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CONTRIBUTION TO THE KNOWLEDGE OF THE ANTS (HYMENOPTERA, FORMICIDAE) FROM SERBIA

A b s t r a c t

The study of the fauna of ants (Hymenoptera, Formicidae) in northeastern and northwestern part of Serbia have been provided and 42 species, belonging to 18 genera and 4 subfamilies respectively, were established. Among these taxa, three species are mentioned at the first time for Serbia (*Lasius paralienus* Seifert, 1992, *Lasius platythorax* Seifert, 1991 and *Formica truncorum* Fabricius, 1804), while the new localities for many species are cited.

Key words: taxonomy, distribution, ants, Hymenoptera, Formicidae, Serbia.

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PRILOG POZNAVANJU MRAVA (HYMENOPTERA, FORMICIDAE) SRBIJE

I z v o d

Na osnovu istraživanja faune mrava (Hymenoptera, Formicidae) provedenih u sjeveroistočnom i sjeverozapadnom dijelu Srbije, nađene su na tom području 42 vrste mrava iz 18 rodova odnosno 4 podfamilije. Među njima, 3 vrste su nove za faunu Srbije (*Lasius paralienus* Seifert, 1992, *Lasius platythorax* Seifert, 1991 i *Formica truncorum* Fabricius, 1804), dok su za mnoge vrste citirani novi lokaliteti.

Ključne riiječi: taksonomija, rasprostranjenje, mravi, Hymenoptera, Formicidae, Srbija.

INTRODUCTION

The fauna of ants (Hymenoptera, Formicidae) in Serbia is still partially known. The first investigations of ants from this region have been realized in the middle of the last century (ŽIVOJINOVIĆ, 1950; VOGRIN, 1955; JANKOVIĆ, 1974; GRADOJEVIĆ, 1981; MITIĆ & GRADOJEVIĆ, 1983, etc.), but all these studies have been very sporadic and partial only. AGOSTI & COLLINGWOOD published (1987) a list of ants from Balkan, and PETROV & COLLINGWOOD published (1992) a list of known Formicidae from Yugoslavia, where indirectly have been mentioned also the taxa from Serbia. PETROV & COLLINGWOOD described (1993) a new species, *Formica balcanina*, n. sp. from Serbia (Deliblato Sandy Area). PETROV recently published various papers on the taxonomy of ants from Serbia (1984, 1986, 1992, 1996, 2002, PETROV & MESAROŠ, 1988, etc.). During many years, we have been collected the ants (Formicidae) from many regions of former Yugoslavia, including Serbia, also. We collected, in the period of 1993-2002, numerous samples of ants from various parts of Serbia, especially from northeastern (Homoljske Mts., Stol Mt., Dubašnica and other regions of Bor and Zlot), as well as from northwestern part of Serbia (Fruška Gora Mt., Sremska Mitrovica region). A part of results of the investigation of that material, regarding the nesting, nonparasitic ants, are presented in this work.

TAXONOMIC PART

Subfamily Ponerinae

Ponera coarctata (Latreille, 1802)

MATERIAL EXAMINED: SREMSKA MITROVICA REGION:
- Trebljevina, Banovo Polje (Zasavica), 14.06.2002 (leg. Gordan & Božana Karaman), 1 worker;
- Batar, Zasavica, 14.8.2002 (leg. G. & B. Karaman), 6 workers; Ibid., 15.08.2002 (leg. G. & B. Karaman), 9 workers, 1 male;
- Jovača, Zasavica, 14.08.2002 (leg. G. & B. Karaman), 7 workers, 1 female;
- Zasavica, forest, 13.08.2002 (leg. G. & B. Karaman), 8 workers, 1 female;
- Radenkovići village near Batar, Zasavica, in the soil, 15.08.2002 (leg. G. & B. Karaman), 1 worker;
- Mačvanska Mitrovica, towards Čevrntija, 16.8.2002 (leg. M. Stanković), 3 workers.

