), Păltiniş (Markó and Csősz 2002), Sibiu (Markó and Csősz 2002), Cisnădioara, Racoviţa, Şura Mare (Tăuşan *et al*. 2012); SJ: Stana (Csősz *et al*. 2001); SM: Foieni (Markó 2008a); SV: Căsoi (Poiana Stampei) (Cîrdei *et al*. 1969), Vicovul de Sus (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969); TL: Murighiol (Bulimar 1985); TM: Timişoara (Pogorevici 1947); VS: Negreşti (Cîrdei *et al*. 1969); UL: Carpathian and sub-Carpathian zones (Paraschivescu 1978a), Crişul Repede Valley (Paraschivescu 1978b), Drăgan Valley (Cluj County) (Markó 1997a, Gallé *et al*. 2005), Făina Valley (Frivaldszky 1875), forest steppes of the Romanian Plain (Paraschivescu 1976b), surroundings of Iaşi city (Iaşi County) (Paraschivescu 1978b), Motrul Valley (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969), Prahova Valley (Prahova County) (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969), Romanian Plain (Paraschivescu 1978b), Ţicău strait (Markó 1999a, Gallé *et al*. 2005), Transylvania (Fuss 1853, Frivaldszky 1869, Cîrdei and Bulimar 1965), Trotuş Valley (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969), Valea Uzului – Dărmăneşti (Uz – Başca) (Paraschivescu 1963), Pasul Turnu Roşu Lotrioara (Tăuşan *et al*. 2012).

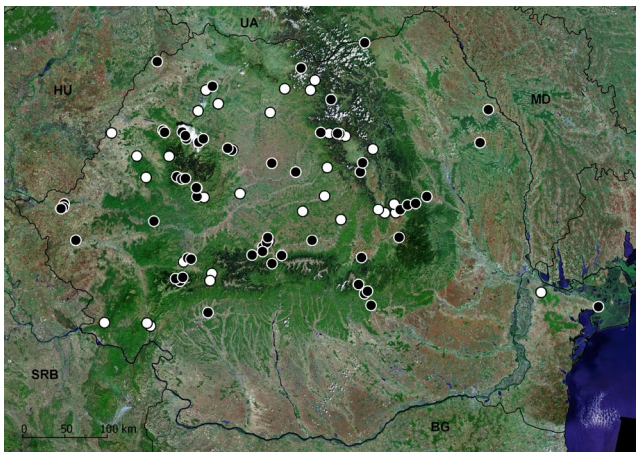


Fig. 5. Distribution of *Myrmica rubra* in Romania (white symbols-new collections, black symbols - published data).

New collecting sites: AB: Abrud (1w, Abrudbánya, 09.1908, leg. Anonymous, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Aiud (5w, N.enyed, 09.04.1909, leg. Nagy, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 5w, N.enyed [Papok rétje], 03.07.1917, leg. Biro, *Myrmica laevinodis* Nyl. det Somfai, coll. HNHM), Detunata (1w, 2m, Detonáta, 15.08.1907, leg. Szilády, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM); AR: Moneasa (9w, Menyháza, 1916, leg. Horváth, *Myrmica rubra* ssp. *laevinodis* Nyl. det. Szabó-Patay, coll. HNHM), BH: Cefa (Cefa Natural Park) (6w, leg. Petrovici *et al.*, coll. BBU), Stâna de Vale (1w, Biharfüred, 1907, leg. Biró, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Șuncuiuș (1q, 07.1944, Vársonkolyos, Rév, leg. Móczár, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM); BN: Beclean (1w, Betlen, leg. Kiss, *Myrmica laevinodis* Nyl. det. Somfai, *Myrmica laevinodis* det. Anonymous, coll. HNHM), Ineu Peak – Rodna Mts. (1q, Ünőkő, 12.08.1911, leg. Anonymous, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Telciu (6w, Telcs, Fiadvölgy, 20.06.1913, leg. Csiki, *Myrmica laevinodis* Nyl. det. Somfai coll. HNHM), Valea Vinului (1w, Radnaborberek, 22.06.1941, leg. Allodiatoris, *M. laevinodis* det. Somfai, coll. HNHM); CJ: Ciucea (1w, Csucsa, Com. Kolozs, 06.1913, *Myrmica ruginodis* Nyl. det. Szabó (coll. HNHM), *Myrmica laevinodis* Nyl. det. Somfai, Cluj-Napoca (4w, 03.10.2004, leg. Sipos et Boros, coll. BBU); CS: Băile Herculane (6w, 09.05.2004, leg Markó *et al.*, coll. BBU), Bei valley (6w, 09.05.2010, leg. Markó *et al.*, coll. BBU); Mehadia (1w, Mehádia, 1908, leg. Horváth, *Myrmica laevinodis* Nyl., det. Somfai) (coll. HNHM), Nera Valley – between the Bei bridge and the Damian spring (6w, 09.05.2009, leg Markó *et al.*, coll. BBU); CV: Băile Balvanyos, Gana creek (12w, Bálványosfüred, Gana-patak, 12.17.1947, leg. Gebhardt, *Myrmica ruginodo laevinodis* F. det. Somfai, *M. rubra* L. det. Anonymous, coll. HNHM), Balvanyos Mts. (8w, Bálványoshegy, 1943, leg. Pongrácz, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Covasna (9w, 1q, Kovászna, 29.06.1943, leg. Kolosváry, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 1w, Kovászna, leg. Aigner, *Myrmica laevinodis* det. L. Biró, coll. HNHM), between Sânzieni and Catroșa (6w, 05.06.2005, leg. Markó et Sipos, coll. BBU); HD: Cetate Boli (1w, Cetate Boli, 1916, leg. Horváth, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Gura Zlata (1w, Retyezát, Gura Zlata, 03.07.1917, leg. Streda, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 1w, Retyezát, Gura Zlata, 06-07.07.1917, leg. Horváth, *Myrmica rubra* ssp. *laevinodis* Nyl. det. Szabó-Patay, coll. HNHM; 1w, Retyezát, Gura Zlata, 09.07.1917, leg. Horváth, *Myrmica rugulosa* Nyl. det. Somfai, coll. HNHM; 1w, 1q, Retyezát, Gura Zlata, 11.07.1917, leg. Horváth, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 1w, Retyezát, Gura Zlata, 12.07.1917, leg. Streda, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Reea (2w, Rea, 11.09.1918, leg. Horváth, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Vulcan (2w, Vulkán, leg. Csiki, *Myrmica laevinodis* Nyl. det. Somfai, coll.HNHM); HR: Băile Tușnad (10w, Tusnádfürdő, 21.06.1941, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Cristuru Secuiesc (6w, Székelykeresztúr, 500 m, 06.1943, leg. Móczár, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Homorod (1w, Homoród, 1916, leg. Horváth, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Iacopeni (Salutaris spring) (6w, HU, Csík-m. Kászon, Salutaris, 800 m, 18-29.06.1943, leg. Kaszab, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 1q, Salutaris, 800 m, Hu. Csík-m., Kászon, 18-29.06.1943, leg. Kaszab, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Lacul Roșu (12w, 1q, Gyilkostó, 1267 m, 18.07.1941, leg. Gebhardt, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Toplița (1w, O.Toplica, 04.07.1886, *Myrmica lobicornis* Nyl. det. Biró, coll. HNHM); MS: after Criș, wet meadow – small marsh (21w, 25.07.2012, leg. Markó et Erős, coll. BBU), Lunca Bradului (1w, Ilva, 04.07.1886, leg. Anonymous, *Myrmica laevinodis* Nyl. det. L. Biró, coll. HNHM), Sovata (2w, Szováta, leg. Csiki, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Stânceni (3q, 1m, Gödemesterháza, 750 m, Hungária, Marostorda m., 1-15.08.1943, leg. Éhik et Loksa, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM; 1w, 1m, Gödemesterháza, 750 m, Hungária, Marostorda m., 1-15.08.1943, leg. Éhik et Loksa, *Myrmica laevinodis* Nyl. det. Anonymous, coll. HNHM); SB: Gușterița – Sibiu (1w, Szt. Erzsébet, Szeben, leg. Csiki, *Myrmica rubra* ssp. *laevinodis* Nyl. det. Szabó-Patay coll. HNHM; 4w, Szt. Erzsébet, Szeben, leg Csiki, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Lotrioara (1w, Lotrioara, leg. Csiki, *Myrmica laevinodis* Nyl. det. L. Biró, coll. HNHM), Sibiu (5w, leg. Csiki, coll. HNHM); SJ: Cehu Silvaniei(1w, Szilágycseh, leg. Kiss, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Surduc (1q, Szurduk, 1916, leg. Horváth, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM), Zalău (3w, Zilah, 10.09.1882, leg. Anonymous, *Myrmica laevinodis* Nyl. det. Biró, coll. HNHM; 8w, 1m, Zilah, 10.09.1882, *Myrmica ruginodis* Nyl. det. Biró, *M. rubra* Linné det. Csősz, coll. HNHM; 7w, 2m, Zilah, 10.09.1882, *Myrmica laevinodis* Nyl. det. Somfai, *Myrmica ruginodis* Nyl. det. L. Biró, coll. HNHM); TL: Valea Fagilor (Măcin Mts.) (1w, 30.05.2005, leg. Markó et Sipos, coll. BBU); UL: Balvanyos creek valley (6w, Bálványospatak völgye, 29.06.1943, leg. Anonymous *Myrmica ruginodo laevinodis* F. det. Somfai, coll. HNHM; 2w, 1q, Bálványospatak völgye, 29.06.1943, leg. Anonymous *Myrmica laevinodis* F. det. Somfai, coll. HNHM), Cașin Depression, Bărdăuța Mts. (3w, HU, Csík-m. Kászon, Bordica, 1200 m, 18-29.06.1943, leg. Kaszab, *Myrmica laevinodis* Nyl. det. Somfai, coll. HNHM),

Myrmica ruginodis Nylander, 1846

Previously reported as *Myrmica ruginoidis* [sic] in Pogorevici (1947).

