Myrmecologische Nachrichten	8	201 - 207	Wien, September 2006

A critical checklist of the ants of Kyrgyzstan (Hymenoptera: Formicidae)

Roland SCHULTZ, Alexander RADCHENKO & Bernhard SEIFERT

Abstract

We present a critical list of ant species of Kyrgyzstan based on current literature, taxonomic changes and the unpublished record of scientific expeditions of German-Kyrgyz teams. A total of 106 species and subspecies of Formicidae are now known to occur in Kyrgyzstan. Twelve species are new to Kyrgyzstan: *Crematogaster bogojawlenskii* RUZSKY, 1905, *Formica clara* FOREL, 1886, *Formica cunicularia* LATREILLE, 1798, *Formica* cf. *frontalis* SANTSCHI, 1919, *Formica* cf. *lemani* BONDROIT, 1917, *Lasius uzbeki* SEIFERT, 1992, *Lepisiota semenovi* (RUZSKY, 1905), *Messor excursionis* RUZSKY, 1905, *Plagiolepis taurica* SANTSCHI, 1920, *Strongylognathus minutus* RADCHENKO, 1991, *Temnothorax melleus* (FOREL, 1904), and *Tetramorium armatum* SANTSCHI, 1927.

Key words: Hymenoptera, Formicidae, checklist, Kyrgyzstan, Tian Shan, Alai, Central Asia.

Dr. Roland Schultz (contact author), Zoologisches Institut & Museum, Ernst-Moritz-Arndt-Universität Greifswald, Johann-Sebastian-Bach-Str. 11-12, D-17487 Greifswald, Germany. E-mail: roland@uni-greifswald.de

Prof. Dr. Alexander Radchenko, Museum and Institute of Zoology, Polish Academy of Sciences, 64, Wilcza str., 00-679, Warsaw, Poland. E-mail: rad@public.icyb.kiev.ua

Dr. Bernhard Seifert, Staatliches Museum für Naturkunde Görlitz, Postfach 300154, D-02806 Görlitz, Germany. E-mail: bernhard.seifert@smng.smwk.sachsen.de

Introduction

In contrast to other Central Asian countries, the ant fauna of Kyrgyzstan seems to be well known. Thanks to TARBINSKY (1976, 1996), who included the works of Arnoldi, Dlussky, Kusznetzov-Ugamsky, Marikovsky, Ruzsky and others about this region, we have a checklist and a fauna of Kyrgyz ants. In 2004, however, RADCHENKO & ELMES described a new species (*Myrmica tobiasi* RADCHENKO & ELMES, 2004), and in the same year SEIFERT redescribed *Formica candida* SMITH, 1878 for the region. In 2005, SCHULTZ & SEIFERT recorded *Lasius neglectus* VAN LOON, BOOMSMA & ANDRASFALVY, 1990 as new invasive species for the country.

In cooperation with the Academy of Sciences Kyrgyzstan (Bishkek), the Academy of Sciences Kazakhstan (Almaty), and the Xinjiang University Urumqi (P. R. of China), the University of Greifswald has carried out eight scientific expeditions in the mountains of Central Asia since 1998. The aim of these expeditions was a survey of selected fauna in this mountain range. A first list of the ant fauna found so far was published in SCHULTZ (2001). Here, we present a checklist of the ants of Kyrgyzstan based on a critical evaluation of the literature and on the results of our own expeditions.

Taxonomic knowledge on many of the taxa listed below is severely deficient, in part because morphology-based alpha-taxonomy (MOBAT) is in a critical situation world-wide; translated into the terminology of conservation biology, it is threatened with extinction. This is a paradox because MOBAT is the only research field capable of non-destructive investigation of insect type material and of interpreting the printed documents spanning 250 years of Zoological Nomenclature since Linnaeus. In other words, MOBAT is the only method providing the link between Linnean Nomenclature and other biosciences such as molecular systematics. Nevertheless, MOBAT ranks very low within the disciplines of bioscience and almost entirely lacks political, administrative and financial support. As a consequence, the very few actively working ant taxonomists in the world are confronted with an overwhelmingly large biodiversity, and there are no modern revisions for most genera or species groups. Two of us, A. Radchenko and B. Seifert, have done some recent revisionary work in a small number of genera or species groups. Since it was not possible to find a coincident opinion between persons with different working philosophies for each taxonomic case, we divided the responsibilities for taxonomic treatment: B. Seifert was responsible for the genera *Lasius*, *Cardiocondyla* and *Formica*, and A. Radchenko for all remaining genera.

Material and method

The first author participated in scientific expeditions to Central Asia from 1998 to 2001, 2004 and 2005, the third author in 2000 and 2001. The expeditions always took place from mid-July to early August. They led to all parts of Kyrgyzstan and bordering areas of Kazakhstan, Uzbekistan, Tadzhikistan, and China. Each year, different geographic areas were visited.

