

RIASSUNTO

Lo studio del materiale rinvenuto su diciotto isole circumsarde ha portato all'identificazione di 31 specie, delle quali 5 nuove per la Sardegna e 19 nuove per le isole circumsarde. Il corotipo dominante è quello mediterraneo, rappresentato da 10 specie.

Con l'occasione viene ridisegnato l'epigino di *Ozyptila confluens*.

La causa della scarsa presenza di specie appartenenti a famiglie quali Araneidae, Lycosidae, Gnaphosidae, Thomisidae e Salticidae e la totale assenza di altre ben rappresentate in Sardegna (Dysderidae, Linyphiidae, Agelenidae, Clubionidae s. lat., Philodromidae, ecc.) è da ricercare senza dubbio nelle modalità di raccolta adottate.

ABSTRACT

Zoological researches of the oceanographic ship "Minerva" (C. N. R.) on the circumsardinian islands. XXXII. Araneae.

The study of Araneae collected in eighteen circumsardinian islands allowed the identification of 31 species: 5 are new for Sardinia (*Ariadna insidiatrix*, *Crustulina scabripes*, *Selamia reticulata*, *Scotophaeus scutulatus*, *Zelotes tenuis*) and 19 are new for the circumsardinian islands. Dominant corotype is mediterranean (10 species). The epigyne of *Ozyptila confluens* is redrawn.

The cause of the scarce presence of Araneidae, Lycosidae, Gnaphosidae, Thomisidae e Salticidae and the total absence of others families well represented in Sardinia (Dysderidae, Linyphiidae, Agelenidae, Clubionidae s. lat., Philodromidae, etc.) it is to seek without doubt in the prevailing collecting methods adopted.

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IMPORTANT ALTERATIONS IN THE TAXONOMY OF
THE ANT GENUS *MYRMICA*, BASED ON THE
INVESTIGATION OF THE M. RUZSKY'S TYPE
SPECIMENS, PRESERVED IN THE MUSEO CIVICO DI
STORIA NATURALE "GIACOMO DORIA" IN GENOA

(HYMENOPTERA, FORMICIDAE)

INTRODUCTION

The famous Russian entomologist M. D. Ruzsky (1864-1948) produced the first synthesis of the myrmecofauna of Russia (RUZSKY 1905, 1907) and established the basis for the future development of myrmecological studies in that country. He described about 150 new ant taxa, among which were 28 species and infraspecific forms of the genus *Myrmica*; 12 of these are now considered as good species.

The type specimens of only 13 of Ruzsky's *Myrmica*-taxa were present in the collections of the Zoological Museum of the Moscow State University and Zoological Institute of the Russian Academy of Sciences (St.-Petersburg) and neotypes had been designated for a further 5 species (ARNOLDI 1970; RADCHENKO 1994 c, d, e; SEIFERT 2002). Based on this material, the taxonomic status of most of Ruzsky's *Myrmica* taxa had been resolved and agreed by all modern ant taxonomists, but inconsistent opinions had been published for three species for which the type specimens were believed to be lost: *M. deplanata*, *M. salina* and *M. lacustris* (see ARNOLDI 1970, 1976; SEIFERT 1988, 2002; RADCHENKO 1994 c, d; RADCHENKO & ELMES 2004; RADCHENKO *et al.* 2006).

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In 2007, one of the present authors (AR) fortunately was given the opportunity to study the ant collection of Carlo Emery, one of the greatest myrmecologists of all times, which is preserved in the Museo Civico di Storia Naturale "Giacomo Doria" in Genoa, Italy. Somewhat unexpectedly, Emery's collection contained type specimens of 7 of the *Myrmica* taxa described by Ruzsky. Types of four forms, *M. dshungarica*, *M. sulcinodis* var. *nigripes*, *M. stangeana* and *M. bergi*, were already known from the Moscow and St.-Petersburg collections, but types were found of three other species that previously were believed to be lost: *M. saposhnikovii*, *M. lacustris* and *M. salina*. This good fortune now allows us put an end to the confusion generated by old conflicting opinions and to propose a new arrangement of the taxonomic positions of five common forms of Palearctic *Myrmica*: *M. lacustris*, *M. deplanata*, *M. stangeana*, *M. salina*, and *M. slovaca*.

MATERIALS AND METHODS

The type specimens of all the species discussed here are deposited in the following Museums and Institutions: Museo Civico di Storia Naturale "G. Doria", Genoa, Italy (MSNG); Zoological Institute of the Russian Academy of Sciences, St.-Petersburg, Russia (ZISP); Institute of Zoology of the Ukrainian National Academy of Sciences, Kiev, Ukraine (IZK); Zoological Museum of Moscow State University, Russia (ZMMU); Museum and Institute of Zoology of Polish Academy of Sciences, Warsaw, Poland (MIZ); National Museum of Natural History, Prague, Czech Republic (NMNHP); Museum of Comparative Zoology of Harvard University, USA (MCZ).

Specimens were drawn by A. Radchenko using various stereomicroscopes (Olympus, Leica, MBS) and photos of the type specimens were made using microscope Leica MZ16 with attached camera IC3D with computer program Leica Application Suite. Measurements of specimens (accurate to 0.01 mm) were taken for each caste and these were used to calculate various indices.

Morphometrics:

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, when 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 and males).
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 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.
SCW	maximum width of scutum in dorsal view (queens and males).
SCL	length of scutum + scutellum in dorsal view (queens and males).
AH	height of alitrunk, measured from upper level of mesonotum perpendicularly to the level of lower margin of mesopleuron (queens and males).

Indices:

CI = HL/HW; FI = FW/HW; FLI = FLW/FW; SI₁ = SL/HL; SI₂ = SL/HW; PI₁ = PL/PH; PI₂ = PL/HW; PI₃ = PW/HW; PPI₁ = PPL/PPH; PPI₂ = PPH/PPW; PPI₃ = PPW/PW; PPI₄ = PPW/HW; ESLI = ESL/HW; ESDI = ESD/ESL; AI = AL/AH; SCI = SCL/SCW.

RESULTS

- 1) The *Myrmica lacustris* Ruzsky, *M. deplanata* Emery and *M. stangeana* Ruzsky problem.