Myrmica ruginodis is a transpalaearctic species, distributed across Eurasia, from the Atlantic Ocean to Japan, but not found in the mountains of Middle Asia. It occurs mainly in various kinds of forests (replacing *M. rubra*) and also in open habitats at higher altitudes. It avoids dry, sunny places. It forms nests as *M. rubra*, and colonies can be either mono- or polygynous. After *M. rubra,* this species is the most common in the country (Fig. 6).

Published records: AB: Arieşeni, Gârda de Sus, Scărişoara, at confluence of Ţoha creek with Arieşul Mic (Tăuşan 2009); BH: near Arieşul Mic river, Cheresig (Markó 1997a, Gallé *et al*. 2005); BH: Crişul Repede strait, (Bihor County) (Markó 1997a, Gallé *et al*. 2005); BV: Voilă (Knechtel 1956), Târnpa – Braşov (Markó and Csősz 2002); CS: Mehadia (Mocsáry 1897); CJ: Baciu (Markó 1997b), Cluj-Napoca (Pogorevici 1947), Poieni (Kiss and Mátis 2002); CV: Apa Lentă (Nemira Mts.) (Markó *et al*. 2004), Covasna (Markó 1999c), Fagul Rotund (Nemira Mts.) (Markó *et al*. 2004); DB: Rîul Alb (Fromunda et al 1967); HR: Lacul Dracului (Harghita Mts.) (Markó *et al*. 2004), Voşlobeni (Markó *et al*. 2004, Gallé *et al*. 2005); MM: Sighetu Marmaţiei (Mocsáry 1897); MS: Moreşti (Röszler 1943), Corneşti Plateau – Tîrgu Mureş (Markó 1997b), Răştoliţa – Călimani Mts. (Markó 1999c), Sovata – Gurghiu Mts. (Markó 1999c), Stânceni – Gurghiu Mts. (Markó 1999c), Ungheni (Röszler 1943); PH: Câmpina (Paraschivescu 1976a), Comarnic (Knechtel 1956, Paraschivescu 1976a), Secăria (Knechtel 1956), Sinaia (Knechtel 1956, Knechtel and Paraschivescu 1962a, Paraschivescu 1976a); SJ: Stana (Csősz *et al.* 2001); SM: Foieni (Markó 2008a); SB: Cisnădie (Markó and Csősz 2002), Cisnădioara (Tăuşan and Markó 2009), Dumbrava Sibiului – Sibiu (Tăuşan and Markó 2009), Guşteriţa – Sibiu (Tăuşan and Markó 2009), Sibiu (Markó and Csősz 2002), Tălmaciu (Markó and Csősz 2002) Dumbrăveni, Ocna Sibiului, Poplaca, Racoviţa, Sadu (Tăuşan *et al*. 2012); SV: Poiana Stampei (Cîrdei *et al*. 1969); UL: Cibin Mts. (Transylvania, Sibiu County) (Paraschivescu 1975), Ilva Valley (Călimani Mts., Mureş County) (Gallé *et al*. 2005), Romanian Plain (Paraschivescu 1978b), Romania (Paraschivescu 1975), Semenic Mts. (Mocsáry 1897).

New collecting sites: AB: Aiud (1w, N.enyed, 19.07.1917, leg. Biró, *M. ruginodis* det. Csősz, coll. HNHM); BH: Şuncuiuş (1w, 17.07.1944, Vársonkolyos, leg. Móczár, *M. ruginodis* Nyl. det. Anonymous, *M. ruginodis* Nylander det. Csősz, coll. HNHM; 3w, 07.1944, Vársonkolyos, leg. Móczár, *M. ruginodis* Nyl. det. Anonymous, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nylander det. Csősz, coll. HNHM); BN: Ineu Peak (Rodna Mts.) (1w, Ünőkő, 12.08.1911, leg. Anonymous, *M. ruginodis* Nyl. det. Somfai, coll. HNHM); CS: Băile Herculane (3w, 2000.05.27, leg. Markó, coll. BBU), Bei Valley(4w, 08.05.2009, leg. Markó *et al.*, coll. UBB), Mehadia (1w, Mehádia, leg. Anonymous, *M. ruginodis* Nyl. det. Biró coll. HNHM; 1w, Mehádia, 1885, *M. ruginodis* Nyl. det. L. Biró coll. HNHM; 1w, Mehadia, leg. Anonymous, *M. ruginodis* Nyl. det Somfai, *M. laevinodis* Nyl. det. Biró, *M. ruginodis* Nyl. det. Csősz, coll. HNHM); CV: Catroşa creek (5w, Hu. Csík-m. Kászon, Katrosa p., 800 m, 27.07.1943, leg. Székessy, *Myrmica ruginodis* Nyl. det. Somfai), Comandău (3w, Komandó, 06.07.1943, leg. Kolosváry, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), between Sânzieni and Catroşa (9w, 05.06.2005, leg. Markó et Sipos, coll. UBB); HR: Băile Harghita (3w, Hargitafürdő, 07.07.1943, leg. Dudich, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), Băile Tuşnad (1w, Tusnád, leg. Kuthy, *M. ruginodis* Nyl. det. Biró, coll. HNHM), Băile Homorod (2w, Homoród-fürdő, 700 m, Hungaria, Udvarhely m., leg. Éhik & Loksa, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), Frumoasa (1w, 16.07.2012, leg. Czekes *et al.*, coll. BBU), Hăşmaşu Mare Mts. (6w, 06-18. 07.2004, leg. Markó, coll. BBU), Homorod hill (9w, Homorodi-tető, Hargita, 02.08.1942, leg. Gebhardt, *M. ruginodis* Nyl. det. Somfai, coll. HNHM; 2w, 1q, Homorodi-tető, Hargita, 02.08.1942, leg. Gebhardt, *M. laevinodis* F. det. Somfai, *M. ruginodis* det. Csősz, coll. HNHM), Iacopeni (2w, Hu. Csík-m. Kászon, Salutaris, 800 m, 10-31.07.1943, leg. Székessy, *M. ruginodis* Nyl. det. Somfai, coll. HNHM), Miercurea Ciuc (2w, Csíkszereda, 02.07.1943, leg. Dudich, *M. ruginodis* Nyl. det. Somfai, coll. HNHM; 3w, Csíkszereda, Somlyói hegy, 02.07.1943, leg. Dudich, *M. ruginodis* Nyl. det. Somfai, coll. HNHM; 2w, Csíkszereda, Somlyói hegy, 02.07.1943, Dudich, *M.*

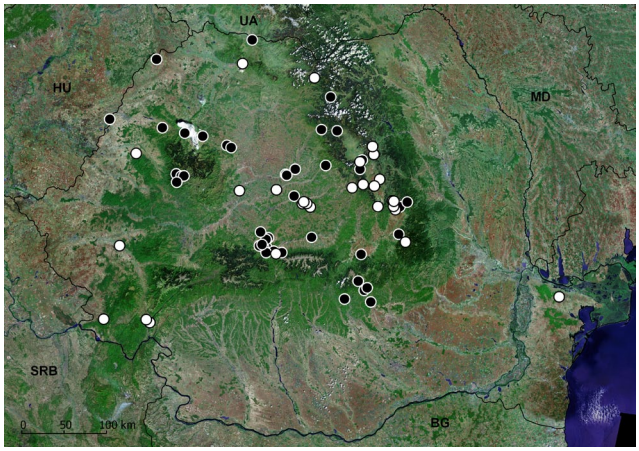


Fig. 6. Distribution of *Myrmica ruginodis* in Romania (white symbols- new collections, black symbols - published data).

ruginodis Nyl. det. Somfai, *M. ruginodis* Nylander det. Csősz, coll. HNHM), Lacul Roşu (2w, 1q, Gyilkostó, 1210 m, 18.07.1941, leg. Gebhardt, *M. laevinodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), Senetea (4w, 06-18.09.2007, leg. Marko *et al.*, coll. BBU); MM: Maramureş (1w, Máramaros, leg. Pop, *M. ruginodis* Nyl. det. Biró, *M. ruginodis* Nyl. det. Csősz, coll. HNHM); MS: near Apold, forest (11w, 1q, 1m, 24.07.2012, leg. Markó et Erős, coll. BBU), Breite – Sighişoara (6w, leg. Markó et Czekes, det. Czekes, coll. BBU), before Criş, forest (11w, 1q, 25.07.2012, leg. Markó et Erős, coll. BBU), after Şaeş, pasture (5w, 23.07.2012, leg. Markó et Erős, coll. BBU; 7w, 23.07.2012, leg. Markó et Erős, coll. BBU), before Stejărenii, forest (6w, 1m, 25.07.2012, leg. Markó et Erős, coll. BBU; 6w, 2q, 25.07.2012, leg. Markó et Erős, coll. BBU), Târnăveni (4w, Dicsőszt.Márton, leg. Csiki, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz , coll. HNHM); SB: Turnu Roşu (1w, Verestorony, 31.07.1912, leg. Csiki, *Messor structor* Latr. det. Somfai, coll. HNHM); TM: Lugoj (1q, 09.10.2011, leg. Markó *et al.*, coll. BBU); UL: Cugir Mts. (1w, Kudsiri havasok, Surian , 66, leg. Anonymous, *M. ruginodis* Nyl. det Somfai, *M. ruginodis* Nylander det. Csősz, coll. HNHM; 1w, Kudsiri havasok, 65, leg. Anonymous, *M. ruginodis* Nyl. Det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), Harghita Mts. near Ciceu (7w, Csicsói Hargita k. old. [1600 m], 15.07.1943, leg. Szent-Iványi, *M. ruginodis* Nyl. det. Somfai, coll. HNHM), Rodnei Mts. (1w, Radnai havasok, 29.08.1942, leg. Móczár, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM).

Myrmica rugulosa Nylander, 1849

It was previously reported as *Myrmica ruguloasa* [sic] in Paraschivescu (1976b) and as *Myrmica scabrinodis* st. *rugulosa* in Montandon and Santschi (1910).