REMARKS. The color of our specimens (workers) is very variable, from dark brown till almost black, extremities are slightly lighter colored. This variability of color was observed also among the specimens from the same nest. The size of workers was 3.0-3.2 mm, females 3.8 mm, males 3.5 mm. The males are black, antennae dark brown, the legs are colored slightly lighter. Scapus of antennae in males is as long as the next antennal article. We found this species in the oak forests in the valleys mainly, under the leaves and dried rami of the trees. In the locality Jovača we found the entire nest within the shell of *Helix* sp. under one tree.

Subfamily Myrmicinae

Aphaenogaster subterranea (Latreille, 1798)

MATERIAL EXAMINED: - Lipovača, Fruška Gora Mt., 15.06.1994 (leg. Marko Karaman), 30 workers;
- Radenkovići village near Batar, Zasavica, oak forest (Sremska Mitrovica region), 15.8.2002 (leg. G. & B. Karaman), 1 female, 3 males, 40 workers.

REMARKS. Nests in the soil under trees in oak forest (Radenkovići). Body size of the workers L=3.8-4.2 mm (specimens from Lipovača).

Cardiocondyla stambuloffii Forel, 1892

MATERIAL EXAMINED: - Sremska Mitrovica town, within the fissures of the rocks at the bank of Sava river, 25.08.2001 (leg. G. & B. Karaman), 1 worker.

REMARKS. Size of body L=2.6 mm.

Crematogaster schmidti (Mayr, 1853)

MATERIAL EXAMINED: - Near Vodena pečina cave, calcareous rocks above Zlot village (Bor region), 15.07.1993 (leg. G. & B. Karaman), 4 workers.

REMARKS: Was found it in the dried rami of the trees on calcareous soil.

Diplorophthrum fugax (Latreille, 1798)

MATERIAL EXAMINED: - Sremska Kamenica, 30.05.1994 (leg. M. Karaman), 1 worker, in the walls of the nest of *Tetramorium* sp.
- Beljevina above Zlot village (Bor region), near the road, 6.06.1993 (leg. G. & B. Karaman), 86 workers. Size of the workers: L=1.3 - 2.0 mm.

REMARKS: The nest was in the soil under calcareous rocks.

Leptothorax acervorum (Fabricius, 1793)

MATERIAL EXAMINED: - Dubašnica Mt. above Bor Lake (Bor reg.), 23.04.1993 (leg. G. & B. Karaman), 10 workers (L=3.2 - 3.5 mm);
- Dubašnica Mt., in the forest (Bor region), 05.06.1993 (leg. G. & B. Karaman), 2 workers (L= 3.5 mm);
- Beljevina (Bor region), near captured spring (Bor region), dense vegetation, 01.08.1997 (leg. G. & B. Karaman), 2 workers (L= 3.2 mm).

REMARKS: Nesting in the soil, often under stones. In Beljevina was found in the nest of the ant *Tetramorium caespitum.*

Leptothorax nylanderi (Foerster, 1850)

MATERIAL EXAMINED: - Near Lazareva (=Zlotska) pečina cave near village Zlot (Bor region), 14.07.1993 ((leg. G. & B. Karaman), 8 workers (L= 2.2 - 2.5 mm); Ibid., another nest, 19 workers (L= 2.2 - 2.8 mm).

REMARKS: In the soil, between calcareous rocks above the cave.

Messor structor (Latreille, 1798)

MATERIAL EXAMINED: - Near Vodena pečina cave, several km above Zlot village (Bor region), 15.07.1993 (leg. G. & B. Karaman), 2 workers (L= 5.0 - 6.0 mm);
- Near Lazareva (=Zlotska) pečina cave near village Zlot (Bor region), 14.07.1993 (leg. G. & B. Karaman) 1 worker (L= 3.5 mm);
- Bank of Mikuljska reka river near Zlot (Bor reg.), 15.07.1993 (leg. G. & B. Karaman), 20 workers (L=4.6 - 6.5 mm);
- On the banks of Lazareva reka river, below Lazareva pečina cave (Zlot, Bor region) (leg. G. & B. Karaman), 2 workers (L= 4.5 - 5.0 mm).

REMARKS. The nests were found in the soil near the road or between the rocks in the field; near the entrance of the nests usually large quantity of the seeds's or plant rests.