In essence, the problem was that the original description of *M. scabrinodis* var. *lacustris* (RUZSKY 1905: 686) is very brief, incomplete and at least partly ambiguous. So that in the absence of original types it was hard even to be sure to which species-group of *Myrmica* it belonged (see RADCHENKO 1994 a for discussion of species groups of *Myrmica*). It belonged either to the *lobicornis*-group/*schencki*-group, in which case it was a senior synonym of *M. deplanata* (a familiar name for a species distributed from Central Europe to Altai Mts.), or it belonged to the *scabrinodis*-group and was possibly a synonym of one of the *scabrinodis*-group species. RADCHENKO (1994 d) took the former view and synonymised the name *deplanata* under *M. lacustris* to the irritation of several myrmecologists working in central Europe (see also SEIFERT 2003; RADCHENKO *et al.* 2006).

a) Review of *Myrmica lacustris* Ruzsky

The original description (RUZSKY 1905: 686 - in "old" Russian - translation by AR) reads:

"Workers. Anterior clypeal margin with the small notch medially. Propodeal spines are short, equal to 1/2 or at most 2/3 of the length of dorsal surface of propodeum. Frontal triangle striated distally. Antennal scape at the base is with a small, inclined dentiform lobe. Metanotal groove weak, not deep, as a result mesonotum and propodeal dorsum more flattened (in typical *M. scabrinodis* they are more convex). Body rugosity is finer. Body colour is as in the type [i.e. *M. scabrinodis*], but the whole gaster, except of its tip, is dark brown.

Localities: Tobolskaya Gubernia, salted marshes near Lake Gor'koe, on the way from st. Belovskaya to Petropavlovsk, 6.VII.96; vicinity of the Lake Bol'shoy Nevidim, near vil. Lopatinskoe, Kurgansky Okrug, 27.VI.96; salted marshes near Lake Sladkoe, vil. Sladkovskoe, Ishimsky Okrug, 28.VII.96" [now = Pavlodar Province of Kazakhstan, and Kurgan Province and north-west of Altaisky Krai of Russia].

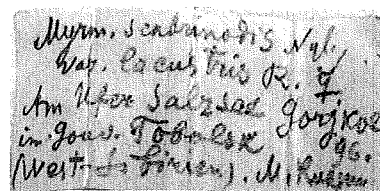
While much of this description could apply to many European *Myrmica* species, the most important characters are barely understandable, even for someone familiar with "old" Russian. For example, the shape and direction of the lobe at the base of antennal scape is very important in separating *scabrinodis*-group from *lobicornis*- or *schencki*-group species, but the description could apply to either. On the other hand, Ruzsky clearly indicated a medially-notched clypeus, which is a feature of *lobicornis*- and *schencki*-group species.

In the course of his revision of the Asian *Myrmica*, RADCHENKO (1994 d) found a queen in the collection of ZMMU that had an original Ruzsky label reading "N.-Petrovsky, Akmolinskyy uезд [now - Akmola Province of Kazakhstan], *M. scabrinodis* var. *lacustris* Ruzs". Although this specimen could not belong to the type series of var. *lacustris* (which was described only from workers), it had been identified by Ruzsky, and in the absence of any other material and under the assumption that Ruzsky had determined his "own" species correctly, Radchenko felt justified in considering this a suitable neotype. He was sure that this queen is a specimen of *M. deplanata* Ruzsky, and because *M. deplanata* was described originally as a quadrimen (i.e. unavailable name), the name *lacustris* had priority (RADCHENKO 1994 d; see also SEIFERT 2003; RADCHENKO *et al.* 2006).

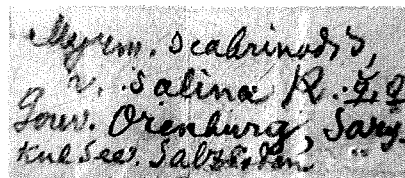
The discovery in the MSNG of two specimens (workers) that we believe were part of Ruzsky's original type series of *M. lacustris*, contradicts the above approach. They are clearly *scabrinodis*-group species having a scape that is angled at the base with a narrow horizontal carina, not vertical as in the *schencki*-group (for more details see RADCHENKO 1994 a; RADCHENKO *et al.* 2006). Therefore *M. lacustris* cannot be synonymous with *M. deplanata* that clearly belongs to the *schencki*-group, consequently we revive the name *M. deplanata* from synonymy (see below).

The MSNG specimens are stuck on a single cardboard triangle, and have an original Ruzsky label (written by a pencil, see Fig. 1): "*Myr. scabrinodis* Nyl. var. *lacustris* R., [w] Am Uber Salzsee Gorjkoe im Gouv. Tobolsk (West-Sibirien) 96. M. Ruzsky". These data correspond with the type localities given by Ruzsky (see above), and the main diagnostic features of these specimens do not contradict with the original description, except for the clypeal notch. We have

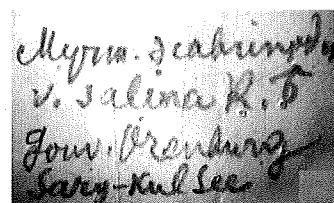
no explanation for this discrepancy other than it is possible that Ruzsky simply made a transcription error resulting from describing so many forms of *Myrmica* at the same time. We designate the distal specimen (stuck on the tip of triangle) as the lectotype of *M. lacustris* and the second specimen as a paralectotype. Consequently, the neotype of *M. lacustris*, designated by RADCHENKO (1994 d), loses taxonomic status. *M. lacustris* is now redescribed based on lectotype and paralectotype.



1



2



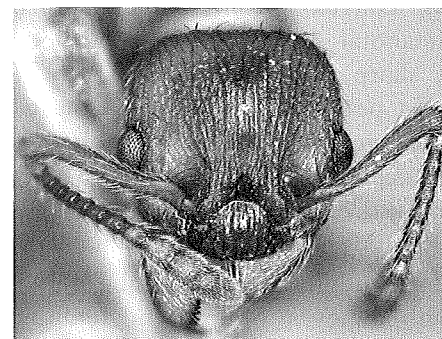
3

Figs 1-3. - Photos of original Ruzsky's labels of the type specimens of *Myrmica lacustris* (1) and *M. salina* (2, 3).

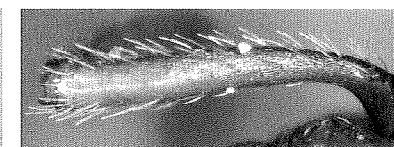
b) Redescription of *Myrmica lacustris* Ruzsky
Workers (Figs 4-7).

Head somewhat longer than broad, with weakly convex sides, straight occipital margin, and rounded occipital corners. Anterior

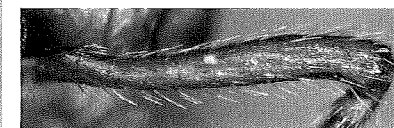
clypeal margin rounded, not prominent and not-notched medially. Frontal carinae moderately curved, frons relatively wide (similar to that of *M. scabrinodis*); antennal sockets surrounded by fine con-



4



5



6



7

4, 7

5, 6

Figs 4-7. - Photos of the lectotype worker of *M. lacustris*: 4 - head, frontal view; 5 - scape, lateral view; 6 - scape, dorsal view; 7 - body, lateral view; scale bars = 1 mm.

centric rugulae; frontal lobes slightly extended, not raised over the surface of head dorsum. Scape distinctly shorter than head-width, angularly curved at the base at a blunt angle, with a narrow horizontal carina only.