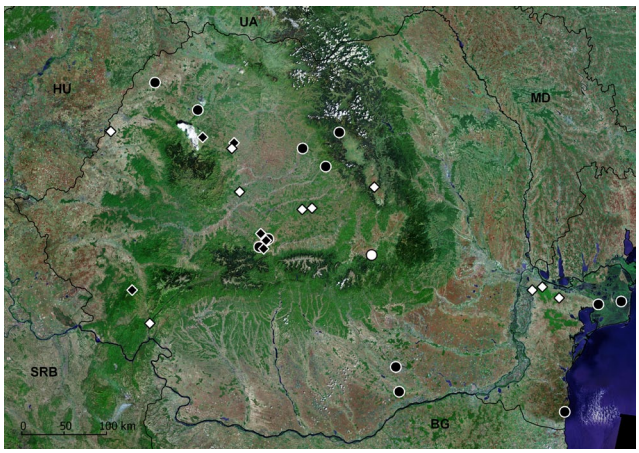


Fig. 7. Distribution of *Myrmica rugulosa* (circles) and *M. specioides* (diamonds) in Romania (white symbols- new collections, black symbols - published data).

Myrmica rugulosa has been documented in the region stretching from France through Central and East Europe to the Ural Mts., and from southern Sweden and southern Finland to northern Italy; it is also found in Greece (Macedonia), Bulgaria and in the Caucasus, though is absent in the British Isles. It occurs in dry, sunny open habitats, in forest clearings, in the mountains on dry slopes or river terraces. It tolerates anthropogenic pressure better than any other *Myrmica* species in Central Europe. It nests in the ground and has polygynous – occasionally even polycalic – colonies, with several thousands workers. It has been documented in a number of localities across the country (Fig. 7).

Published records: B: Bucureşti (Montandon and Santschi 1910, Paraschivescu 1974); CT: Tatlageac lake shore (Bulimar 1985); GR: Comana (Paraschivescu 1974); MS: Ciobotani (Gallé *et al*. 2005), Reghin (Markó and Csősz 2002), Sovata (Paraschivescu 1972b); SB: Sibiu (Markó and Csősz 2002), Guşteriţa – Sibiu (Markó and Csősz 2002), Poplaca (Tăuşan *et al*. 2012); SJ: Zalău (Mocsáry 1897); SM: Pir (Mocsáry 1897), TL: Murighiol (Bulimar 1985), Potcoavă Lake (Bulimar 1985); UL: Ceahlău Mt. (Neamţ county) (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969), Dobrogea (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969), Ilva Valley (Călimani Mts., Mureş County) (Gallé *et al*. 2005), Muntenia and Transylvania (Paraschivescu 1976b), Prahova Valley (Prahova County) (Cîrdei and Bulimar 1965, Cîrdei *et al*. 1969).

New collecting sites: BV: Tărlungeni (6w, Brassó VM. Hétfalu, Tatrang oldal, 01.07.2002, leg. Csősz, coll. HNHM).

Myrmica sabuleti Meinert, 1861

Previously it was also reported as *Myrmica sabuletti* [sic] in Kiss and Mátis (2002).

Myrmica sabuleti is a Euro-Caucasian species, and it prefers habitats that are slightly drier (forests and open habitats) than the habitats of *M. scabrinodis*. It forms polygynous colonies with a maximum of 2000 workers, nesting in the ground, under stones or in tufts of grass and moss. It is one of the most common *Myrmica* species in Romania, yet there is little published data on its presence (Fig. 4).

Published records: AB: Avram Iancu (Tăuşan, 2009); AR: Sederhat (Markó 2008b); BV: Negru Peak at Racoş (as "Rákoser Töpe" in Markó and Csősz 2002), Sânpetru (Markó and Csősz 2002); CJ: Fânaţele Clujului – Cluj-Napoca (Markó 1997b), Poieni (Kiss and Mátis 2002), Luna de Jos (cited as "Răscruci" in Tartally *et al*. 2008a); MS: Stânceni – Gurghiu Mts. (Markó 1999c); SB: Guşteriţa – Sibiu (Markó and Csősz 2002), Sibiu (Markó and Csősz 2002), Tălmaciu (Markó and Csősz 2002), Ocna Sibiului, Racoviţa, Sadu, Şura Mare (Tăuşan *et al*. 2012); SJ: Stana (Csősz *et al.* 2001); SM: Foieni

(Markó 2008a); UL: Romanian Plain (Paraschivescu 1978b), Bârlad Valley (Montandon and Santschi 1910).

New collecting sites: AB: Băgău (1w, Radnai havasok, 29.08.1942, leg. Móczár, *M. ruginodis* Nyl. det. Somfai, *M. ruginodis* Nyl. det. Csősz, coll. HNHM), Scărişoara (1q, Aranyosfő, 27.06.1916, leg. Csiki, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM); BH: Cefa (Cefa Natural Park) (2w, 19.08.2009, leg. Petrovici *et al.*, coll. BBU; 1w, 22.08.2009, leg. Petrovici *et al.*, coll. BBU; 6w, 30.07.2008, leg. Petrovici *et al.*, coll. BBU; 1w, 28.03.2010, leg. Petrovici *et al.*, coll. BBU); BN: Beclean (2w, Betlen, leg. Kiss, *Myrmica scabrinodis* Nyl. det. Szabó-Patay, coll. HNHM); CJ: Chiuieşti (1w, Pecsétszeg, 08.08.1911, *Myrmica scabrinodis* Nyl. det. Somfai, *Myrmecina ruginodis* det. Anonymous, coll. HNHM); CS: Bei Valley (6w, 05.09.2009, leg. Markó *et al.*, coll. BBU), Nera Valley – between the Bei bridge and the Damian spring (6w, 09.05.2009, leg. Markó *et al.*, coll. BBU); CV: between Sânzieni and Catroşa (3w, 05.06.2005, leg. Markó et Sipos, coll. BBU); HR: Cristuru Secuiesc (1m, Székelykeresztúr 500 m, 06.1943, leg. Móczár, *Myrmica scabrinodis* Nyl. det. Somfai, *Myrmica sabuleti* Mein. det. Csősz, coll. HNHM; 4w, Székelykeresztúr 500 m, 06.1943, leg. Móczár, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM) Frumoasa (1w, leg., 16.07.2012, Czekes *et al.*, coll. BBU), Miercurea Ciuc (6w, leg., 16.07.2012, Czekes *et al.*, coll. BBU); IS: Cilibiu (1w, 07.06.2006, leg. Markó, coll. BBU); SJ: Zalău (1m, Zilah, 18.09.1882, *Myrmica scabrinodis* Nyl. det. Biró, *Myrmica sabuleti* Mein. det. Csősz, coll. HNHM); SM: Hodod (1w, Hadad, leg. Kiss, *Myrmica scabrinodis* Nyl. det. Somfai coll. HNHM), Tăşnad (1w, Tasnád, 14.04.1883, *Myrmica scabrinodis* Nyl. det. Biró, *M. sabuleti* Mein. det. Csősz, coll. HNHM); TL: Bordei valley – near Cerna (1w, 13.09.2004, leg. Markó *et al.*, coll. BBU), Cetăţuia (2w, 30.05.2005, leg. Markó et Sipos, coll. BBU), after Horia (7w, 13.09.2007, leg. Markó, coll. BBU), Niculiţel (1w, 15.09.2004, leg. Marko et Sipos, coll. BBU), Pasul Teilor (Măcin Mts.) (1w, 12.09.2004, leg. Markó et Sipos, coll.BBU).

Myrmica salina Ruzsky, 1905

The taxonomic history of *M. salina* is very complicated and confusing. For many decades the types of this species had been presumed to be lost, and the original description of this species was quite ambiguous. Various authors considered it either as the infraspecific form of *M. scabrinodis* or *M. schencki*, or as a good species, or even as a junior synonym of various species from different species-groups (for details see Radchenko and Elmes 2009, 2010). Nevertheless, after the discovery of its type specimens the species' taxonomic position was clarified and now it is considered as a good species related to *M. specioides* (Radchenko and Elmes 2009; Seifert 2011).

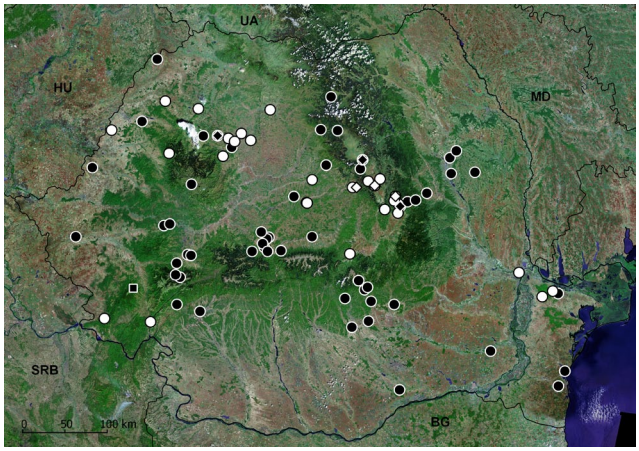


Fig. 8. Distribution of *Myrmica scabrinodis* (circles), *M. vandeli* (diamonds) and *M. salina* (square) in Romania (white symbols-new collections, black symbols - published data).

The occurrence of *Myrmica salina* has been documented in the south of West Siberia and northern Kazakhstan by Radchenko and Elmes (2010), but Seifert (2011) also reported it from southern Ukraine and south of the European part of Russia, Transcaucasus, Asia Minor, Kyrgyzstan, and Romania (Fig. 8). It probably inhabits halophylous, relatively wet steppe habitats.

Published records: CS: Brebu Nou (Semenic Mts.) (Seifert 2011)

Myrmica scabrinodis Nylander, 1846

Previously it was also reported as *Myrmica scabrinadis* [sic] in Paraschivescu (1976b), as *Myrmica scabrinoides* [sic] in Scobiola *et al.* (1955), as *Myrmica scabrinoidis* [sic] in Pogorevici (1947), and as *Myrmica scarbrinodis* [sic] in Paraschivescu (1978b) and in Paraschivescu *et al.* (1976).

Myrmica scabrinodis is a Euro-Siberian species. Its distribution reaches East Siberia. It lives in moderately humid habitats, tolerates soil moisture but needs great insolation, avoiding only definitely xerothermal places. It is often found in peat bogs. It builds nests in the ground, in grass or moss tussocks, under stones, or in rotten wood. Colonies are monogynous or have only a few queens, containing up to 2500 workers. It is one of the most common and widely distributed species in Romania (Fig. 8).