Myrmecina graminicola (Latreille, 1802)

MATERIAL EXAMINED: - Trebljevina near Banovo Polje, Zasavica (Sremska Mitrovica region), forest, 14.06.2002 (leg. G. & B. Karaman), 1 female (L= 3.6 mm).

REMARKS: was found in the humid soil of the forest, under the leaves.

Myrmica rubra (Linnaeus, 1758)

MATERIAL EXAMINED: SREMSKA MITROVICA REGION:
- Trebljevina, Banovo Polje (Zasavica), 14.08.2002 (leg. G. & B. Karaman), 2 males (L=5.0 - 5.3 mm), 1 female (L= 6.0 mm), 28 workers (L=4.0-5.0 mm); Ibid., another nest, 1 female (L=6.0 mm), 21 workers (L= 4.5 -5.0 mm); Ibid., another nest, 1 female (L= 5.5 mm), 7 workers (L= 4.0 - 4.5 mm);
- Raševića Ćuprija, Banovo Polje (Zasavica), 14.08.2002 (leg. G. & B. Karaman), 15 workers (L=4.0 -4.8 mm);
- Radenkovići village, Batar (Zasavica), oak forest, 15.08.2002 (leg. G. & B. Karaman), 58 workers (L=4.3 - 4.7 mm);
- Batar (Zasavica), nest in the soil under leaves, 15.08.2002 (leg. G. & B. Karaman), 3 workers (L=4.5 mm);
- Grozana village on road Zlot- Podgorac, nest in the soil near road,

under stone. 26.08.1996 (leg. G. & B. Karaman) 20 workers, 4 males (L= 5.0 mm);
- In the soil near Vodena pečina cave, several kilometers above Lazareva pečina cave (Zlot, Bor region), 15.07.1993 (leg. G. & B. Karaman), 30 workers (L= 4.5 - 5.0 mm);
- At the bank of Brestovačka reka river, under the bridge, below Đanovo polje village (Bor region), 22.08.1996 (leg. G. & B. Karaman), 1 male (L= 5.0 mm), 58 workers (L=4.4 - 4.5 mm);
- Homoljske Mts. above Žagubica, 10.07.1993 (leg. M. Karaman), 8 workers (L= 4.2 - 4.5 mm);
- Bank of river Mlava, Homoljske Mts., 06.07.1993 (leg. M. Karaman), 27 workers (L=4.0 - 4.5 mm).

REMARKS. The nests of this species are in the humid soil under stones or under trees with shadow. The males from Grozana are with dark brown body, second article of funiculus is longer than first one as well as third one. Last pair of legs with numerous semi erected setae longer than half of corresponding tibia width. Mesonotum and scutellum are mainly smooth.

Myrmica ruginodis (Nylander, 1846)

MATERIAL EXAMINED: - At the bank of Kriveljska reka river (Bor region), 25.8.1996 (leg. G. & B. Karaman), 5 workers (L= 5.0 mm).

REMARKS: The nest was under leaves of the trees in the humid soil.

Tetramorium caespitum (Linnaeus, 1758)

MATERIAL EXAMINED: - Goransko ribolovačko jezero-Lake near Mačvanska Mitrovica, 16.08.2002 ((leg. G. & B. Karaman), 17 workers (L= 2.8 -3.5 mm);
- Radenkovići village near Batar (Zasavica, Sremska Mitrovica reg.), 15.08.2002 (leg. G. & B. Karaman), 15 workers (L=2.8 -3.0 mm);
- Raševića Ćuprija in Banovo Polje (Zasavica, Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 6 workers (L=3.0 - 3.3 mm);
- Jovača, Banovo Polje (Zasavica, Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 6 workers (L=3.0 mm);
- Trebljevina, Banovo Polje (Zasavica, Sremska Mitrovica reg.),