During the three- or four-week expeditions, ants where collected in as many places as possible. Whenever feasible, at least a one-hour sampling period was devoted to every new location. In this time, ants were collected in the surroundings by locating the nest entrances, overturning stones and looking for ant trails on the soil surface and on trees and other plants.

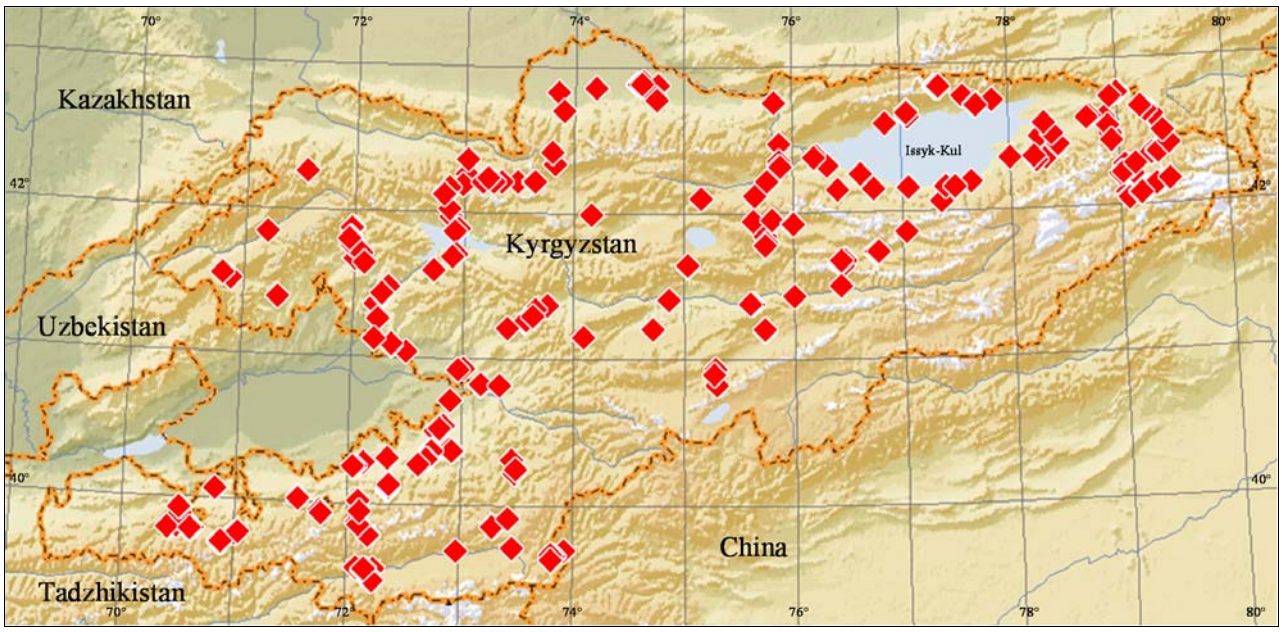

Fig. 1: Map of Kyrgyzstan including positions of sample sites of the German-Kyrgyz expeditions.

During the first expeditions (up until 2004) the ants where preserved in 70 % ethanol, from 2005 on in pure ethanol. A new vial was used for each nest sample whenever possible. The latitude, longitude and altitude of each location were determined with a GPS. In Germany the ants in each vial where counted and 3 or 4 specimens were mounted for determination. If more than one species were collected in one tube, these were separated according to species. Most of this material is now stored in the collection of the first author at the Department of Zoology of the University of Greifswald. Some material is in the Hymenoptera collection of the Staatliches Museum für Naturkunde Görlitz, in the collection of the Institute of Zoology, Polish Academy of Sciences, Warsaw, and the collection of the Institute of Zoology of the Ukrainian National Academy of Sciences, Kiev.

Results and Discussion

Thus far, we collected 1,230 samples with 49,312 individuals of Formicidae in Kyrgyzstan during our expeditions (Fig. 1). Most of these ants were workers (46,832), but we also gathered 1,268 gynes and 1,212 males. The investigated material contained more than 66 species from 20 genera. Twelve species are new for Kyrgyzstan.

In his monograph about Kyrgyz ants, TARBINSKY (1976) recorded 102 taxa for the country. In 1996, Tarbinsky wrote a checklist in the Cadastre of Kyrgyz Insects; this involved some taxonomic changes. Together these lists are the most complete listing of ants for the region. In the list from 1996, *Stenamma westwoodi asiaticum* RUZSKY, 1905, *Cataglyphis setipes dschambulica* TARBINSKY, 1976, and *Temnothorax tuberum* (FABRICIUS, 1775) were not mentioned again, but *Camponotus buddhae* FOREL, 1892, *Monomorium pharaonis* (LINNAEUS, 1758), *Ponera coarctata* (LATREILLE, 1802), and *Rossomyrmex proformicarium* ARNOLDI, 1928 were added. According to TARBINSKY (1996) there are 103 ant taxa in Kyrgyzstan.