Promesonotal dorsum slightly convex, promesonotal suture indistinct (seen from above). Metanotal groove shallow. Propodeal spines rather short, straight, sharp, directed backward at an angle about 45°. Petiole with distinct peduncle, its anterior surface concave, dorsum of node slightly convex, with weakly developed, posteriorly-inclined dorsal plate. Postpetiole with convex dorsum, higher than long. Spurs on middle and hind tibiae well developed and pectinate.

Frons with slightly sinuous longitudinal rugae, numbering > 15 between frontal carinae level with the eyes; occiput and temples with reticulation, clypeus with longitudinal rugosity; surface between rugae finely punctated, but appearing shiny; mandibles longitudinally rugose. Alitrunk dorsum with sinuous rugulosity, sides of alitrunk with longitudinal, often sinuous rugae. Surface between rugae on alitrunk smooth and shiny. Petiole with longitudinal sinuous rugae, postpetiole with longitudinally-concentric rugosity, surface between rugae at most with very fine superficial microsculpture, appearing shiny. Gaster smooth and shiny.

Head margins with relatively short subdecumbent to suberect hairs. Alitrunk, waist and gaster with numerous, long erect to suberect hairs. Scape with subdecumbent to suberect hairs, tibiae with subdecumbent ones. Body colour brownish-yellow, mandibles and appendages somewhat lighter, gaster brownish.

Measurements and indices of *M. lacustris* (means for lectotype and paralectotype workers):

HL 1.18, HW 1.095, FW 0.385, FLW 0.515, SL 0.91, AL 1.73, HTL 0.855, PNW 0.765, PL 0.515, PW 0.32, PH 0.415, PPL 0.395, PPW 0.48, PPH 0.49, ESL 0.29, ESD 0.405 mm;

CI 1.075, FI 0.355, FLI 1.325, SI₁ 0.775, SI₂ 0.835, PI₁ 1.24, PI₂ 0.47, PI₃ 0.295, PPI₁ 0.805, PPI₂ 1.025, PPI₃ 1.50, PPI₄ 0.44, ESLI 0.265, ESDI 1.405.

The next question was: if *M. lacustris* is not synonymous with *M. deplanata*, is it a "good" species? The most similar *scabrinodis*-group species was *M. stangeana*. Direct comparison of the types of

M. lacustris with the type specimens and non-type material from the whole range of *M. stangeana* did not show any essential differences (including morphometrics, and compare Figs. 4-7 and 8-11). Therefore, we consider that *M. lacustris* Ruzsky, 1905 is a junior synonym of *M. stangeana* Ruzsky, 1902.

Myrmica stangeana Ruzsky, 1902

Myrmica stangeana Ruzsky, 1902: 234, w, Russia and Kazakhstan.

Myrmica bergi subsp. *stangeana*: RUZSKY 1903: 314; 1905: 678.

Myrmica scabrinodis subsp. *stangeana*: EMERY 1908: 178; 1921:4; WEBER 1950: 210.

Myrmica stangeana: ARNOLDI 1970: 1841, m; ARNOLDI & DLUSSKY 1978: 533; SEIFERT 1988: 23, q; RADCHENKO 1994 a: 42; 1994 b: 144; 1994 c: 78; BOLTON 1995: 283.

Myrmica stangeana medvedevi Arnoldi, 1970: 1841, w, Ukraine; synonymy: SEIFERT 1988: 23; RADCHENKO 1994 c: 78.

Myrmica scabrinodis var. *lacustris* Ruzsky, 1905: 686, w, Russia (West Siberia) and Northern Kazakhstan; EMERY 1908: 177, 1921: 40, WEBER 1950: 206, nec RADCHENKO 1994 a: 44, 1994 b: 140, 1994 d: 77; BOLTON 1995: 280; SEIFERT 2003: 150; RADCHENKO *et al.* 2005: 168; RADCHENKO *et al.* 2006: 516, **syn. nov.**

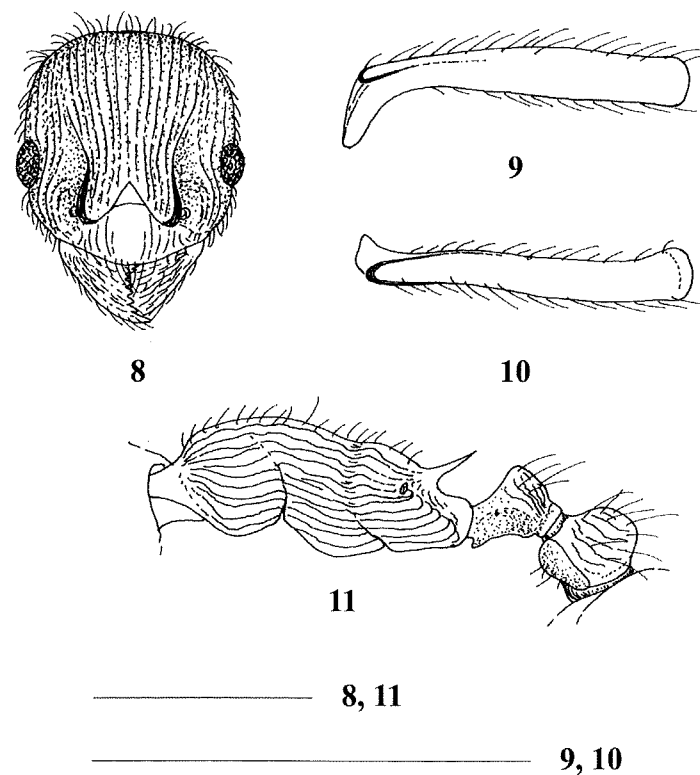
Material examined: lectotype of *M. stangeana* (designated here), worker, with Ruzsky's original label (written in Russian): "*Myrmica scabrinodis stangeana* Ruz., [w], Kirgizskaya Step', gor. Mal. Bogdo, 4.VI.1902, M. Ruzsky" (ZISP); paralectotypes: 2 workers with same labels (ZISP, ZMMU); 1 worker, "Turgai-Steppe No 26, *Myrm. Stangeana* m. [w] 2 ex." (written by Ruzsky) (MSNG); 1 worker, "*M. scabrinodis stangeana* Ruzsky Turgai gebiet" [Turgai area], "MCZ cotypus 20562" [red]; holotype of *M. stangeana medvedevi*: worker, "Askania-Nova, Ukraine, A 6496, V.1927, Medvedev" (written in Russian), "*Myrmica stangeana medvedevi* K. Arn. Holotype" (ZMMU); paratypes: 6 workers with the same labels as the holotype (ZMMU).