14.08.2002 (leg. G. & B. Karaman) 1 worker (L=3.5 mm);
- Žagubica, hill just above the spring of Mlava river, 07.07. 1993 (leg. M. Karaman), 62 workers (L= 3.0 - 3.2 mm);
- Canyon Suvi Do in Žagubica region, Homoljske planine Mts., 10.07.1993 (leg. M. Karaman), 32 workers (L= 3.0 mm);
- The hill nearly 500 m above Mlava spring, 17.07. 1993 (leg. M. Karaman), nest in the soil, 40 workers (L= 3.0- 3.5 mm);
- Village Donji Ribari, Homoljske Mts., 06.07.1993 (leg. M. Karaman), nest in the dried soil, 32 workers (L=3.0 - 3.2 mm);
- Lipovača, Fruška Gora Mt., 15.06.1994 (leg. M. Karaman), 32 workers (L= 3.0 - 4.0 mm);
- Sremska Kamenica near Novi Sad, 27.05.1995 (leg. M. Karaman), nest in the ground of the house, 25 workers (L= 3.0 - 3.5 mm);
- Glavica, Fruška Gora Mt., 20.05.1994 (leg. M. Karaman), nest in the soil, 16 workers (L=3.0 - 3.3 mm);
- Beljevina (Bor region), near captured spring (Bor region), dense vegetation, 01.08.1997 (leg. G. & B. Karaman), 12 workers, mixed with 2 workers of *Leptothorax acervorum*.

REMARKS. The size of the body and the size of the epinotum spines of the workers is very variable within the same nest. Other taxonomic characteristics are more stable (color, pilosity, ornamentation, etc.).

Tetramorium impurum (Foerster, 1850)

MATERIAL EXAMINED: - Lipovača, Fruška Gora Mt., 15.06.1994 (leg. M. Karaman), 28 workers (L= 3.2- 3.4 mm);
- Glavica, Fruška Gora Mt., 20.05.1004 (leg. M. Karaman), 22 workers (L=3.0 - 3.2 mm).

REMARKS. Determination of the specimens within the genus *Tetramorium*, based on the workers only, is not always too adequate, especially between the morphologically close species, as *Tetramorium caespitum* and *T. impurum*. Many authors (KUTTER, 1977; SEIFERT, 1996; RADCHENKO et al., 1998) mentioned that the differences between workers of *T. impurum* and *T. caespitum* are in the ornamentation of the petiolus and postpetiolus. The workers of *T. impurum* are with small smooth dorsal surface on petiolus and postpetiolus, or that surface is missing entirely because these segments are dorsally poorly and

irregularly striated or punctuate. Our collected workers from Fruška Gora are with petiolus and postpetiolus dorsally variable ornamented: from very smooth shining small dorsal surface till completely matt poorly striate surface, also within the specimens of the same nest. The workers of *T. caespitum* are with dorsal ornamentation of petiolus and postpetiolus always constant, with distinct dorsal central smooth shining surface.

Subfamily Dolichoderinae

Liometopum microcephalum (Panzer, 1798)

MATERIAL EXAMINED: - Lipovača, Fruška Gora Mt., 15.06.1993 (leg. M. Karaman), 25 workers (L= 4.0 - 4.5 mm);
- Village Radenkovici near Batar (Zasavica, Sremska Mitrovica region), 15. 08. 2002 (leg. G. & B. Karaman), 1 worker;
- Šumareva Ćuprija, Zasavica (Sremska Mitrovica reg.), forest near water, 13.08.2002 (leg. G. & B. Karaman) 1 worker in wet soil;
- Mačvanska Mitrovica, 16.08.2002 (leg. G. & B. Karaman), 21 workers, large colony nesting in the ground of the trees (L=3.0 -5.2 mm).

REMARKS. Usually the colonies of this species are very large.

Tapinoma erraticum (Latreille, 1798)

MATERIAL EXAMINED:-Crni Vrh Mt., near the torrent Kazanova (Bor region), 17.08.1997 (leg. G. & B. Karaman), 24 workers, nest in the wet soil (L=2.8 -3.0 mm);
- Paragovo, Fruška Gora Mt., 20.05.1994 (leg. M. Karaman), in the soil near the road, 2 females (L=5.0 mm), 35 workers (L= 2.2 - 3.5 mm).

REMARKS: The body of the female is regularly dark brown, and tarsus, tibia and funiculus are yellow brown colored. Clypeal incision is with parallel lateral margins.