In many cases the names of the species have been changed since the time when Tarbinsky wrote his monograph of Kyrgyz ants (TARBINSKY 1976) and his latest checklist (TARBINSKY 1996). For example most species of the genus *Leptothorax* (subgenus *Myrafant* M.R. SMITH, 1950) have been transferred to the genus *Temnothorax* by BOLTON (2003). Based on the latest taxonomic publications (BOLTON 1995, 2003, RADCHENKO 1994a, b, c, d, 1995, 1997a, b, c, 2004, RADCHENKO & al. 2002, SEIFERT 1992, 2000, 2003, 2004), numerous other changes have been made; all listed completely in Tab. 1. Ten taxa of TARBINSKY (1996) had to be removed from the list of ants of Kyrgyzstan because of synonymy.

After cross checking the material collected by the German-Kyrgyz expeditions 1998 - 2005, we conclude that twelve species are new to the Kyrgyz fauna (R. Schultz, unpubl.):

Crematogaster bogojawlenskii RUZSKY, 1905: Alai Mts., Abshir Say valley, meadows with *Juniperus*, 40° 07' 16.63" N, 72° 21' 35.99" E, 18.VII.2004, leg. R. Schultz, det. A. Radchenko.

Formica clara FOREL, 1886: West Tianshan, Tshatkal Valley near Kolnysh-Kyja, 41° 49' 57.7" N, 71° 11' 41.3" E, 1830 m a.s.l., 28.VII.1998, leg. R. Schultz, det. B. Seifert.

Formica cunicularia LATREILLE, 1798: West Tianshan, Kyrgyzky Alatao, Kap Tshigai valley, 42° 24' 28.4" N, 73° 47' 21.3" E, 2080 m a.s.l., 16.VII.1998, leg. R. Schultz, det. B. Seifert.

Formica cf. *frontalis* SANTSCHI, 1919: Inner Tianshan, Terskij Alatao, Dsheti-Oguz, 42° 19' 19" N, 78° 14' 50" E, 2100 m a.s.l., 23.VII.2000, leg. B. Seifert, det. B. Seifert.

Formica cf. *lemani* BONDROIT, 1917: West Tianshan, Kyrgyzky Alatao, near tunnel Tejo Ashun, 42° 20' 00.0" N, 73° 49' 00.0" E, 3000 m a.s.l., 17.VII.1998, leg. R. Schultz, det. B. Seifert.

Tab. 1: Valid names of Kyrgyz ant taxa of species and subspecies rank and their former names or junior synonymies that have been used in TARBINSKY (1996); as on the one hand TARBINSKY (1996) did not give years of description of taxa, and on the other hand in other publications of Tarbinsky (e.g., TARBINSKY 1976) the given years frequently are erroneous, we do not give years of description in the list of synonyms – they would merely represent our own interpretation.