Measurements and indices of *M. stangeana* (means and SD for 34 workers, including type specimens):

HL 1.155 ± 0.068 , HW 1.058 ± 0.074 , FW 0.381 ± 0.027 , FLW 0.502 ± 0.034 , SL 0.938 ± 0.048 , AL 1.690 ± 0.122 , HTL 0.852 ± 0.061 , PNW 0.735 ± 0.049 , PL 0.485 ± 0.039 , PW 0.295 ± 0.026 , PH 0.385 ± 0.027 , PPL 0.393 ± 0.034 , PPW 0.465 ± 0.046 , PPH 0.473 ± 0.045 , ESL 0.327 ± 0.042 , ESD 0.430 ± 0.047 mm;

CI 1.093 ± 0.028 , FI 0.361 ± 0.013 , FLI 1.318 ± 0.041 , SI₁ 0.815 ± 0.018 , SI₂ 0.890 ± 0.028 , PI₁ 1.259 ± 0.053 , PI₂ 0.459 ± 0.024 , PI₃ 0.279 ± 0.012 , PPI₁ 0.833 ± 0.061 , PPI₂ 1.018 ± 0.034 , PPI₃ 1.571 ± 0.066 , PPI₄ 0.439 ± 0.023 , ESLI 0.308 ± 0.026 , ESDI 1.320 ± 0.094 .

Notes. The "lectotype" of *M. stangeana* (ZMMU) designated by ARNOLDI (1970: 1841) was a specimen collected by Ruzsky from Sarepta near Volgograd, that does not correspond with the type localities, given by RUZSKY (1902: 235): vicinities of Irgiz and Turgai (now = Astrakhan' Province of Russia and Turgai Province of Kazakhstan). Therefore Arnoldi's designation was erroneous and should be ignored. On the other hand, the "cotype" specimen (MCZ) that



Figs 8-11. - Drawings of the lectotype worker of *M. stangeana*: 8 - head, frontal view; 9 - scape, lateral view; 10 - scape, dorsal view; 11 - alitrunk and waist, lateral view; scale bars = 1 mm.

we examined, almost certainly belongs to the type series and should be considered as a paralectotype. Most probably, WEBER (1950) re-described *M. stangeana* from this specimen and although minimal data are given on its labels, the location is correct and furthermore, Weber had unpublished reasons to attribute it to Lehmboden (G. Stange).

***Myrmica deplanata* Emery, 1921, stat. rev.**

Myrmica lobicornis var. *deplanata* Emery, 1921: 38, w, Ukraine (Crimea), Georgia, Russia, types lost [first available use of *Myrmica scabrinodis* subsp. *lobicornis*. var. *deplanata* Ruzsky, 1905: 700, unavailable name]; KARAWAJEW 1927: 283; WEBER 1948: 276.

Myrmica schencki var. *deplanata*: FINZI 1926: 111.

Myrmica deplanata: KARAWAJEW 1934: 83, q, m; 1936: 275; ARNOLDI 1934: 169; STITZ 1939: 105; ARNOLDI 1970: 1842; Tarbinsky, 1976: 31; ARNOLDI & DLUSSKY 1978: 535; SEIFERT 1988: 36; DLUSSKY *et al.* 1990: 184; BOLTON 1995: 278.

Myrmica moravica Soudek, 1922: 45, w, q, Czechia (Moravia) [also described as new by SOUDEK 1923: 107]; 1925: 35, m; FINZI 1926: 104; synonymy: KARAWAJEW 1934: 83; revived from synonymy: KARAWAJEW 1936: 275; WEBER 1950: 213; synonymy: SEIFERT 1988: 36; BOLTON 1995: 281 (as synonym of *deplanata*); RADCHENKO 1994 d: 78, SEIFERT 2003: 150; RADCHENKO *et al.* 2006: 516 (as synonym of *lacustris*).

Myrmica deplanata moravica: NOVÁK & SADIL 1941: 80; KRATOCHVÍL, in KRATOCHVÍL *et al.* 1944: 40; SADIL 1940: 102; 1952: 263; ARNOLDI 1970: 1843.

Myrmica lobicornis var. *plana* Karawajew, 1927: 283, w, Ukraine; synonymy: KARAWAJEW 1934: 83; ARNOLDI 1970: 1843, SEIFERT 1988: 36 (as synonym of *deplanata*), RADCHENKO 1994 c: 78, BOLTON 1995: 282, SEIFERT 2003: 150 (as synonym of *lacustris*).

Myrmica schencki var. *plana*: KARAWAJEW 1929: 208; KARAWAJEW 1936: 276; WEBER 1948: 302.

Myrmica deplanata nat. *plana*: ARNOLDI 1934: 170, q, m.

Myrmica deplanata subsp. *plana*: SADIL 1940: 102.

Material examined: neotype of *M. deplanata* (designated here): worker, Ukraine, vicinity of Kherson, valley riv. Vir'ovchyna, steppe, 3.IX.2000, leg. S. Bondar (IZK); syntypes of *M. moravica*: 4 workers on the same pin, "*Myrmica moravica* Soudek", "Brno Moravia" (most probably both written by Soudek), "Museo Genova, coll. C. Emery (dono 1925)" (recent curatorial label); 7 workers (4 and 3 on two pins), "Brno Moravia" (most probably both written by Soudek), "Museo Genova, coll. C. Emery (dono 1925)" (recent curatorial label); syntypes of *Myrmica lobicornis* var. *plana*: 4 workers, "Askania-Nova, Dobrschanskiy, 1923" (IZK, ZMMU); non-

type material: more than 100 workers, several tens of queens and males from the whole geographic range of the species.

It is important to record that the neotype of *M. deplanata* was chosen from a nest series that included >20 workers, 6 gynes and 6 males.