Subfamily Formicinae

Camponotus aethiops (Latreille, 1798)

MATERIAL EXAMINED:- Žagubica, the hill above spring of Mlava river, 17.07.19933 (leg. M. Karaman), nest in the soil, 21 workers (L=6.0 - 9.0 mm);
- Near Vodena pečina cave, several km above Zlot village, 15.07.1993 (leg. G. & B. Karaman), 1 worker (L= 4.5 mm).

REMARKS. The specimens collected always in the shadow of the trees, the nests are in the foot of the trees.

Camponotus lateralis (Olivier, 1792)

MATERIAL EXAMINED: - On the tree near Lazareva (= Zlotska) pečina cave, Zlot village (Bor region), 14.07.1993 (leg. G. & B. Karaman), 1 worker.

REMARKS: Was found on the dried ramus of the tree.

Camponotus ligniperdus (Latreille, 1802)

MATERIAL EXAMINED:- Veliki Krš Mt., Babušnica (Bor region), 04.06.1993 (leg. G. & B. Karaman), 2 workers (L=8.0 -9.0 mm);
- Dubašnica Mt. (Bor reg., beech forest, 05.06.1993 (leg. G. & B. Karaman), 3 workers (L=7.0 - 11.0 mm);
- Dubašnica, toward Beljevina, mountains, forest, 06.06.1993 (leg. G. & B. Karaman), 7 workers (L=8.5 - 10.5 mm);
- In front of Vernikica cave, above Zlot (Bor reg.), 14.07.1993 (leg. G. & B. Kara man), 1 worker (L= 7.5 mm);
- Beljevina (Bor reg.), forest, 06.06.1993 (leg. G. & B. Karaman), 3 workers (L= 9.5 -10.0 mm);
- Sto Mt. (Bor reg.), 20.08.1997 (leg. G. & B. Karaman), 2 workers (L= 7.5-10.0 mm);
- Crni Vrh Mt. eastern side, forest (Bor reg.), 17.08.1997 (leg. G. & B. Karaman), 8 workers (L=7.5 -10.5 mm);
- Canyon of the Tisnica river, Homoljske Mts., 08.07.1993 (leg. M. Karaman). 5 workers (L= 10.0 -11.5 mm).

REMARKS: The nests have been found in the forest on the foot of the trees in the soil.

Camponotus piceus (Leach, 1825)

MATERIAL EXAMINED: - Goransko ribolovačko jezero-lake near Mačvanska Mitrovica, in the forest near the lake, 16.08.2002 (leg. G. & B. Karaman), 2 workers (L= 3.8 = 4.2 mm);
- Near Vernikica cave above Zlot village (Bor reg.), 14.07.1993 (leg. G. & B. Karaman), 7 workers (L= 4.0 - 5.5 mm);
- Near Vodena pečina cave, several km above Zlot village, 15.07.1993

(leg. G. & B. Karaman), 10 workers (L= 4.2 - 4.5 mm);
- Near Lazareva (=Zlotska) pečina cave, off Zlot village (Bor reg.), 13.07.1993 (leg. G. & B. Karaman), 1 worker (L= 5.2 mm);

REMARKS: The nests are in the soil or under stones near dried rami of trees.

Camponotus vagus (Scopoli, 1763)

MATERIAL EXAMINED: - Žagubica, Homoljske Mts., near the road, 10.07.1993 (leg. M. Karaman), 3 workers (L= 6.0 - 11.0 mm);
- Savača near Bor lake (Bor reg.), 13.07.1993 (leg. G. & B. Karaman), 18 workers (L= 9.0 - 12.0 mm);
- Dubašnica, mountain (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 13 workers (L= 7.5 - 12.0 mm);
- Beljavina, forest (Bor reg.), 21.08.1997 (leg. G. & B. Karaman), 1 worker (L= 9.0 mm).

REMARKS: The specimens were found in the forest or under the trees, on soil. Nesting in the dried wood or in the soil.