valid name	**synonym in TARBINSKY (1996)**
Dolichoderinae	
Tapinoma erraticum (LATREILLE, 1798)	*Tapinoma erraticum breve* EMERY
Formicidae	
Camponotus fedtschenkoi MAYR, 1877	*Camponotus tichomirovi* RUZSKY
Camponotus herculeanus (LINNAEUS, 1758)	*Camponotus herculianus* L.
Camponotus semirufus EMERY, 1925	*Camponotus semirifus* KUZNETZOV-UGAMSKIJ
Camponotus turkestanus ANDRE, 1882	*Camponotus ferganensis* RUZSKY
Cataglyphis aenescens (NYLANDER, 1849)	*Cataglyphis aenescens aterrima* (KARAWAJEW)
Cataglyphis aenescens (NYLANDER, 1849)	*Cataglyphis aenescens chatkalensis* (TARBINSKY)
Cataglyphis aenescens (NYLANDER, 1849)	*Cataglyphis aenescens tancrei* (FOREL)
Cataglyphis bergiana ARNOLDI, 1964	*Cataglyphis setipes turcomanica* EMERY
Formica candida SMITH, 1878	*Formica picea* NYLANDER
Formica exsecta NYLANDER, 1846	*Formica fukaii* WHELLER
Formica lusatica SEIFERT, 1997	*Formica cunicularia glauca* RUZSKY
Lasius flavus (FABRICIUS, 1782)	*Lasius flavus flavus* F.
Lasius myops FOREL, 1894	*Lasius flavus myops* FOREL
Lepisiota semenovi kassansai (TARBINSKY, 1976)	*Acantholepis frauenfeldi kassansai* TARBINSKY
Lepisiota semenovi nigra (DALLA TORRE, 1893)	*Acantholepis frauenfeldi nigra* EMERY
Proformica kaszabi DLUSSKY, 1969	*Proformica kassabi* DLUSSKY
Myrmicinae	
Cardiocondyla gibbosa KUZNETZOV-UGAMSKY, 1927	*Cardiocondyla elegans gibbosa* KUZNETZOV-UGAMSKIJ
Cardiocondyla koshewnikovi RUZSKY, 1902	*Cardiocondyla stambulovi koshewnikovi* RUZSKY
Cardiocondyla ulianini EMERY, 1889	*Cardiocondyla elegans uljanini* EMERY
Chalepoxenus tarbinskii (ARNOLDI, 1976)	*Leonomyrma longipilosus* (TARBINSKY)
Messor aralocaspius infumatus KUZNETZOV-UGAMSKY, 1929	*Messor infumatus* KUZNETZOV-UGAMSKIJ
Messor darianus SANTSCHI, 1926	*Messor rufitarsis darianus* SANTSCHI
Messor denticulatus SANTSCHI, 1927	*Messor denticulatus* KUZNETZOV-UGAMSKIJ
Messor rufus SANTSCHI, 1923	*Messor karawajevi* SANTSCHI
Messor structor (LATREILLE, 1798)	*Messor clivorum* RUZSKY
Myrmica dshungarica RUZSKY, 1905	*Myrmica dschungarica* RUZSKY
Myrmica kirghisorum ARNOLDI, 1976	*Myrmica lobicornis kirghizorum* ARNOLDI
Myrmica lacustris RUZSKY, 1905	*Myrmica deplanata* RUZSKY
Myrmica orthostyla ARNOLDI, 1976	*Myrmica orthostila* ARNOLDI
Myrmica saposhnikovi RUZSKY, 1904	*Myrmica saposhnikovi bergiana* TARBINSKY
Myrmica schencki VIERECK, 1903	*Myrmica schencki* EMERY
Myrmica tenuispina RUZSKY, 1905	*Myrmica tenuispina* FOREL
Solenopsis fugax LATREILLE, 1798	*Diplorhoptrum fugax orientalis* RUZSKY
Temnothorax arpini (TARBINSKY, 1976)	*Leptothorax narinicus* TARBINSKY
Temnothorax nassonovi (RUZSKY, 1895)	*Leptothorax nassonovi* RUZSKY
Temnothorax oxianus (RUZSKY, 1905)	*Leptothorax oxianus juglandeti* ARNOLDI
Temnothorax oxianus (RUZSKY, 1905)	*Leptothorax talassicus* TARBINSKY
Temnothorax tuberum (FABRICIUS, 1775)	*Leptothorax tuberum alaicus* TARBINSKY
Tetramorium schneideri EMERY, 1898	*Tetramorium striativentre schneideri* EMERY
Tetramorium turcomanicum SANTSCHI, 1921	*Tetramorium turcomanicum* EMERY

Lasius uzbeki SEIFERT, 1992: West Tianshan, Sary-Tshelek, Tos-Kol, 41° 52' 24.8" N, 71° 58' 42.9" E, 2250 m a.s.l., 23.VII.1998, leg. R. Schultz, det. B. Seifert.

Lepisiota semenovi (RUZSKY, 1905): West Tianshan, Kurp-Say-reservoir north of Tasch-Kumyr, 41° 25' 27.3" N, 72° 15' 12.0" E, 700 m a.s.l., 29.VII.1999, leg. R. Schultz, det. A. Radchenko.

Messor excursionis RUZSKY, 1905: Issyk Kul region, semi-desert 5 km west of Ottuc, 2 km from the lakeshore, 42° 22' 12.1" N, 76° 11' 52.9" E, 1670 m a.s.l., 22.VII. 2000, leg. R. Schultz, det. A. Radchenko.

Plagiolepis taurica SANTSCHI, 1920: West Tianshan, Tshitshkan Valley, 41° 57' 55.7" N, 72° 52' 25.6" E, 1360 m a.s.l., 20.VII.1998, leg. R. Schultz, det. A. Radchenko.

Strongylognathus minutus RADCHENKO, 1991: West Tianshan, Kurp-Say-reservoir north of Tasch-Kumyr, 41° 25' 27.3" N, 72° 15' 12.0" E, 700 m a.s.l., 29.VII.1999, leg. R. Schultz, det. A. Radchenko.

Temnothorax melleus (FOREL, 1904): West Tianshan, Tshitshkan Valley, 42° 06' 56.7" N, 72° 48' 20.1" E, 1600 m a.s.l., 30.VII.1999, leg. R. Schultz, det. A. Radchenko.