The type specimens of *M. moravica* for many years were considered as lost. At least, they are not in the National Museum of Natural History, Prague, Czech Republic (J. Macek, pers. comm., 2001), nor in the Moravian Museum, Brno (I. Malenovsky, pers. comm., 2004). In the ZMMU there are 2 workers labelled as "Hubochepy, Praha, Bohemia, J. Sadil, 1938", "*Myrmica moravica* Soud., var. n., cotype", however these cannot belong to the type series, because were collected later (in 1938). KARAWAJEW (1934, 1936) noted that he investigated Soudek's "cotype" (single worker) of *M. moravica* from Moravia; we cannot find this "cotype" specimen in the Karawajew's collection (IZK). This collection does contain 6 workers with the labels "Morava, Sadil leg.", "*Myrmica moravica* Soud. Karawajew det."; they are indeed specimens of *M. deplanata*, but they are not mentioned in any of Karawajew's publications and we have no reason to think they are from the type series of *M. moravica*. WEBER (1950) redescribed workers, queen and male of *M. moravica* based on "cotypes" from "South Moravia, Pavlovske Kopce (S. Soudek)". This material is not in the MCZ list of type material and we have not seen it. Although the locality and collector data correspond with the original description, we are not completely sure that this material is part of the type series because Soudek did not describe the male until 1925. We located in the MSNG 11 workers, which we consider as syntypes (see above), and 1 male with the labels "*M. moravica* (formix.) 8.VIII.1923 Dr. Soudek", "Museo Genova, coll. C. Emery (dono 1925)" (recent curatorial label); this male cannot belong to the type series because the males were described later than the original description of the workers. However, based on the descriptions and our inspection we are certain that all these type and non-type specimens of *M. moravica* belong to *M. deplanata*, confirming the synonymy.

2) The *Myrmica salina* Ruzsky and *M. slovacica* Sadil problem.

As with *M. lacustris* (above), in the absence of type material the

confusion with this pair of species stemmed from Ruzsky's somewhat ambiguous original description that did not include many important characters that are used in the modern taxonomy of the genus, combined with some confusing additional comments.

a) Review of *Myrmica salina* Ruzsky

Myrmica scabrinodis var. *salina* was described by RUZSKY (1905) based on workers, queens and males from the following localities: Orenburgskaya gubernia, Cheliabinsky uezd, vicinity of the lake Sary-Kul', ♀♀ and ♂♂, 2-5.VIII.[18]94; Tobolskaya gubernia: Lake Gor'koe, on the road from the st. Belovskaya to Petropavlovsk, salted marsh, 6.VII.[18]96; vicinity of the Lake Kamenskoe, near vil. Kureinskoe, Kurg[ansky] okrug, 30.VI.[18]96 (now = Chelyabinsk and Kurgan Provinces and north-west of Altaisky Krai of Russia, and Akmolá Province of Kazakhstan). The original text is in Russian and a translation (by AR) of the description and further comments by Ruzsky follows:

"(workers). Frontal carinae well developed, raised at the base, lobe-like (in typical *scabrinodis* they are smaller). Lobe at the bend of scape transversally oblique (less oblique than in *scabrinodis* and less transverse than in *lobicornis*), and looks like transversal dent or thick scale. Middle part of frontal triangle smooth and shiny. Sides of head dorsum with large reticulation, surface between reticulation punctated but appears shiny. [Propodeal] spines long and straight. Petiolar dorsum angulate. Outstanding hairs more sparse [compared to *scabrinodis*?], on the gastral tergites almost absent. Brownish-red with dark brown or blackish-brown head dorsum and first gastral segment; antennae, mandibles, legs and apex of gaster lighter. Length 4.7-5 mm.

(queens). With same features as workers. Colour somewhat darker than in workers, alitrunk with brownish-black patches. Basal half of wings brownish. Length 5-6 mm.

(males). Whole head very finely punctato-striated (in typical *scabrinodis* head, especially on sides and rear part, with quite coarse irregular rugosity). Antennal scape thickened in the middle. Outstanding hairs on the body, legs and antennae sparser [than in *scabrinodis*?]. Alitrunk almost without hairs. Colour of

wing as in queens. Length of scape as in typical *scabrinodis*."

Additional comments by Ruzsky: "...This variety is interesting because its queens and workers by the dark colour and by the almost transverse, scale-like lobe at the bend of antennal scape, are similar to *Myrmica lobicornis*, but its males on main features are similar to *M. scabrinodis* males and differs only by sculpture of head and sparser pilosity. This species, indubitably, is most similar to the variety *schencki* Emery, and both are intermediate between *scabrinodis* and *lobicornis*. ... *Myrmica schencki* together with var. *salina* are intermediate between *M. scabrinodis* and *M. lobicornis*, but *salina* is more close to the first and *schencki* to the latter".

Unsurprisingly, many subsequent authors treated var. *salina* as an infraspecific form of either *M. scabrinodis* or *M. schencki*. Thus, EMERY (1908: 177) noticed: "Nach Untersuchung von Originalenexemplaren halte ich diese var. [i. e. *salina*] für eine Übergangsform von *scabrinodis* zu *schencki*". FINZI (1926) and WEBER (1948) just repeated Emery's opinion; moreover, Weber considered it as a var. of *M. schencki*. Somewhat mysteriously, SADIL (1952) without any comments regarded *salina* as a junior synonym of *M. lonae* Finzi (despite the first name having priority).

ARNOLDI (1970) revived the name *salina* from synonymy and raised *M. salina* to the species level, designating as the lectotype a worker (ZMMU) that at most could only be a neotype by its data label: "Kulundinskaya step', Blagodarnoe, 19 July 1969, 504 (Pavlova)". Arnoldi considered that *M. salina* could be discriminated from any other related species (i. e. those of the *scabrinodis*-group sensu RADCHENKO 1994 a) by its very narrow frons ($FI \leq 0.30$) and raised frontal lobes. Despite these being features of *M. slovaca*, Arnoldi considered *M. salina* to be separate species. SEIFERT (1988) followed Arnoldi's treatment, but synonymised the name *M. slovaca* with *M. salina* and later corrected Arnoldi's error, designating his "lectotype" as a neotype (SEIFERT 2002).

A completely different view was taken by RADCHENKO (1994 d) who believed that Ruzsky's description (see above) indicated that workers of *M. salina* have a transversal lobe at the bend of scape, so placing it in the *schencki*-group as a junior synonym of *M. lacustris*

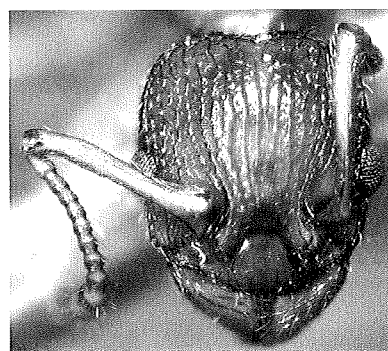
(= *M. deplanata*). As a consequence, he considered "*M. salina*" sensu Arnoldi and Seifert to be a junior synonym of *M. slovaca* (see also RADCHENKO 1994 c). However, SEIFERT (2002) disagreed with this approach and reaffirmed his previous opinion; he revived *M. salina* from synonymy, considering *M. slovaca* as its junior synonym. We accepted Seifert's treatment of *M. salina* as definitive (RADCHENKO & ELMES 2004; RADCHENKO *et al.* 2006) because without the original type specimens any further discussion would be futile.