Published records: AB: Ponorel (Tăuşan, 2009); AR: Socodor (Fromunda *et al.* 1967); BC: Barcana (Paraschivescu *et al.* 1975, Goagă and Paraschivescu 1991), Prăjeşti (Paraschivescu *et al.* 1975), Roşiori (Goagă and Paraschivescu 1991), Slănic-Moldova (Goagă and Paraschivescu 1991), Tamaşi (Paraschivescu *et al.* 1975, Goagă and Paraschivescu 1991), Târgu Ocna (Paraschivescu and Hurghişiu 1973, Goagă and Paraschivescu 1991);

BH: Borşa (Goagă and Paraschivescu 1991); BV: Voilă (Knechtel 1956); CJ: Cluj-Napoca (Pogorevici 1947), Fânaţele Clujului – Cluj-Napoca (Tartally and Varga 2008, Tartally *et al.* 2008b), Luna de Jos (cited as "Răscruci" in Tartally and Varga 2008, Tartally *et al.* 2008a, b), Şardu (Tartally and Varga 2008, Tartally *et al.* 2008a, b); CT: Năvodari (Paraschivescu 1961), Valu lui Traian (Scobiola *et al.* 1955); CV: Apa Lentă (Nemira Mts.) (Markó *et al.* 2004), Fagul Rotund (Nemira Mts.) (Markó *et al.* 2004); DB: I. L. Caragiale (Fromunda *et al.* 1967), Râul Alb (Fromunda *et al.* 1967); GJ: Cloşani (Knechtel and Paraschivescu 1962b), Corneşti (Fromunda *et al.* 1967); GR: Comana (Montandon and Santschi 1910, Paraschivescu 1974); IL: Mărculeşti (Scobiola *et al.* 1955); HR: Lacul Dracului (Harghita Mts.) (Markó *et al.* 2004), Voşlobeni (Markó *et al.* 2004, Gallé *et al.* 2005); HD: Dobra (Gallé *et al.* 2005), surroundings of Gemene lakes (Retezat Mts.) (Paraschivescu 1972a), Gura Zlata (Paraschivescu 1972a, 1976a); Haţeg (Paraschivescu 1972a, 1976a), Ilia (Gallé *et al.* 2005), Sarmisegetuza (Paraschivescu 1972a, 1976a), Subcetate (Paraschivescu 1972a, 1976a); MS: Răştoliţa – Călimani Mts. (Markó 1999c), Sovata – Gurghiu Mts. (Markó 1999c), Stânceni – Gurghiu Mts. (Markó 1999c); PH: Câmpina (Paraschivescu 1976a), Comarnic (Knechtel 1956, Paraschivescu 1976a), Prahova (Knechtel and Paraschivescu 1962b), Secăria (Knechtel 1956), Sinaia (Knechtel 1956, Paraschivescu 1976a); SB: Cisnădioara (Tăuşan and Markó 2009), Dumbrava Sibiului – Sibiu (Tăuşan and Markó 2009), Guşteriţa – Sibiu (Markó and Csősz 2002, Tăuşan and Markó 2009), Păltiniş (Markó and Csősz 2002), Sibiu (Markó and Csősz 2002); SJ: Stana (Csősz *et al.* 2001), Dumbrăveni, Ocna Sibiului, Racoviţa, Sadu Cînaia, Sibiu (Tăuşan *et al.* 2012); SM: Foieni (Markó 2008a); SV: Poiana Stampei (Cîrdei *et al.* 1969); TL: Teliţa (Fromunda *et al.* 1965); TM: Timişoara (Pogorevici (1947); UL: Carpathian and sub-Carpathian zones (Paraschivescu 1978a), Ceahlău Mt. (Neamţ County) (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969), Cibin Mts. (Sibiu County) (Paraschivescu 1975), Dobrogea (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969), Dobrogea, Danube Delta (Paraschivescu 1975), upper Mureş region (Gallé *et al.* 2000), Prahova Valley (Prahova County) (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969), Romania (Fromunda *et al.* 1965), Lucina (Fromunda *et al.* 1967), Transylvania (Mayr 1853, Frivaldszky 1869).

New collecting sites: BH: Cefa (Cefa Natural Park) (3w, 11.12.2009, leg. Petrovici *et al.*, coll. BBU; 6w, 28.05.2010, leg. Petrovici *et al.*, coll. BBU; 6w, 28.05.2010, leg. Petrovici *et al.*, coll. BBU), Stâna de Vale (1w, Biharfüred, 1907, leg. Biró, *Myrmica scabrinodis* Nyl. det. Somfai, *Myrmica scabrinodis* Nyl. det. Csősz, coll. HNHM), Suplacu de Barcău (1m, B.Széplak, Töreki láp, IV. halastavi rét, fűháló, 01-04.09.1953, leg. Solymosné, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM); CS: Băile Herculane (1w, 08.05.2004, leg. Markó, coll. BBU), Bei Valley (6w, 08.05.2009, leg. Markó *et al.*, coll. BBU); CJ: Chinteni (6w, 21.05.2011, leg. Markó *et al.*, coll. BBU), Fânaţele Clujului (6w, 23.05.2010, leg. Markó *et al.*, coll. BBU), Luna de Jos (6w, 27.03.2010, leg. Markó *et al.*, coll. BBU), Săvădisla (6w, 04.06.2011, leg. Markó *et al.*, coll. BBU), Vişea (9w, 2q, 07.06.2011, leg. Markó *et al.*, coll. BBU); CV: Băile Balvanyos (1w, Bálványosfüred, 800 m, leg. Pongrácz, *M. scabr*. v. *rugulos*., *Myrmica rubida* Latr. det. Somfai, coll. HNHM), Polia peak - Repat Mts. (1w, Hu, Csík-m., Kászon, Gombásbérc 1200 m, 26.07.1943, leg. Székessy, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM); GL: near Barboşi creek (1w, 09.06.2006, leg. Markó, coll. BBU); HD: Vulcan (3w, Vulkán, leg. Csiki *Myrmica scabrinodis* Nyl., det. Somfai, coll. HNHM); HR: Băile Homorod (2w, Homoród, 1916., leg. Horváth, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM), Fierăstrăul creek valley (Harghita Mts.) (1w, Hargita hsg., Fürész p. völgye, [1200-1330 m], 19.07.1943, leg. Szent-Iványi, coll. HNHM), Frumoasa (6w, 16.08.2011, leg. Czekes *et al.*, coll. BBU), Iacopeni – near Salutaris (3w, Hu, Csík-m., Kászon, Salutaris 800 m, 10-31.07.1943, leg. Székessy, *Myrmica scabrinodis* Nyl. det. Somfai, coll. HNHM), Miercurea Ciuc (6w, 16.07.2012, leg. Czekes *et al.*, coll. BBU; 6w, 16.08.2011, leg. Czekes *et al.*, coll. BBU), Plăieşii de Sus (6w, 19-29.07.2012, leg. Czekes, coll. BBU); MS: Breite – Sighişoara (6w, 09.2009, leg. Markó et Czekes, coll. BBU), Sângeorgiu de Pădure (1w, Erdőszentgyörgy, 07.1943, leg. Kolosváry, *Myrmica scabrinodis* Nyl. det. Somfai, *Myrmica scabrinodis* Nyl. det. Csősz, coll. HNHM), before Şaeş, small patch of marsh (6w, 23.07.2012, leg. Markó et Erős, coll. BBU); SJ: Zalău (1q, Zilah, 18.09.1882, leg. Anonymous, *Myrmica scabrinodis* Nyl. det. Biró, *Myrmica scabrinodis* Nyl. det. Csősz, coll. HNHM; 1m; Zilah, 08.09.1882, leg. Anonymous, *Myrmica rugulosa* Nyl. det. Biró, coll. HNHM); TL: Cerna, Bordei Valley (3w, 13.09.2004, leg. Markó et Sipos, coll. BBU).

Myrmica schencki Viereck, 1903

Previously it was also reported as *Myrmica schenki* [sic] in Paraschivescu (1972b).

Myrmica schencki has been documented in Europe (in the region stretching to central England and Ireland in the north, south of Norway, Sweden and Finland, and in the south to the north of Spain, Italy and the Balkans), the Caucasus, north-eastern Turkey, south of West Siberia, northern Kazakhstan, Tien-Shan, the Altai Mts.; the easternmost known locality is the vicinity of Krasnoyarsk (East Siberia). It inhabits dry

habitats in open areas and forests. Nests are built in the ground, occasionally in tussocks of grass or moss. Colonies are polygynous with up to 1000 workers. Despite the relatively little data on its distribution in Romania, it seems to be present across the whole country (Fig. 3).

Published records: AB: Avram Iancu (Tăuşan, 2009); BV: Negru Peak at Racoş (as "Rákoser Töpe" in Markó and Csősz 2002), Voilă (Knechtel 1956); CJ: Fânaţele Clujului – Cluj-Napoca (Markó 1997b), Luna de Jos (cited as "Răscruci" in Tartally *et al.* 2008a), HR: Voşlobeni (Gallé *et al.* 2005); MS: Sovata (Paraschivescu 1972b); PH: Câmpina (Paraschivescu 1976a), Comarnic (Knechtel 1956, Paraschivescu 1976a), Secăria (Knechtel 1956), Sinaia (Knechtel 1956, Paraschivescu 1976a); SB: Guşteriţa – Sibiu (Markó and Csősz 2002), Sibiu (Markó and Csősz 2002), Ocna Sibiului, Racoviţa, Sadu (Tăuşan *et al.* 2012); SM: Foieni (Markó 2008a); UL: Prahova Valley from Sinaia to Câmpina (Prahova County) (Knechtel and Paraschivescu 1962b), Romanian Plain (Paraschivescu 1978b), upper Mureş region (Gallé *et al.* 2000).