Tetramorium armatum SANTSCHI, 1927: Issyk Kul, lakeshore near Ak-Terek, 42° 11' 22.1" N, 77° 38' 25.9" E, 1690 m a.s.l., 23.VII.2000, leg. R. Schultz, det. A. Radchenko.

Some of the species in Kyrgyzstan resemble certain species from other regions in the Palaearctic. These may, however, actually represent new species that differ in their genotype from those species that they resemble. This may be the case with *Messor* cf. *darianus* SANTSCHI, 1926, *Formica* cf. *frontalis* SANTSCHI, 1919, and *Formica* cf. *lemani* BONDROIT, 1917.

Based on the personal investigation (AR) of the type material of *Cataglyphis setipes dschambulica* TARBINSKY, 1976, this name was synonymised with *Cataglyphis setipes* (FOREL, 1894) (RADCHENKO 1997c). Despite the omission of *C. setipes dschambulica* from Kyrgyzstan's ant fauna by TARBINSKY (1996), we include *C. setipes* in the current checklist.

We removed *Formica fusca* LINNAEUS, 1758 from the list of the ants of Kyrgyzstan. *Formica fusca* is a west-Palaearctic species and probably does not occur in Kyrgyzstan. We examined 51 samples from all over the country – all of them are *Formica* cf. *lemani* BONDROIT, 1917, which are on the average less hairy than their European counterparts. This probably explains Tarbinsky's misidentification as "*Formica fusca*".

As shown by DLUSSKY & al. (1990), "*Crematogaster sordidula*" sensu TARBINSKY (1976) is actually *Crematogaster bogojawlenskii* RUZSKY, 1905 – the species distributed in Central Asia – while *C. sordidula* occurs in Europe and Caucasus.

In summary, we report 106 taxa for Kyrgyzstan (see Tab. 2): From TARBINSKY's (1996) 103 taxa ten are subtracted because of synonymy and two because of biogeographic reasoning; one taxon is added, which had been listed by TARBINSKY (1976), two taxa are added, which have been reported in recent publications, as well as twelve taxa, which are reported as new to the Kyrgyz fauna in this paper. Nonetheless, the record of the ants of Kyrgyzstan remains far from complete. There are still at least three undescribed species in the material obtained so far, and a further, more precise investigation of the country would no doubt significantly increase the species number. On the other hand, Kyrgyzstan is probably the best-investigated country in Central Asia with respect to the ants. The present results should stimulate the investigation of the ant fauna of the bordering countries.

Acknowledgements

We sincerely thank Michael Stachowitsch (Vienna, Austria) for improving the language. Two anonymous referees gave helpful comments and advice. The expeditions were funded by the German Academic Exchange Service (DAAD).

Zusammenfassung

Es wird eine kritische Artenliste der Ameisen Kirgistans vorgelegt, die auf der gegenwärtigen Literatur, taxonomischen Änderungen und den unpublizierten Ergebnissen wissenschaftlicher Expeditionen von kirgisisch-deutschen Teams beruht. Insgesamt 106 Arten und Unterarten der Formicidae sind jetzt für Kirgistan bekannt. Zwölf Arten sind neu für Kirgistan: *Crematogaster bogojawenskii* RUZSKY, 1905, *Formica clara* FOREL, 1886, *Formica cunicularia* LATREILLE, 1798, *Formica* cf. *frontalis* SANTSCHI, 1919, *Formica* cf. *lemani* BONDROIT, 1917, *Lasius uzbeki* SEIFERT, 1992, *Lepisiota semenovi* (RUZSKY, 1905), *Messor excursionis* RUZSKY, 1905, *Plagiolepis taurica* SANTSCHI, 1920, *Strongylognathus minutus* RADCHENKO, 1991, *Temnothorax melleus* (FOREL, 1904) und *Tetramorium armatum* SANTSCHI, 1927.

References

BOLTON, B. 1995: A new general catalogue of the ants of the world. – Harvard University Press, Cambridge, MA, 504 pp.

BOLTON, B. 2003: Synopsis and classification of Formicidae. – Memoirs of the American Entomological Institute 71: 1-370.