We found in the EMERY collection (MSNG) four specimens on three pins that we believe are from Ruzsky's original type series of *M. salina*. One pin has a single worker and a queen and an original Ruzsky label, written by pencil (Fig. 2) saying "*Myrm. scabrinodis* v. *salina* R. [w], ♀ Gouv. Orenburg, Sary-Kul See. Salziden". A second pin has a queen, and a third a male also with Ruzsky's original labels, written by pencil (Fig. 3) saying "*Myrm. scabrinodis* v. *salina* R. ♀ Gouv. Orenburg, Sary-Kul See", and "*Myrm. scabrinodis* v. *salina* R. ♂ Gouv. Orenburg, Sary-Kul See", respectively. The specimens do not contradict with the original description and the collection data conforms, thus we have no doubt that these are type specimens, and we designate the worker as the lectotype and the other 3 specimens as paralectotypes. A redescription of *M. salina* based on these types follows.

b) Redescription of *Myrmica salina* Ruzsky

Worker (Figs 12-15).

Head somewhat longer than broad, with convex sides, slightly concave occipital margin, and widely rounded occipital corners. Anterior clypeal margin rounded, not prominent and not-notched medially. Frontal carinae moderately curved, frons relatively wide (similar to that of *M. scabrinodis*); antennal sockets are not surrounded by concentric rugae; frontal lobes moderately extended but raised over the surface of head dorsum. Scape distinctly shorter than head-width, sharply curved at the base (at an about right angle), with well developed, quite big horizontal lobe (similar to that of *M. slovaca*). Promesonotal dorsum slightly convex, promesonotal suture indistinct (seen from above). Metanotal groove distinct, quite deep. Propodeal spines rather long, straight, sharp, widened at the



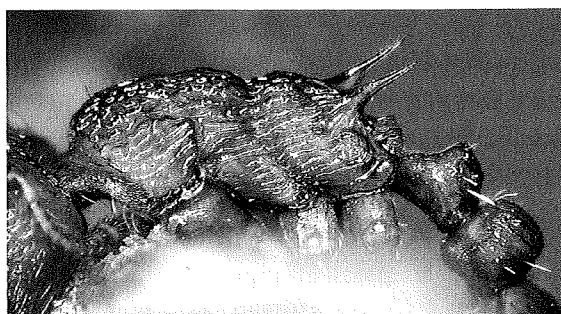
12



13



14



15

12, 15

13, 14

Figs 12-15. Photos of the lectotype worker of *M. salina*: 12 - head, frontal view; 13 - scape, lateral view; 14 - scape, dorsal view; 15 - alitrunk and waist, lateral view; scale bars = 1 mm.

base, directed backward at an angle about 45°. Petiole with distinct peduncle, its anterior surface strongly concave, dorsum of node with well developed, slightly inclined posteriorly dorsal plate. Postpetiole with weakly convex dorsum, roughly subrectangular. Spurs on middle and hind tibiae well developed and pectinate.

Frons with slightly sinuous longitudinal rugae, numbering < 15 between frontal carinae level with the eyes; occiput and temples with reticulation, surface between rugae at most with very fine superficial microsculpture, appearing shiny; central part of clypeus

with reduced rugosity, smooth and shiny; frontal triangle smooth and shiny; mandibles longitudinally rugose. Alitrunk dorsum with sinuous rugulosity, sides of alitrunk with longitudinal, often sinuous rugae. Surface between rugae on alitrunk smooth and shiny. Petiole with longitudinal sinuous rugae, postpetiole with longitudinally-concentric rugosity, surface between rugae at most with very fine superficial microsculpture, appearing shiny. Gaster smooth and shiny.

Head margins with relatively short subdecumbent to suberect hairs. Alitrunk with a few suberect hairs, petiole and postpetiole with not numerous longer hairs (on the single specimen examined some are partly broken). Scape with subdecumbent to suberect hairs, tibiae with subdecumbent ones. Body colour yellowish-brown, mandibles and appendages ochreous-yellow.

Measurements and indices of the lectotype worker:

HL 1.14, HW 1.03, FW 0.37, FLW 0.52, SL 0.88, AL 1.60, HTL 0.80, PNW 0.72, PL 0.48, PW 0.29, PH 0.36, PPL 0.37, PPW 0.45, PPH 0.44, ESL 0.37, ESD 0.42 mm;

CI 1.11, FI 0.36, FLI 1.40, SI₁ 0.77, SI₂ 0.85, PI₁ 1.33, PI₂ 0.47, PI₃ 0.28, PPI₁ 0.85, PPI₂ 0.98, PPI₃ 1.58, PPI₄ 0.44, ESLI 0.36, ESDI 1.12.

Queens (Figs 16-19).

Generally like worker by all diagnostic features, having somewhat wider frons and less sinuous rugosity on the alitrunk. Pilosity of the body denser, but this could be artefact (see above).

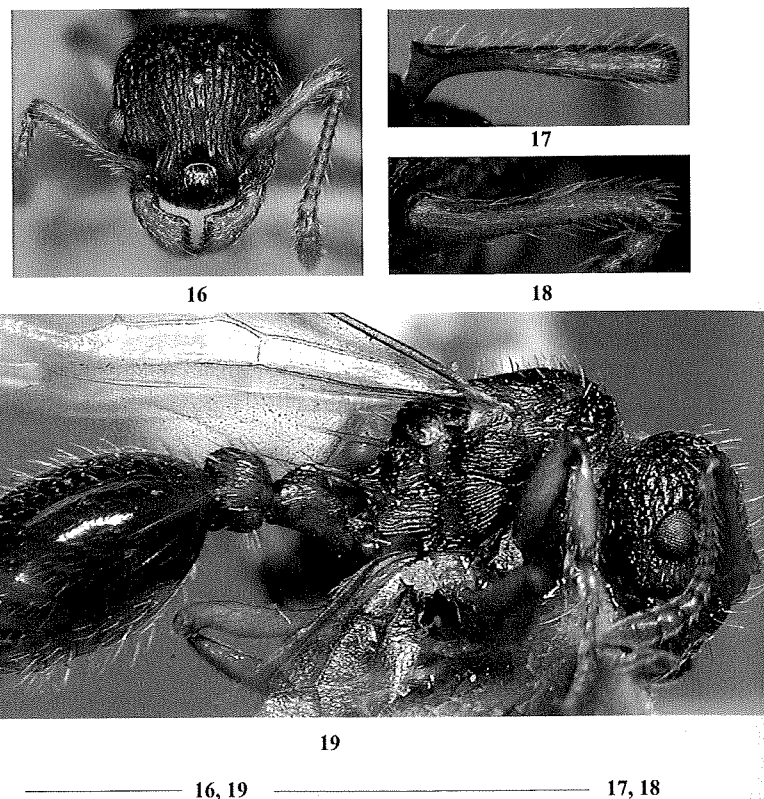
Measurements and indices (means for two paralectotypes queens):

HL 1.19, HW 1.065, FW 0.42, FLW 0.565, SL 0.89, AL 1.805, HTL 0.86, PL 0.52, PW 0.34, PH 0.41, PPL 0.44, PPW 0.52, PPH 0.505, ESL 0.415, ESD 0.465, AH 0.99, SCL 1.165, SCW 0.825 mm;

CI 1.12, FI 0.39, FLI 1.365, SI₁ 0.745, SI₂ 0.84, PI₁ 1.26, PI₂ 0.485, PI₃ 0.325, PPI₁ 0.875, PPI₂ 0.975, PPI₃ 1.52, PPI₄ 0.485, ESLI 0.39, ESDI 1.135, AI 1.82, SCI 1.43.