New collecting sites: AB: Aiud (3w, N.enyed, 23.07.1917, leg. Biró, *Myrmica lobicornis* Nyl. det. Somfai, coll. HNHM), Izvoarele (6w, 14.06.2012, leg. Czekes, coll. UBB); CV: between Sânzieni and Cătruşa (1w, 05.06.2005, leg. Markó, coll. BBU); HD: Lupeni (1w, Lupény, 1916, leg. Horváth, *Myrmica lobicornis* Nyl. det. Somfai, coll. HNHM); HR: Frumoasa (2w, leg., 16.07.2012, Czekes *et al.*, coll. BBU), Miercurea Ciuc (6w, 16.08.2011, leg Czekes *et al.*, coll. UBB), Sândominic (1w, Cs.sztdomokos, Hivák-völgy, 15-16.07.1943, leg. Soós and Allodiatoris, *Myrmica lobicornis* Nyl. det. Somfai, coll. HNHM); SM: Pir (1w, Peér, 29.04.1882, leg. Anonymous, *Myrmica lobicornis* Nyl. det. L. Biró, coll. HNHM).

Myrmica slovaca Sadil, 1952

Previously it was reported as *Myrmica salina* Ruzsky, 1905 (Markó 1998b, 1999a, Markó and Csősz 2002, Gallé *et al.* 2005).

Myrmica slovaca has been documented in the region stretching from Central Europe to West Siberia and northern Kazakhstan (to the east – till Altai Mts.). It often inhabits high salinity sites, frequently near salt lakes. Colonies are usually monogynous, with up to 800 workers. Most probably this species has long been confused with *M. sabuleti*, thus we suppose this species is under-reported in Romania (Fig. 9).

Published records: HD: Dobra (Gallé *et al.* 2005), Sălciva (Gallé *et al.* 2005); SB: Mediaş (Markó and Csősz 2002), SM: Vetiş (Markó 1998b, 1999a, Gallé *et al.* 2005); UL: Sadu Valley (Sibiu County) (Markó and Csősz 2002).

New collecting sites: BH: Cefa (Cefa Natural Park) (6w, 22.08.2009, leg. Petrovici *et al.*, coll. BBU; 2w, 28.03.2010, leg. Petrovici *et al.*, coll. BBU); CJ: Aluniş (6w, 13.04.2012, leg. Markó *et al.*, coll. BBU), Chinteni (3w, 21.05.2011, leg. Markó *et al.*, coll. BBU), Luna de Jos (6w, 01.08.2010, leg. Markó *et al.*, coll. BBU), Vişea (6w, 07.06.2011, leg. Markó *et al.*, coll.BBU); GL: near Barboşi creek (1w, 09.06.2006, leg. Markó, coll. BBU); TL: Sfântu Gheorghe (15w, 06.05.2008, leg. Markó, coll. BBU).

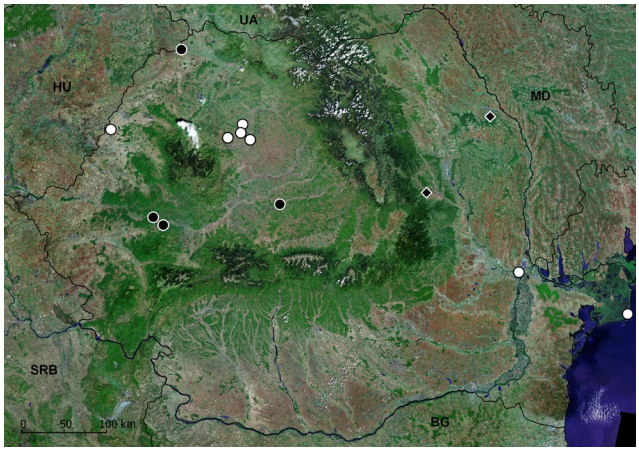


Fig. 9. Distribution of *Myrmica slovaca* (circles) and *M. sulcinodis* (diamonds) in Romania (white symbols- new collections, black symbols - published data).

Myrmica specioides Bondroit, 1918

Myrmica specioides has been documented in Europe (to the north to southern England and Denmark), the Caucasus, Asia Minor, Iran, Turkmenistan, south of West Siberia and northern Kazakhstan, to the east up to the Altai Mts.; it has been introduced to North America (Jansen and Radchenko 2009). It is the most xerophilous species of Central European *Myrmica*, living in open areas with low vegetation. Nests are built in the ground; colonies are mono- or polygynous with up to 1000 workers. It has been documented only in a few localities (Fig. 7), but given its habitat preferences it is likely to be more prevalent than this would suggest.

Published records: CJ: Fânaţele Clujului – Cluj-Napoca (Markó and Csősz 2001); CS: Brebu Nou (Semenic Mts.) (Seifert 2011); SB: Cisnădioara (Tăuşan and Markó 2009), Sibiu (Markó and Csősz 2001, 2002), Ocna Sibiului (Tăuşan *et al.* 2012); SJ: Stana (Csősz *et al.* 2001).

New collecting sites: AB: Aiud (2w, Nagy Enyed, 19.07.1917, leg. Szilády, coll. HNHM); BH: Cefa (Cefa Natural Park) (3w, 28.03.2009, leg. Petrovici *et al.*, coll. BBU; 1q, 2009-2010, leg. Petrovici *et al.*, coll. BBU) CJ: Cluj-Napoca (1w, 04.10.2004, leg. Sipos et Boros, coll. BBU); CS: Băile Herculane (2w, 10.10.2011, leg. Markó *et al.*, coll. BBU); HR: Miercurea Ciuc (6w, 16.08.2011, leg. Czekes *et al.*, coll. BBU); IS: near Prisăcani (1w, 09.06.2009, leg. Markó, coll. BBU); MS: after Criş, meadow (7w, 25.07.2012, leg. Markó et Erős, coll. BBU), near Vulcan, grassland (5w, 24.07.2012, leg. Markó et Erős, coll. BBU); TL: Celic-Dere (Frecăţei) (3w, 31.05.2005, leg. Csősz, coll. HNHM), salt lake shore

between Măcin and Greci (3w, 12.06.2006, leg. Markó, coll. BBU), Pricopanu (Măcin Mts.) (6w, 01.06.2005, leg. Csősz, coll. HNHM).

***Myrmica sulcinodis* Nylander, 1846**

A boreo-mountain species, *Myrmica sulcinodis* occurs in the region stretching from the Atlantic Ocean to the Pacific Ocean (but absent in Japan); in the north reaching the forest-tundra zone, in the south, on plains to the southern limit of the taiga zone. In the more southern regions it lives only in mountains; it is absent in the mountains of Middle Asia. It lives in open and sun exposed habitats at 1400-2600 m a.s.l. in Southern Europe and the Caucasus, at 800-1800 m a.s.l. in Central Europe and in lowland farther to the north. It builds nests in the ground or under stones. Colonies are usually monogynous and small. It has been documented only in a few localities (Fig. 9).

Published records: BC: Târgu Ocna (Paraschivescu 1963, 1972b); IS: Bîrnova (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969), UL: Cibin Mts. (Sibiu County) (Paraschivescu 1975), Romanian Plain (Paraschivescu 1978b), Trotuş Valley (Cîrdei and Bulimar 1965, Cîrdei *et al.* 1969).

***Myrmica vandeli* Bondroit, 1919**

A European species, *Myrmica vandeli* is found sporadically in Austria, Bulgaria, the Czech Republic, France, Germany, Great Britain (England and Wales), Poland, Romania, Spain, Sweden, Switzerland, Slovakia, western Ukraine, and the former Yugoslavia, frequently coexisting with *M. scabrinodis*. It lives in open, wet meadows. Nests are usually constructed in moss pads, sometimes under stones. Polygynous colonies can contain up to 1500 workers. It has been documented only in a few localities in Central Romania, mostly in mountain regions (Fig. 8).

Published records: CJ: Şardu (Tartally and Varga 2008, Tartally *et al.* 2008a, b); CV: Apa Lentă (Nemira Mts.) (Markó *et al.* 2004); HR: Voşlobeni (Markó 1999b, Markó *et al.* 2004, Gallé *et al.* 2005).

New collecting sites: HR: Miercurea Ciuc (6w, 16.08.2011, leg. Czekes *et al.*, coll. BBU), Plăieşii de Sus (6w, 19-29.07.2012, leg. Czekes, coll. BBU), Vlăhiţa pass – Vlăhiţa, (24w, 4m, Tolvajos-tető, 07.08.2003, leg. Csősz, coll. HNHM).

Species with probable occurrence

***Myrmica deplanata* Emery, 1921**

Myrmica deplanata has been documented in the region stretching from Central and Southern Europe, through the Transcaucasus to Iran, Turkmenistan, the south of West Siberia, northern Kazakhstan, Tien-Shan, and the Altai Mts. It is one of the most thermo-xerophilous *Myrmica* species. Although it is widely distributed, it is never abundant. It inhabits primarily steppe-like habitats at low altitudes, on stony sites, with low, sparse vegetation. It nests in the soil, under stones, in warm places. Sexuals may be found in nests from July to September.

M. deplanata is present in almost all countries adjacent to Romania: Bulgaria (Lapeva-Gjonova *et al.* 2010), Hungary (Csősz *et al.* 2011), Serbia (Petrov 2006), and Ukraine (Radchenko and Elmes 2010). Because of its distribution and ecology, it seems probable that it is also present in Romania.

***Myrmica hirsuta* (Elmes, 1978)**

Myrmica hirsuta has been documented in Northern and Central Europe, Serbia and the European part of Russia. It is an obligatory social parasite of *M. sabuleti* in Central Europe. In North Europe it usually lives in *M. lonae* colonies. Workers are rarely produced (Radchenko and Elmes 2010). Due to the fact that *M. hirsuta* is present in Hungary (Csősz *et al.* 2011) and Serbia (Petrov 2006), and, in addition, its host, *M. sabuleti* is very frequent in Romania, it is fair to assume that the probability of its Romanian occurrence is high.

***Myrmica kozakorum* Radchenko et Elmes 2010**

Myrmica kozakorum was recently documented in the region stretching from the steppe zone of southern Ukraine to West Siberia and Kazakshtan It is fairly tolerant of high soil salinity, and normally can be found in relatively wet and shaded places in the steppe region. Colonies are small, containing at most a few hundred workers. Nests are built in the soil (Radchenko and Elmes 2010).