DLUSSKY, G.M., SOYUNOV, O.S. & ZABELIN, S.I. 1990: The ants of Turkmenistan. – Ylym, Ashkhabad, 273 pp. [in Russian]

RADCHENKO, A.G. 1994a: A key to the identification of the genus *Leptothorax* (Hymenoptera, Formicidae) of the Central and Eastern Palaearctic. – Zoologichesky Zhurnal 73: 146-158. [in Russian]

RADCHENKO, A.G. 1994b: A review of species of *Myrmica* belonging to the groups of *rubra*, *rugosa*, *arnoldii*, *luteola* and *schencki* (Hymenoptera, Formicidae) from the Central and Eastern Palaearctic. – Zoologichesky Zhurnal 73: 72-80. [in Russian; English translation: Entomological Review (Washington) 74: 122-132]

Tab. 2: A critical list of the ant taxa of species and subspecies rank that have been found in Kyrgyzstan, based on TARBINSKY (1976, 1996) and our expeditions (1998 to 2005); species new to Kyrgyzstan are in bold letters. Misidentifications and changes of species names have been corrected during the compilation of this species list. Notes: *Formica frontalis* SANTSCHI, 1919 raised to species by TINAUT & MARTINEZ-IBANEZ (1998), *Pheidole koshewnikovi* RUZSKY, 1905 by TARBINSKY (1996). ➔

	German-Kyrgyzian expeditions 1998-2005	TARBINSKY (1976, 1996)
Dolichoderinae		
1. *Bothriomyrmex kusnezovi* EMERY, 1925	×	×
2. *Tapinoma emeryanum* KUZNETSOV-UGAMSKY, 1927	×	×
3. *Tapinoma erraticum* (LATREILLE, 1798)	×	×
Formicidae		
4. *Camponotus buddhae* FOREL, 1892	×	×
5. *Camponotus fedtschenkoi* MAYR, 1877	×	×
6. *Camponotus herculeanus* (LINNE, 1758)	×	×
7. *Camponotus interjectus* MAYR, 1877		×
8. *Camponotus lameerei* EMERY, 1898	×	×
9. *Camponotus reichardti* ARNOLDI, 1967		×
10. *Camponotus semirufus* EMERY, 1925		×
11. *Camponotus tashcumiri* TARBINSKY, 1976	×	×
12. *Camponotus turkestanicus* EMERY, 1887	×	×
13. *Camponotus turkestanus* ANDRE, 1882	×	×
14. *Cataglyphis aenescens* (NYLANDER, 1849)	×	×
15. *Cataglyphis bergiana* ARNOLDI, 1964		×
16. *Cataglyphis pallida* MAYR, 1877		×
17. *Cataglyphis setipes* (FOREL, 1894)		×
18. *Formica candida* SMITH, 1878	×	×
19. ***Formica clara* FOREL, 1886**	×	
20. ***Formica cunicularia* LATREILLE, 1798**	×	
21. *Formica exsecta* NYLANDER, 1846	×	×
22. ***Formica* cf. *frontalis* SANTSCHI, 1919**	×	
23. ***Formica* cf. *lemani* BONDROIT, 1917**	×	
24. *Formica litoralis* KUSNEZOV UGAMSKIJ, 1926	×	×
25. *Formica lusatica* SEIFERT, 1997	×	×
26. *Formica pamirica* DLUSSKY, 1965	×	×
27. *Formica pratensis* RETZIUS, 1783	×	×
28. *Formica sanguinea* LATREILLE, 1798	×	×
29. *Formica subpilosa* RUZSKY, 1902	×	×
30. *Formica truncorum* FABRICIUS, 1804	×	×
31. *Lasius alienus* (FÖRSTER, 1850)	×	×
32. *Lasius carniolicus* MAYR, 1861		×
33. *Lasius flavescens* FOREL, 1904	×	×
34. *Lasius flavus* (FABRICIUS, 1782)	×	×
35. *Lasius myops* FOREL, 1894		×
36. *Lasius neglectus* VAN LOON, BOOMSMA & ANDRASFALVY, 1990	×	
37. *Lasius niger* (LINNAEUS, 1758)	×	×
38. ***Lasius uzbeki* SEIFERT, 1992**	×	
39. ***Lepisiota semenovi semenovi* (RUZSKY, 1905)**	×	
40. *Lepisiota semenovi kassansai* (TARBINSKY, 1976)		×
41. *Lepisiota semenovi nigra* (DALLA TORRE, 1893)		×
42. *Plagiolepis pallescens* FOREL, 1889		×
43. ***Plagiolepis taurica* SANTSCHI, 1920**	×	
44. *Polyergus rufescens* (LATREILLE, 1798)	×	×
45. *Proformica coriacea* KUZNETZOV-UGAMSKY, 1927		×
46. *Proformica epinotalis* KUZNETZOV-UGAMSKY, 1927	×	×
47. *Proformica kaszabi* DLUSSKY, 1969		×
48. *Proformica mongolica* EMERY, 1901		×
49. *Proformica nitida* KUZNETZOV-UGAMSKY, 1923		×
50. *Proformica seraphimi* TARBINSKY, 1970		×
51. *Proformica splendida* DLUSSKY, 1965	×	×
52. *Rossomyrmex proformicarum* ARNOLDI, 1928	×	×