Males (Figs 20-22).

Head slightly longer than broad, with convex sides and occipital margin, and gradually rounded occipital corners; anterior clypeal margin widely rounded, not prominent and not-notched medially. Antennal scape short (similar to that of *M. tulinae* and even shorter



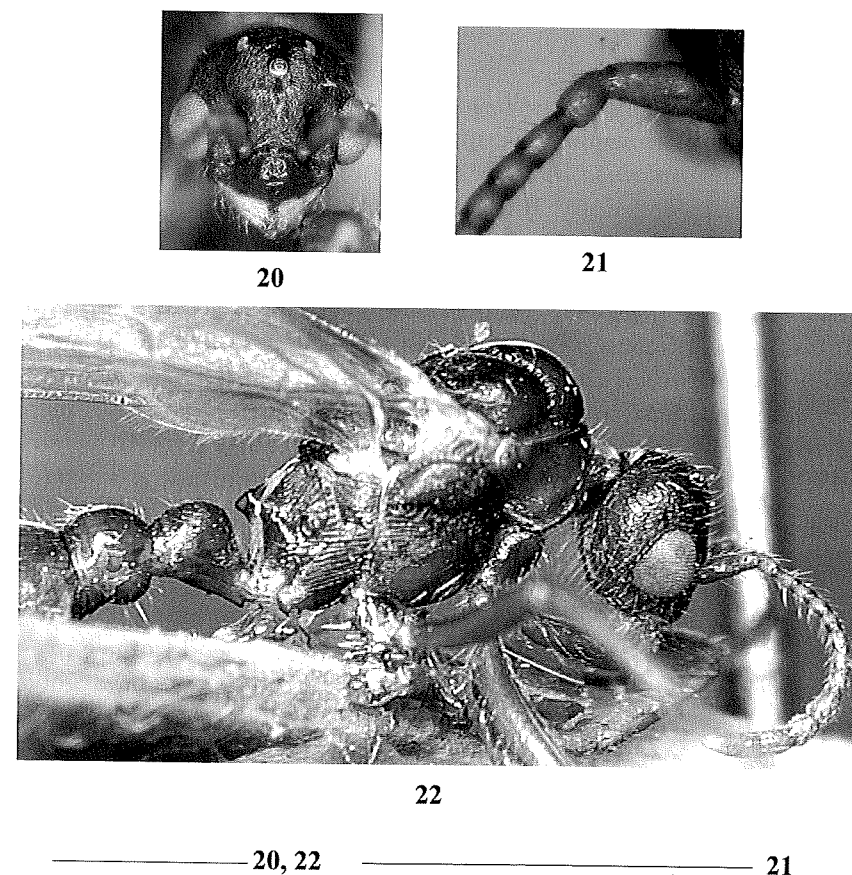
Figs 16-19. Photos of the paralectotype queen of *M. salina*: 16 - head, frontal view; 17 - scape, lateral view; 18 - scape, dorsal view; 19 - body, lateral view; scale bars = 1 mm.

than in *M. scabrinodis*), antennae 13-segmented, antennal club distinctly 5-segmented; second funicular segment approximately 1.3 times longer than third one. Alitrunk relatively long, scutum convex, scutellum does not project dorsally above scutum when seen in profile. Propodeum with blunt, thick subtriangular teeth. Petiole relatively short, massive, with almost straight, steep anterior surface and widely rounded node dorsum; postpetiole higher than long, with weakly convex dorsum.

Head dorsum (including frontal triangle) densely punctated and longitudinally finely striated, only central part of clypeus appearing

shiny. Central part of scutum in front of Mayr's furrows and propodeal dorsum smooth and shiny, the rest of scutum and scutellum densely longitudinally striated and superficially micropunctated, but surface appears shiny. Sides of pronotum and upper part of mesopleura smooth and shiny, lower part of mesopleura posteriorly and sides of propodeum densely longitudinally rugulose. Petiolar node finely punctato-striated, postpetiole smooth and shiny.

Head margins and mandibles with numerous, relatively long, curved suberect hairs. Alitrunk, petiole and gaster with sparser, but



Figs 20-22. - Photos of the paralectotype male of *M. salina*: 20 - head, frontal view; 21 - scape and four basal funicular segments; 22 - head, alitrunk and waist, lateral view; scale bars = 1 mm.

longer hairs. Tibiae and tarsi with relatively short subdecumbent to suberect hairs (like *M. specioides*), the longest hairs on tibiae shorter than the maximal tibial width, those on first tarsal segment subequal to its maximal width. Scape and first 7 funicular segments with relatively long suberect hairs, segments of antennal club with very short subdecumbent hairs. Body colour dark brown, appendages somewhat lighter.

Measurements and indices of the paralectotype male:

HL 0.87, HW 0.84, SL 0.31, AL 1.96, HTL 1.06, PL 0.57, PW 0.32, PH 0.43, PPL 0.42, PPW 0.51, PPH 0.51, AH 1.21, SCL 1.39, SCW 1.07 mm;

CI 1.04, SI₁ 0.36, SI₂ 0.38, PI₁ 1.33, PI₂ 0.68, PI₃ 0.38, PPI₁ 0.83, PPI₂ 1.00, PPI₃ 1.59, PPI₄ 0.61, AI 1.62, SCI 1.30.

It is obvious from the descriptions and the figures that *M. salina* belongs to the *scabrinodis*-group and not to the *schencki*-group, thus the view championed by RADCHENKO (1994 d) was incorrect and *M. salina* clearly is not a synonym of *M. deplanata*. When we take account of the combination of features from all three castes, we place *M. salina* in the *specioides*-complex within the *scabrinodis*-group (see RADCHENKO & ELMES 2004). Also the view championed by SEIFERT (2002) was incorrect: the lectotype worker of *M. salina* well differs from workers of *M. slovaca* by its much wider frons and by much less extended frontal lobes (FI 0.36 versus ≤ 0.30 , FLI 1.40 versus > 1.65). A difference this great in two very important diagnostic characters (within the *scabrinodis*-group) means that these two names cannot be considered as synonyms. Comparison of *M. salina* with the types of *M. stangeana* (and its junior synonym *M. lacustris*, see above) shows that *M. salina* clearly differs by having more extended frontal lobes, by a much bigger lobe at the scape bend, longer propodeal spines, etc. Therefore, we consider *M. salina* to be a good species different from *M. slovaca*, which we revive from synonymy. A revised synonymy for these two species follows.