Based on its occurrence in the Black Sea region of Southern Ukraine, its presence in Romania is expected primarily in the steppe area of Dobdrudja and in Southern Moldova.

***Myrmica ravasinii* Finzi, 1923**

Myrmica ravasinii has been documented in Albania, the former Yugoslavia, Greece, Georgia, Armenia and Turkey. It inhabits semi-xerophilous areas, and can be found primarily in the mountain regions of the Eastern Mediterranean. Nests are built in the soil (Radchenko and Elmes 2010).

Although it is not present in any of the neighboring countries, its occurrence cannot be excluded in Southern Romania, especially in the old mountains of Dobrudja, near the Black Sea.

***Myrmica stangeana* Ruzsky, 1902**

Myrmica stangeana has been documented in steppes stretching from the lower reaches of the river Dnepr to eastern Kazakhstan and the Samara Province of Russia in the north. It is widely distributed, but rare. It inhabits intrazonal, wet, usually saline areas of the Steppe Zone (Radchenko and Elmes 2010).

Based on its distribution and habitat preferences it could occur in the eastern part of Romania, e.g. in Dobrudja.

Myrmica tulinae Elmes, Radchenko et Aktaç, 2002

Myrmica tulinae has been documented in Georgia, France, Italy, the Netherlands, Poland and Turkey, but might be generally widespread in the Euro-Caucasian region. It lives in moderately humid habitats, or even in wet, boggy places (Radchenko and Elmes 2010).

Queens and workers of *M. tulinae* are barely distinguishable from *M. sabuleti*, while *M. tulinae* males mostly resemble those of *M. scabrinodis*. Therefore, workers and also males are both needed for precise identification (Radchenko and Elmes 2010). Because of possible misidentifications based solely on one cast, this species might be much more common in Europe than currently thought. Hence, its occurrence in Romania is expected.

A Key to the identification of Romanian *Myrmica*[1]

1 Frontal carinae curved outwards to merge with the rugae that surround antennal sockets (Fig. 37). Scape very smoothly curved at the base, never angled and without any trace of a lobe or carina (Fig. 10) ……..…… **2**

-- Frontal carinae merging with the rugae that extend to the occipital margin, they do not curve outwards and do not merge with rugae that surround antennal sockets (Figs 45, 49, 51). Scape more strongly curved, often angled at the base, usually with, but sometimes without a lobe, ridge or carina (Figs 11-36) ……..... **3**

2(1) Petiolar node with rounded dorsum, without flattened dorsal plate, node of petiole and postpetiole smooth, at most very finely striated; propodeal spines short, mean ESL/HW 0.26 (Fig. 38). **Males**: scape and tibiae with rather long standing hairs (Figs 61, 62) ……..……..... ***M. rubra*** **(**Linnaeus)

-- Petiolar node with flattened dorsal plate, node of petiole and postpetiole with quite coarse, short sinuous longitudinal rugae; propodeal spines longer, mean ESL/HW 0.41 (Fig. 39). **Males**: scape and tibiae with short standing hairs (Fig. 63, 64) ……..... ..... ***M. ruginodis*** Nylander

3(1) Scape with a vertical lobe or dent and sharply angled at the base (Figs 11-17) ……..... **4**

-- Scape never with a vertical lobe or dent, varying from gradually curved to sharply angled at the base, often with horizontal lobe, ridge or carina of various shape (Figs 18-36) ……...…… **7**

4(3) Frontal carinae very strongly curved, frons extremely narrow (the narrowest among all known *Myrmica* species), FW/HW < 0.19, FLW/FW > 1.95. Scape at the base with an extremely massive, subvertical, plate-like lobe (Figs 11, 12) ……..…..... .....… ***M. ravasinii*** Finzi

-- Frontal carinae less curved, frons wider, FW/HW > 0.20, FLW/FW < 1.90. Scape at the base with vertical lobe ranging from moderately sized plate-like structure to a small dent (Figs 13-17) …… **5**

5(4) Petiole with short peduncle, its anterior surface steep, only slightly concave, meeting the dorsal one at an acute or right angle, petiolar node with a distinct, declined posteriorly, flattened dorsal plate (seen in profile) (Fig. 40). Base of scape (seen anteriorly) without extended shield-like plate, scape at the base usually with a distinct lobe (its size may vary, but it is never dentiform) (Figs 13, 14). **Males**: scape long, SL/HL < 0.70 (Fig. 65) ……..…… ***M. lobicornis*** Nylander

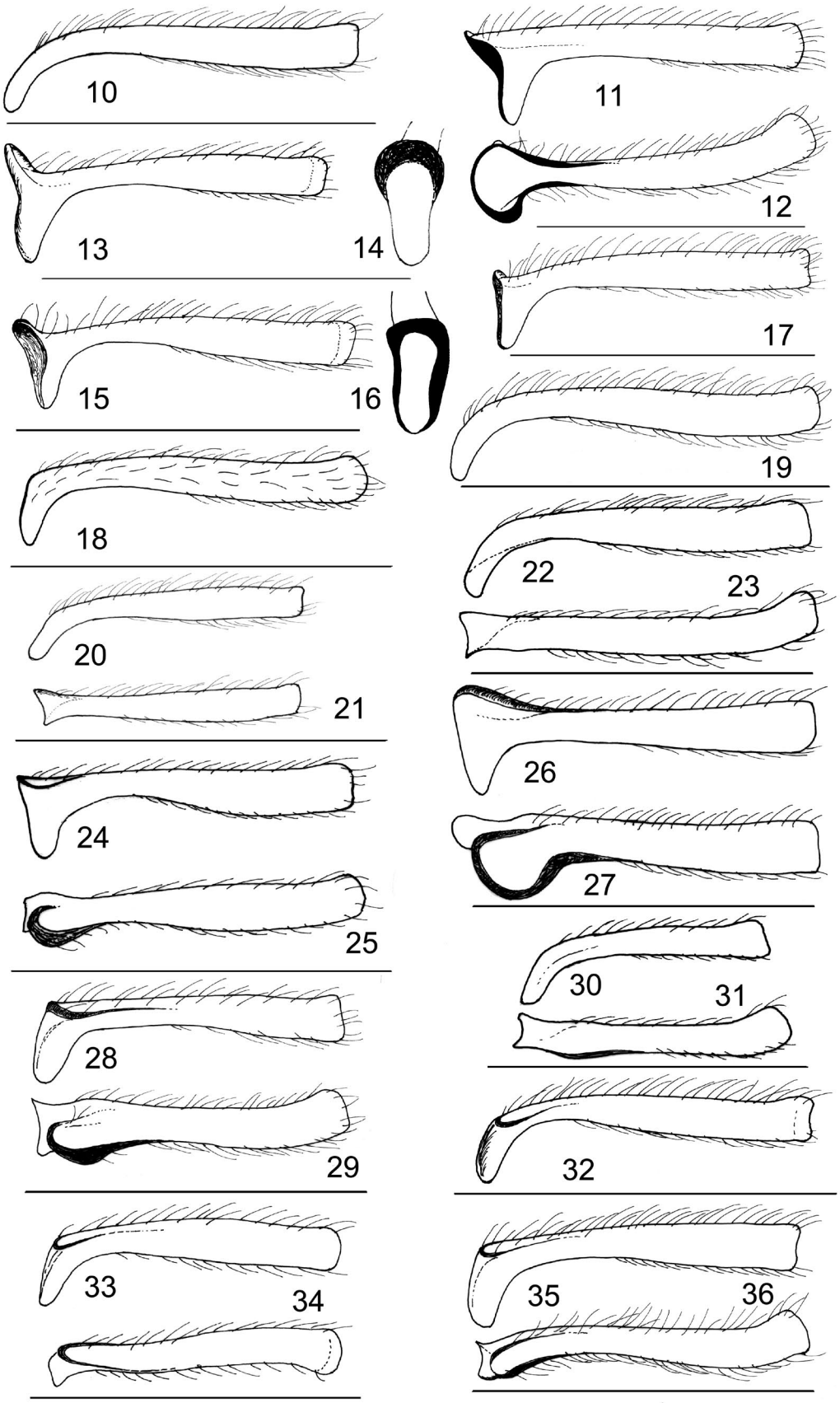
-- Petiole with well developed peduncle, its anterior surface not steep, distinctly concave, meeting the dorsal one to form a blunt, rounded angle, petiolar node without a distinct dorsal plate, its dorsum convex or at most slightly flattened (seen in profile) (Fig. 41). Base of scape (seen anteriorly) with extended, shield-like plate (Fig. 16). Scape at the base either with big or small, often dentiform lobe (Figs 15, 17). **Males**: scape short, SL/HL < 0.50 (Figs 66, 67) ……..…… **6**

6(5) Frons narrower, mean FW/HW 0.23. Scape at the base with big lobe (Figs 15, 16). **Males**: scape strongly curved at the base, relatively long, subequal to the length of three basal funicular segments together, mean SL/HW 0.43 (Fig. 66) …… ……..……..… ***M. schencki*** Viereck

-- Frons wider, mean FW/HW 0.31. Scape at the base with small dent (Fig. 17). **Males**: scape very feebly curved at the base, very short, subequal to the length of first and second funicular segments together, mean SL/HW 0.34 (Fig. 67) ..... ***M. deplanata*** Emery

7(3) Mesosoma and waist with very coarse, straight (not sinuous) longitudinal rugae; petiole with a very short peduncle, and steep anterior surface that meets the dorsal one at an almost right angle, dorsal plate well developed and flattened (Fig. 42). Scape strongly but gradually curved at the base, at most slightly angled, sometimes with a weak longitudinal

1 *M. karavajevi* is a workerless species. Its **queens** well differ from any other Romanian *Myrmica* by the presence of wide lamella on the ventral surfaces of both petiole and postpetiole (Fig. 57). Its **males** have 12-segmented antennae (instead of 13-segmented in other species), long scape that surpasses occipital margin (Fig. 58), and forewing with completely fused closed cells 1r+2r+rm (Fig. 59) (forewing in other species with closed cells *1r+2r* and *rm* partly separated by short vein, Fig. 60).