Myrmicinae		
53. *Cardiocondyla gibbosa* KUZNETZOV-UGAMSKY, 1927		×
54. *Cardiocondyla koshewnikovi* RUZSKY, 1902		×
55. *Cardiocondyla ulianini* EMERY, 1889	×	×
56. *Chalepoxenus tarbinskii* (ARNOLDI, 1976)		×
57. ***Crematogaster bogojawlenskii* RUZSKY, 1905**	×	
58. Crematogaster subdentata MAYR, 1877	×	×
59. *Leptothorax acervorum* (FABRICIUS, 1793)	×	×
60. *Messor aralocaspius aralocaspius* (RUZSKY, 1902)		×
61. *Messor aralocaspius infumatus* KUZNETZOV-UGAMSKIJ, 1929		×
62. *Messor* cf. *darianus* SANTSCHI, 1926	×	×
63. *Messor denticulatus* SANTSCHI, 1927	×	×
64. ***Messor excursionis* RUZSKY, 1905**	×	
65. *Messor inermis* KUZNETZOV-UGAMSKIJ, 1929		×
66. *Messor marikovskii* ARNOLDI, 1970		×
67. *Messor olegianus* ARNOLDI, 1970		×
68. *Messor rufus* SANTSCHI, 1923	×	×
69. *Messor structor* (LATREILLE, 1798)	×	×
70. *Messor valentinae* ARNOLDI, 1970		×
71. Monomorium barbatulum MAYR, 1877		×
72. Monomorium pharaonis (LINNAEUS, 1758)		×
73. *Myrmica bergi* RUSZKY, 1902	×	×
74. *Myrmica dshungarica* RUZSKY, 1905	×	×
75. *Myrmica juglandeti* ARNOLDI, 1976	×	×
76. *Myrmica kirghisorum* ARNOLDI, 1976	×	×
77. *Myrmica lacustris* RUZSKY, 1905	×	×
78. *Myrmica orthostyla* ARNOLDI, 1976		×
79. *Myrmica rubra* (LINNAEUS, 1758)	×	×
80. *Myrmica saposhnikovi* RUZSKY, 1904	×	×
81. *Myrmica scabrinodis* NYLANDER, 1846	×	×
82. *Myrmica schencki* VIERECK, 1903	×	×
83. *Myrmica tenuispina* RUZSKY, 1905	×	×
84. *Myrmica tobiasi* RADCHENKO & ELMES, 2004	×	
85. *Pheidole koshewnikovi* RUZSKY, 1905		×
86. *Pheidole pallidula* NYLANDER, 1849	×	×
87. Solenopsis fugax (LATREILLE, 1798)		×
88. *Stenamma picetojuglandeti* ARNOLDI, 1975		×
89. *Strongylognathus christophi* EMERY, 1889	×	×
90. ***Strongylognathus minutus* RADCHENKO, 1991**	×	
91. *Temnothorax arpini* (TARBINSKY, 1976)	×	×
92. *Temnothorax kirghizicus* (TARBINSKY, 1976)		×
93. ***Temnothorax melleus* (FOREL, 1904)**	×	
94. *Temnothorax nassonovi* (RUZSKY, 1895)		×
95. *Temnothorax oxianus* (RUZSKY, 1905)	×	×
96. *Temnothorax satunini* (RUZSKY, 1902)		×
97. *Temnothorax susamyri* (DLUSSKY, 1965)		×
98. *Temnothorax tianschanicus* (TARBINSKY, 1976)	×	×
99. *Temnothorax tuberum* (FABRICIUS, 1775)		×
100. ***Tetramorium armatum* SANTSCHI, 1927**	×	
101. *Tetramorium* cf. *caespitum* (LINNAEUS, 1758)	×	×
102. *Tetramorium ferox* RUZSKY, 1903	×	×
103. *Tetramorium inerme* MAYR, 1877		×
104. *Tetramorium schneideri* EMERY, 1898		×
105. *Tetramorium turcomanicum* SANTSCHI, 1921		×
Ponerinae		
106. *Ponera coarctata* (LATREILLE, 1802)		×

RADCHENKO, A.G. 1994c: A survey of species of *Myrmica* of the *lobicornis*-group (Hymenoptera, Formicidae) from Central and Eastern Palaearctic. – Zoologichesky Zhurnal 73: 81-92. [in Russian; English translation: Entomological Review (Washington) 74: 133-146]

RADCHENKO, A.G. 1994d: A review of the ants of the genus *Leptothorax* (Hymenoptera, Formicidae) of the Central and Eastern Palaearctic. Communication 1. Division to the species groups. Groups *acervorum* and *bulgaricus*. – Vestnik Zoologii 1994(6): 22-28. [in Russian]