Myrmica salina Ruzsky, 1905

Myrmica scabrinodis var. *salina* Ruzsky, 1905: 687, w, q, m, Russia and Kazakhstan; EMERY 1908:177; 1921:40; FINZI 1926:102, nec ARNOLDI 1970: 1842; ARNOLDI & DLUSSKY 1978: 534; SEIFERT 1988: 25; 1996: 228; 2002: 96; 2007: 201;

RADCHENKO & ELMES 2004: 229; RADCHENKO *et al.* 2004: 55; RADCHENKO *et al.* 2006: 228.

Myrmica schencki var. *salina*: WEBER 1948: 302.

Junior synonym of *Myrmica lonae*: SADIL 1952: 249 (not confirmed).

Myrmica slovaca Sadil, 1952, stat. rev.

Myrmica slovaca Sadil, 1952: 259, w, q, m, Czechia, Slovakia and Ukraine; ARNOLDI 1968: 1170; 1970: 1842; KUTTER 1977: 71; ARNOLDI & DLUSSKY 1978: 534; RADCHENKO 1994 a: 42; 1994 b: 144; 1994 c: 80.

Myrmica salina: ARNOLDI 1970: 1842; ARNOLDI & DLUSSKY 1978: 534; SEIFERT 1988: 25; 1996: 228; 2002: 96; 2007: 201; RADCHENKO & ELMES 2004: 229, nec RUZSKY 1905: 687; EMERY 1908: 177; 1921: 40; FINZI 1926: 102; WEBER 1948: 302.

Material examined: syntypes, 4 workers on one pin, "Chorovce, 1.VI.[19]48, Slovakia, Novák", "*M. slovaca* Sadil (det. 1951)", "Mus. Nat. Prague Inv. 3066" (NMNHP); 4 workers on one pin, "Bohemia occ., Chomutov, 1.VIII.1951, leg. J. Sadil", "*M. slovaca* Sadil det. J. Sadil", "Paratypus" (red label, placed in MIZ), "Inst. Zool. P.A.N. Warszawa 102/57" (MIZ); 5 workers on one pin, "ČSSR, Bohemia, Chomutov, 3.7.[19]51, leg. Sadil" (ZMMU); non-type material: several tens of workers, 5 queens and 5 males from the whole range of the species.

ADDENDUM

Also, we found in the Emery's collection (MSNG) one specimen (worker), labelled as "*Myrmica saposhnikov* R. [w] Fluss Baskan, Alatau, Ssemiretschinsk" (Ruzsky's original label, written by pencil). The data label corresponds with the type localities, given by RUZSKY (1904: 3): "Kopalsk[y] uезд, northern slope of Dzhungarsky Alatau, valley of the riv. Baskan, 1000 m, dense fir forest (13.VIII.02); valley of the riv. Ili, near Dzharkent, steppe (20.VIII.02)" [now = eastern Kazakhstan]. Additionally, all main diagnostic features of this specimen fully correspond with the original description and later treatments of *M. saposhnikov* (see ARNOLDI 1976; TARBINSKY 1976; RADCHENKO 1994 b, e).

Therefore, we designated this worker as the lectotype of *M. saposhnikov* and consequently the neotype designated by RADCHENKO (1994 e) (neotype worker, Alma-Atinsky Natural Reserve,

No.69, 2250 m asl, 23.09.1969, leg. Antsyferov) has lost taxonomic status.

Additionally, the type specimens of two other of Ruzsky's *Myrmica* taxa are in the MSNG collection:

- syntypes of *M. sulcinodis* var. *nigripes*, worker and male on the same pin, "Ural, Uj-Tash No 29 *M. sulcinodis* v. *nigripes*, m." (Ruzsky's original label, written by pencil);

- paralectotypes of *M. bergi*: 2 workers on the same pin (bottom specimen is without head), "*Myrm. Bergi* m, w" (Ruzsky's original label, written by pencil), "*Myrmica bergi* Ruzsky Lago Aral".

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ABSTRACT

The type specimens of several taxa of the genus *Myrmica*, described by M. Ruzsky, were found in the ant collection of Carlo Emery, Museo Civico di Storia Naturale "Giacomo Doria", Genoa, Italy.

Types of three of the taxa (*Myrmica lacustris*, *Myrmica salina* and *Myrmica saposhnikovii*) had been believed to be lost for many years. Lectotypes of these three species are designated from the Genoa material.

A reassessment of the taxonomic position of several taxa is proposed: *M. lacustris* does not belong to the *schrencki* species-group, and is not a senior synonym of *M. deplanata*; it belongs to the *scabrinodis*-group, and is a junior synonym of *M. stangeana*; *M. salina* is not conspecific with *M. slovaca*. As a result, the names *M. slovaca* and *M. deplanata* are revived from synonymy and considered as a good species; the neotype of *M. deplanata* is designated.

RIASSUNTO

Importanti modifiche nella tassonomia del genere *Myrmica*, basate sull'esame dei tipi di M. Ruzsky conservati presso il Museo Civico di Storia Naturale "Giacomo Doria", Genova (Hymenoptera, Formicidae).

Nella collezione di Formicidi di Carlo Emery, conservata nel Museo Civico di Storia Naturale "Giacomo Doria" di Genova, sono stati rinvenuti i tipi di diversi taxa del genere *Myrmica* descritti dal mirmecologo russo M. D. Ruzsky.

Da molti anni i tipi di tre di questi taxa (in particolare *Myrmica lacustris*, *Myrmica salina* e *Myrmica saposhnikovii*) erano stati considerati perduti, ma sulla base del materiale presente a Genova è stato possibile designare i lectotipi di queste tre specie.

Viene proposta una rivalutazione della posizione tassonomica di vari taxa: *M. lacustris* non appartiene al gruppo *schrencki* e non è un sinonimo seniore di *M. deplanata*, appartiene invece al gruppo *scabrinodis* ed è sinonimo juniore di *M. stangeana*; *M. salina* non è conspecifica di *M. slovaca*. Ne risulta che i nomi *M. slovaca* e *M. deplanata* sono recuperati dalla sinonimia e considerati validi. Viene inoltre designato il neotipo di *M. deplanata*.