Figs. 10-36. Antennal scape of *Myrmica* workers; 10 – *M. rubra*, 11, 12 – *M. ravasinii*, 13, 14 – *M. lobicornis*, 15, 16 – *M. schencki*, 17 – *M. deplanata*, 18 – *M. sulcinodis*, 19 – *M. gallienii*, 20, 21 – *M. rugulosa*, 22, 23 – *M. constricta*, 24, 25 – *M. slovaca*, 26, 27 – *M. lonae*, 28, 29 – *M. sabuleti*, 30, 31 – *M. hellenica*, 32 – *M. specioides*, 33, 34 – *M. stangeana*, 35, 36 – *M. scabrinodis*; 10, 11, 13, 15, 17-20, 22, 26, 28, 30, 32, 33, 35 – lateral view; 12, 21, 23, 25, 27, 29, 31, 34, 36 – dorsal view; 14, 16 – foot of scape, anterior view; scale bars – 1 mm.

ridge on the base of scape (seen anteriorly) (Fig. 18). Large and robust species, usually bicoloured, with reddish alitrunk and blackish head dorsum and gaster. **Males:** scape long SL/HL> 0.80 (Fig. 68) ……..... .....…… ***M. sulcinodis*** NYLANDER

-- Mesosoma, and especially waist, with less coarse, usually sinuous longitudinal rugosity; petiole of different shape (Figs 43, 44, 46-48, 52, 53, 55, 56). Scape of various shape (Figs 19-36). **Males**: scape shorter, SL/HL < 0.70 (**Figs.** 69, 71, 73, 77, 79) ……....…… **8**

8(7) Scape at the base bent in an "ideal" curve, with no trace of an angle, carina or ridge (Fig. 19) ……....…… **9**

-- Scape either strongly angled at the base, with horizontal lobe, carina or a weak ridge, or at least slightly angled, but never bent in an "ideal" curve (Figs 20-36) ……....…. **10**

9(8) Propodeal spines short, mean ESL/HW 0.28, petiole low, mean PL/PH 1.24 (Fig. 43). Generally bigger, mean HW 1.12, mean AL 1.80 mm, more robust and darker coloured species ……....… ***M. bergi*** RUZSKY

-- Propodeal spines longer, mean ESL/HW 0.36, petiole higher, mean PL/PH 1.14 (Fig. 44). Generally smaller, mean HW 1.04, mean AL 1.62 mm, more slender and lighter coloured species ……..…… ***M. gallienii*** BONDROIT

10(8) Scape slightly angled at the base, without horizontal lobe, at most with very weak short horizontal ridge (Figs 20-23) ……....……. **11**

-- Scape strongly angled at the base, with horizontal lobe, carina or well developed ridge (Figs 24-36) ……..……...…… **12**

11(10) Scape at the base with no trace of a ridge (Figs 20, 21). Frontal lobes less extended, FLW/FW < 1.10 ……..... .....…… ***M. rugulosa*** NYLANDER

-- Scape at the base with weak ridge (Figs 22, 23). Frontal lobes more extended, FLW/FW ≥ 1.15 ……..… ***M. constricta*** KARAWAJEW

12(11) Frons very narrow, FW/HW < 0.30, mean 0.27. Lobe at the base of scape quite large, but not extended to form a longitudinal carina on the dorsal surface of scape (Figs 24, 25) ……..... ***M. slovaca*** SADIL

-- Frons wider, FW/HW ≥ 0.30, species' means ≥ 0.33. Base of the scape with ornamentation ranging from a ridge or a distinct carina to a large, well developed lobe, but if the lobe is large, it extends to form a longitudinal carina on the dorsal surface of scape (Figs 26-36) ……..…… **13**

13(12) Postpetiole very wide, PPW/HW > 0.55. Body with very abundant, long standing hairs (Figs 45, 46). **Males**: scape relatively long, as long as four basal funicular segments together, SL/HL > 0.50 (Fig. 69). Head margins and waist with numerous long hairs (Fig. 70) …… ***M. hirsuta*** ELMES

-- Postpetiole narrower, PPW/HW < 0.45. Body with less abundant and shorter hairs (Figs 47-49, 51-53, 55, 56). **Males**: scape of various length, head pilosity various (Figs 71-73, 75, 77, 79) **14**

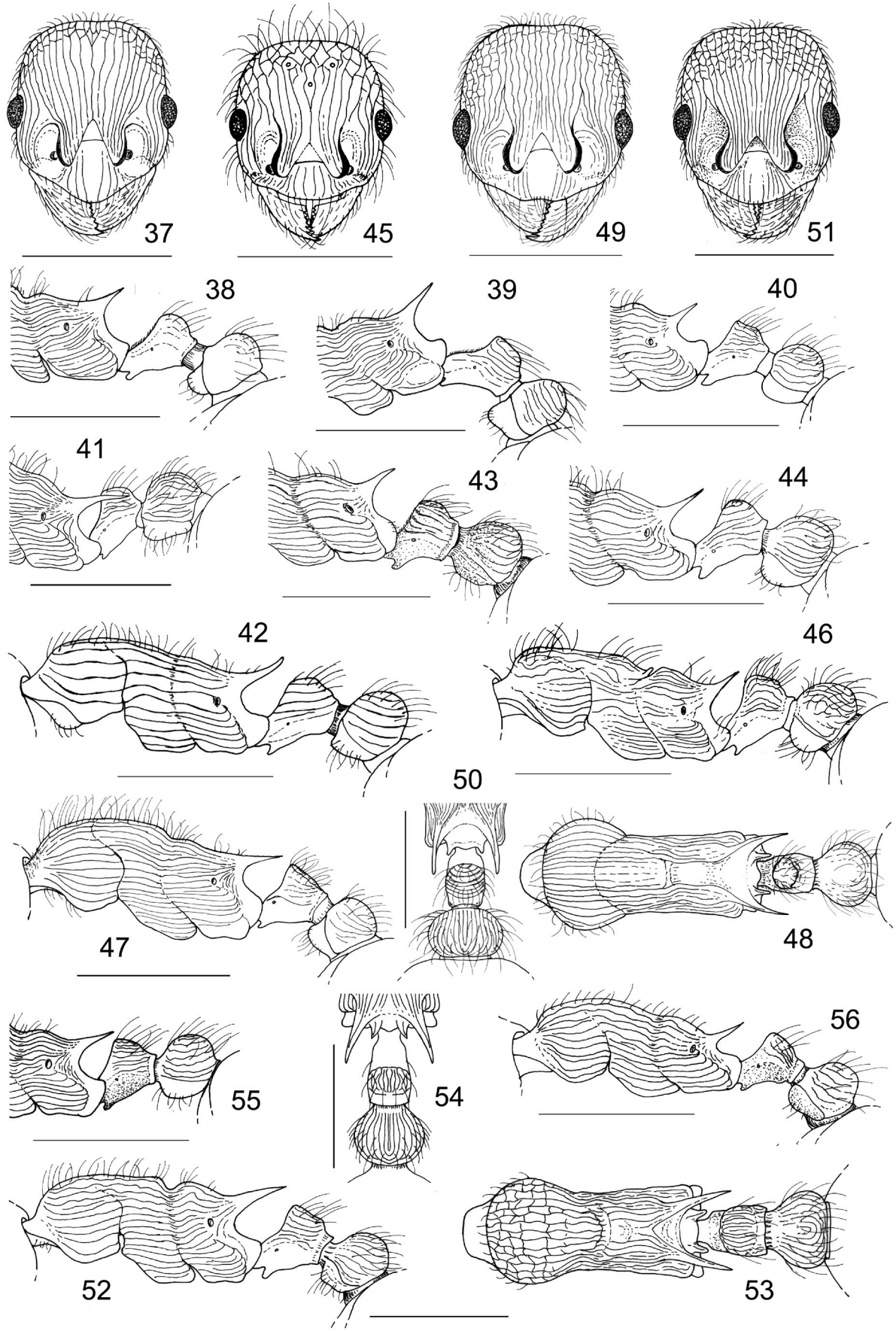
14(13) Relatively hairy species, petiole with more than 10 (usually with 12-20) long, thin and often curved hairs; mesosomal dorsum with longitudinal, slightly sinuous rugae, without reticulation; postpetiolar dorsum with partly reduced sculpture (Fig. 47, 48). Anterior clypeal margin shallowly but distinctly notched medially (Fig. 49). Spurs on middle and hind tibiae at least partly reduced and usually not pectinate. **Queens**: petiolar node with coarse, regular longitudinally-concentric rugosity, without reticulation (Fig. 50). **Males**: scape relatively long, as long as four basal funicular segments together, SL/HL > 0.50; head margins with numerous long hairs (Figs 71, 72) ……..…***M. vandeli*** BONDROIT

-- Less hairy species, petiole with less than 10 (usually not more than 8) long, straight, thick standing hairs; mesosomal dorsum with strongly sinuous longitudinal rugae and often also with reticulation; postpetiolar dorsum with coarser sculpture (Figs 52, 53, 55, 56). Anterior clypeal margin not notched medially (Fig. 51). Spurs on middle and hind tibiae as a rule well developed and pectinate. **Queens**: petiolar node with various sculpture, but never with coarse, regular longitudinally-concentric rugosity (Fig. 54). **Males**: scape shorter, if the same length then head margins with very short and sparse standing hairs (Fig. 73, 75, 77, 79) ……..……. **15**