RADCHENKO, A.G. 1995: A review of the ants of the genus *Leptothorax* (Hymenoptera, Formicidae) of the Central and Eastern Palaearctic. Communication 2. Groups *tuberum*, *corticalis*, *affinis*, *clypeatus*, *alinae* and *singularis*. – Vestnik Zoologii 1995(2): 14-21. [in Russian]

RADCHENKO, A.G. 1997a: A review of the Palaearctic ants of the genus *Camponotus* (Hymenoptera, Formicidae). Subgenus *Camponotus* s. str. – Zoologichesky Zhurnal 76: 554-564. [in Russian]

RADCHENKO, A.G. 1997b: A review of the ants of the subgenera *Tanaemyrmex*, *Colobopsis*, *Myrmamblis*, *Myrmosericus*, *Orthonotomyrmex* and *Paramyrmamblis* of the genus *Camponotus* (Hymenoptera, Formicidae) of the Asian part of Palaearctic. – Zoologichesky Zhurnal 76: 806-815. [in Russian]

RADCHENKO, A.G. 1997c: A review of the ants of the genus *Cataglyphis* FOERSTER (Hymenoptera, Formicidae) of Asia. – Entomologicheskoe obozrenie 76: 424-442. [in Russian; English translation: Entomological Review (Washington) 77: 684-698]

RADCHENKO, A. 2004: A review of the ant genera *Leptothorax* MAYR and *Temnothorax* MAYR (Hymenoptera, Formicidae) of the Eastern Palaearctic. – Acta Zoologica Academiae Scientiarum Hungaricae 50: 109-137.

RADCHENKO, A.G. & ELMES, G.W. 2004: Taxonomic notes on the *scabrinodis*-group of *Myrmica* species (Hymenoptera: Formicidae) living in eastern Europe and western Asia, with a description of a new species from Tien Shan. – Proceedings of the Russian Entomological Society, St. Petersburg 75: 222-233.

RADCHENKO, A., ELMES G.W. & WOYCIECHOWSKI, M. 2002: An appraisal of *Myrmica bergi* RUZSKY and related species (Hymenoptera, Formicidae). – Annales Zoologici 52: 409-421.

SCHULTZ, R. 2001: Erste Ergebnisse der Erfassung der Ameisenfauna (Hymenoptera: Formicidae) des Tien-Shan und des Alai. – Mitteilungen der Deutschen Gesellschaft für allgemeine und angewandte Entomologie 13: 117-120.

SCHULTZ, R. & SEIFERT, B. 2005: *Lasius neglectus* (Hymenoptera: Formicidae) – a widely distributed tramp species in Central Asia. – Myrmecologische Nachrichten 7: 47-50.

SEIFERT, B. 1992: A taxonomic revision of the Palaearctic members of the ant subgenus *Lasius* s. str. (Hymenoptera: Formicidae). – Abhandlungen und Berichte des Naturkundemuseums Görlitz 66: 1-66.

SEIFERT, B. 2000: A taxonomic revision of the ant subgenus *Coptoformica* MUELLER, 1923 (Hymenoptera, Formicidae). – Zoosystema 22: 517-568.

SEIFERT, B. 2003: The ant genus *Cardiocondyla* (Insecta: Hymenoptera: Formicidae): A taxonomic revision of the *C. elegans*, *C. bulgarica*, *C. batesii*, *C. nuda*, *C. shuckardi*, *C. stambuloffii*, *C. wroughtonii*, *C. emeryi*, and *C. minutior* species groups. – Annalen des Naturhistorischen Museums in Wien 104B: 203-338.

SEIFERT, B. 2004: The "Black Bog Ant" *Formica picea* NYLANDER 1846 – a species different from *Formica candida* SMITH, 1878 (Hymenoptera: Formicidae). – Myrmecologische Nachrichten 6: 29-38.

TARBINSKY, Y.S. 1976: The ants of Kyrgyzstan. – Izdatelstvo Ilim, Frunse Kirgisia, 117 pp. [in Russian]

TARBINSKY, Y.S. 1996: Formicoidea. In: SHUKUROV, E.D., VOROBIEV, G.G., MATYASHOV, V.D., SULTANOVA, B.A. & TARBINSKY, Y.S.: Genetical Fund Cadastre of Kyrghyzstan. Vol. III. Superclassis Hexapoda (Entognatha and Insecta). – Ecological Movement of Kyrgyzstan "Alejne", Bishkek, 400 pp.

TINAUT, A. & MARTINEZ-IBANEZ, D. 1998: Taxonomy and distribution of *Formica dusmeti* EMERY, 1909 and of *F. frontalis* SANTSCHI, 1919 (Hymenoptera, Formicidae). – Graellsia 54: 31-41.