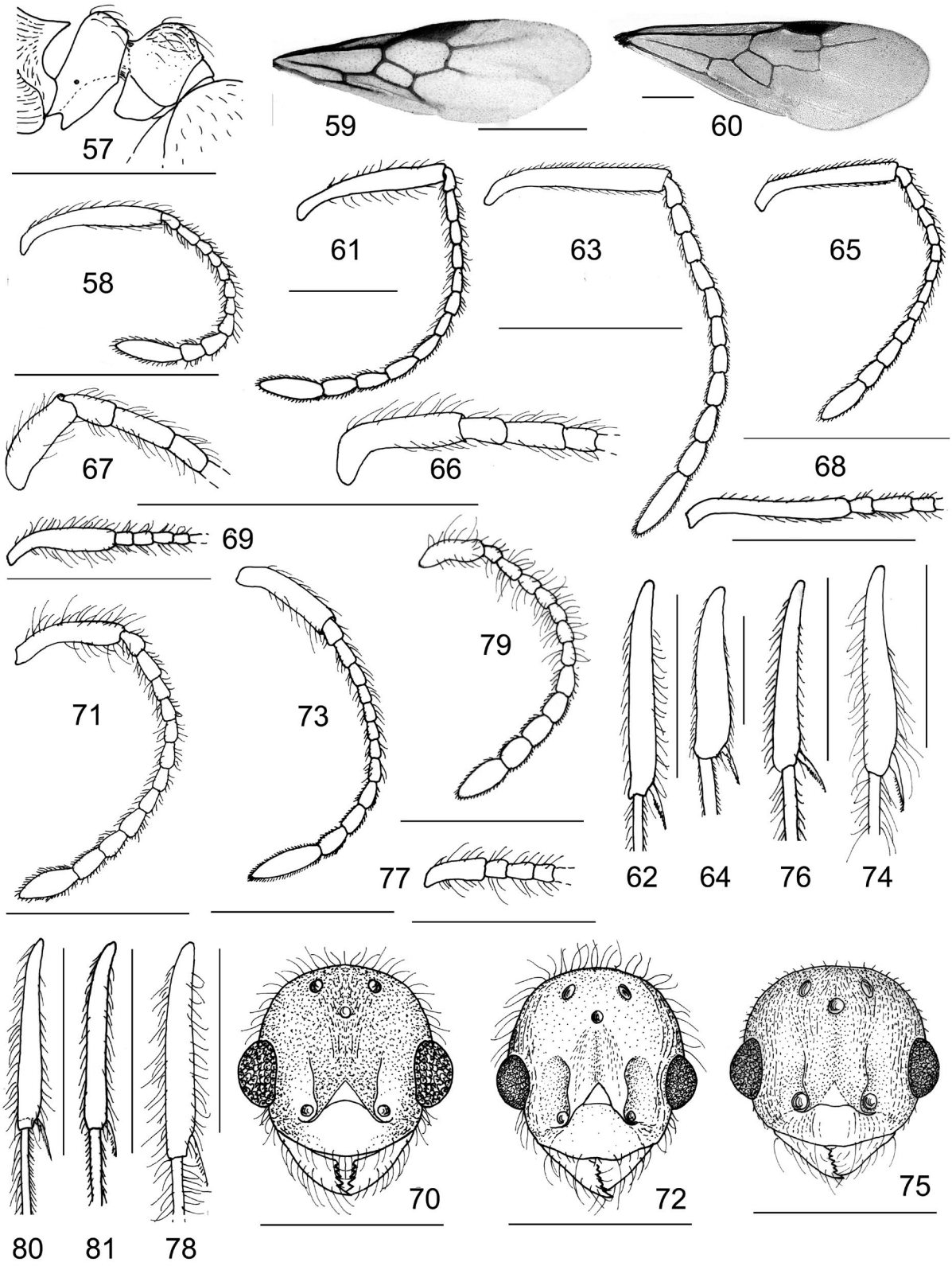
15(14) Scape at the base with very large, massive lobe, which is clearly raised over the dorsal plane of scape (seen in profile) (Figs 26, 27). Frons narrow, mean FW/HW 0.32. **Males**: **s**cape relatively long, as long as 4-4.5 basal funicular segments together, SL/HL > 0.50 (as in Fig. 73) ……....…… ***M. lonae*** FINZI

-- Scape at the base with smaller, not very massive lobe, which is never raised over the dorsal plane of the scape (seen in profile), or with narrow carina or ridge (Figs 28-36). **Males**: scape of various lengths (Figs 73, 77, 79) ……....…… **16**

16(15) Frons relatively narrow, species' means FW/HW ≤ 0.35. Scape at the base with relatively large posteriorly bulging lobe (Figs 28, 29). **Males**: scape of various length (Figs 73, 79) ……..…… **17**



Figs. 37-56. Details of body structure of *Myrmica* (37-49, 51-53, 55, 56 – workers, 50, 54 – queens); 37, 38 – *M. rubra*, 39 – *M. ruginodis*, 40 – *M. lobicornis*, 41 – *M. schencki*, 42 – *M. sulcinodis*, 43 – *M. bergi*, 44 – *M. gallienii*, 45, 46 – *M. hirsuta*, 47-50 – *M. vandeli*, 51-54 – *M. scabrinodis*, 55 – *M. specioides*, 56 – *M. stangeana*; 37, 45, 49, 51 – head, dorsal view; 38-41, 43, 44, 55 – propodeum and waist, lateral view; 42, 46, 47, 52, 53, 56 – mesosoma and waist, lateral view; 48, 53 – mesosoma and waist, dorsal view; scale bars – 1 mm.



Figs. 57-81. Details of body structure of *Myrmica* (57 – queen, 58-81 – males); 57-59 – *M. karavajevi*, 60, 63, 64 – *M. ruginodis*, 61, 62 – *M. rubra*, 65 – *M. lobicornis*, 66 – *M. schencki*, 67 – *M. deplanata*, 68 – *M. sulcinodis*, 69, 70 – *M. hirsuta*, 71, 72 – *M. vandeli*, 73-75 – *M. sabuleti*, 76 – *M. kozakorum*, 77, 78 – *M. scabrinodis*, 79 – *M. tulinae*, 80 – *M. specioides*, 81 – *M. stangeana*; 57 – waist, lateral view; 59, 60 – fore wing; 58, 61, 63, 65, 71, 73, 79 – antenna, 66-69, 77 – scape and basal funicular segments; 62, 64, 74, 76, 78, 80, 81 – hind tibia and part of basitarsus; 70, 72, 75 – head, dorsal view; scale bars – 1 mm.

-- Frons relatively wide, species' means FW/HW ≥ 0.36. Scape at the base with smaller lobe, carina or ridge (Figs 30-36). **Males**: scape short, SL/HL < 0.45 (Fig. 77) …… **19**

17(16) Frons somewhat wider, mean FW/HW 0.35, frontal lobes less extended, mean FLW/FW 1.50. **Males**: scape somewhat shorter than first to third basal funicular segments together, mean SL/HL 0.42. Standing hairs on tibiae ant tarsi shorter, longest hairs on tibiae not longer than tibial width, same on tarsi less than twice longer than tarsal width (Fig. 76) ……..…..***M. kozakorum*** Radchenko et Elmes

-- Frons somewhat narrower, species' means FW/HW 0.33-034, frontal lobes more extended, species' means FLW/FW 1.53-1.57. **Males**: scape either short (SL/HL < 0.40) or long (SL/HL > 0.50) (Figs 73, 79). Standing hairs on tibiae and tarsi very long, longest hairs on tibiae distinctly longer than tibial width, same on tarsi more than twice longer than tarsal width (Fig. 78) ……...…… **18**

18(17) Spur of hind and middle tibiae well developed, pectinate. **Males**: **s**cape relatively long, as long as length of 4-4.5 basal funicular segments together, SL/HL > 0.50 (Fig. 73) … ……...……...…… ***M***. ***sabuleti*** Meinert

-- Spur of hind and middle tibiae often reduced to some extent. **Males**: scape short, shorter than length of first to third basal funicular segments together, SL/HL < 0.40 (Fig. 79) ..……***M. tulinae*** Elmes, Radchenko et Aktaç

19(16) Frons very wide, mean FW/HW 0.43, frontal lobes weakly extended, mean FLW/FW 1.15. Scape at the base with a narrow horizontal lobe, carina or even distinct ridge (size of this structure is quite variable) (Figs 30, 31) …….....…… ***M. hellenica*** Finzi

-- Frons narrower, species' means FW/HW ≤ 0.40, frontal lobes distinctly more extended, species' means FLW/FW ≥ 1.30. Scape at the base with a much more pronounced, larger horizontal lobe or carina (Figs 32-36) ….. **20**

20(19) Frons somewhat wider, mean FW/HW 0.38, frontal lobes less extended, mean FLW/FW 1.32. Petiolar node without a distinct horizontal dorsal plate, its posterior surface declines gradually to postpetiole (seen in profile); propodeal spines relatively short, mean ESL/HW 0.36 (Fig 55). Scape at the base with a rather small lobe or only narrow carina (Fig. 32). **Males**: middle and hind tibiae and basitarsi with shorter standing hairs, longest hairs not longer than maximum width of tibia (Fig. 80) ...…… ***M. specioides*** Bondroit

-- Frons narrower, species' mean FW/HW 0.36, shape of frontal lobes, petiole and propodeum various (Figs 52, 56). **Males**: pilosity on middle and hind tibiae and basitarsi various (Figs 78, 81) …….. **21**

21(20) Frontal lobes less extended, mean FLW/FW 1.31. Scape at the base with narrow horizontal ridge or at most very small carina (Figs 33, 34). Propodeal spines short, mean ESL/HW 0.31, not widened at the base, thin, often needle-like; metanotal groove weak or completely absent; petiolar node without dorsal plate, usually only rounded, its posterior surface gradually declines to postpetiole; sides of alitrunk with relatively coarse, regular, almost straight longitudinal rugae (Fig. 56). Body colour rather dark, brownish-red. **Males**: scape very short, mean SL/HL < 0.33. Middle and hind tibiae and basitarsi with short subdecumbent hairs (Fig. 81) ……..... ***M. stangeana*** Ruzsky

-- Frontal lobes more extended, mean FLW/FW ≥ 1.40. Scape at the base with more developed, but never massive, horizontal carina or lobe (Figs 35, 36). Propodeal spines longer, mean ESL/HW > 0.40, usually widened at the base (more thorn-like) never needle-like; metanotal groove well developed, often deep; petiolar node with a distinct horizontal or slightly declined posteriorly dorsal plate; sides of alitrunk with less coarse sinuous longitudinal rugae (Fig. 52). Body colour lighter, usually ochreous- or yellowish-red. **Males**: scape somewhat longer, mean SL/HL > 0.37. Middle and hind tibiae and basitarsi with very long standing hairs, longest hairs longer than maximum width of tibia (Fig. 78) ……..…… ***M. scabrinodis*** Nylander

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