Formica balcanina Petrov & Collingwood, 1993

MATERIAL EXAMINED: - Gornji Ribari, Homoljske Mts., 06.07.1993 (leg. M. Karaman), 1 worker (L= 8.5 mm);
- Zlot village, near Lazareva pečina cave, on calcareous soil, nesting in the soil, 14.07.1993 (leg. G. & B. Karaman), 1 worker;
- On the bank of Lazareva reka river, below Lazareva pečina cave (Zlot, Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 8 workers (L= 4.5 - 6.0 mm);
- Homoljske Mts., above canyon of Tisnica river, nest in the soil, 08.07.1993 (leg. M. Karaman), 26 workers (L= 4.5 - 6.0 mm).

REMARKS: The nests of this species are in the dried soil or low vegeta tion.

Formica cunicularia Latreille, 1798

MATERIAL EXAMINED: - Banovo Polje, Zasavica (Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman) 5 workers (L= 5.5 mm);
- Jovača in Banovo Polje, Zasavica (Sremska Mitrovica reg.), 14.08.2002

(leg. G. & B. Karaman), 3 workers (L= 5.0 mm);
- Trebljevina in Banovo Polje (Zasavica, Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 2 workers (L= 5.0 - 5.2 mm);
- Zlot village near Lazareva (=Zlotska) pečina cave (Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 1 female (L= 10.0 mm);
- Dubašnica towards Beljevina, mountains, forest and high vegetation (Bor reg.), 06.06.1993 (leg. G. & B. Karaman), 32 workers (L= 4.5 - 6.0 mm);
- Near Vernikica cave above Zlot village (Bor reg.), 14.07.1993 (leg. G. & B. Karaman), 2 workers (L= 5.0 - 5.5 mm).

REMARKS: Thorax of the workers is with dark pigmentation (spot) in the median part of the segment, and towards the suturae is prevalently red-brown. The size of this dark spot is variable between the workers from various nests. The intensity of the pigmentation is variable from light till dark.

Formica exsecta Nylander, 1846

MATERIAL EXAMINED: - On the bank of Lazareva reka river, below Lazareva pečina cave (Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 1 female (L= 7.8 mm).

Formica fusca Linnaeus, 1758

MATERIAL EXAMINED: - Dubašnica, forestry house, mountains (Bor reg.), 23.06.1993 (leg. G. & B. Karaman), 1 female (L= 8.0 mm), 9 workers (L= 6.0 mm), nest in the soil, forest;
- Raševića Ćuprija near Banovo Polje (Zasavica, Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 7 workers (L= 4.5 - 5.2 mm);
- Dubašnica, mountain forest (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 40 workers; Ibid., 04.06.1993, (leg. G. & B. Karaman), 2 females, 15 workers;
- Canyon of Tisnica river, Žagubica, nest in the soil (leg. M. Karaman), 5 females (L= 9.0 mm).

REMARKS: In the place near the forest or in the fields among the trees, nesting in the soil.

Formica gagates Latreille, 1798

MATERIAL EXAMINED: - Near Vodena pečina cave, several km above Zlot village (Bor reg.), 15.07.1993 (leg. G. & B. Karaman), 6 workers (L= 4.5 - 5.2 mm);
- Žagubica, Homoljske Mts., the hill above the spring of Mlava river, 500 m a.s.l., nest in soil, 17.07.1993 (leg. M. Karaman), 15 workers (L= 5.8 - 6.5 mm);
- Glavica, Fruška Gora Mt., 20.05.1994 (leg. M. Karaman), 16 workers (L= 4.5 - 6.0 mm);
- Iriški Venac, Fruška Gora Mt., under the dry tree stump, 20.05.1994 (leg. M. Karaman), 21 workers (L= 6.0 mm).

REMARKS. The thorax of the workers from one nest with variable number of the setae (2-8). *Formica gagates* is rather similar to the species *fusca*, but it differs from *fusca* by more shining body and by pilosity of abdomen. Abdomen of *F. fusca* dorsally besides a row of setae along posterior borders, also with rare short setae over the other part of the segment. On the other side, abdomen of *F. gagates*, besides the setae along posterior margins of the segments, is provided with numerous long setae between them.

Formica polyctena Foerster, 1850

MATERIAL EXAMINED: - Dubašnica, forest (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 2 females (L= 9.0 - 10.0 mm), 2 workers (L= 5.0 - 8.0 mm).

REMARKS; The specimens are collected in the clearing within the forest.

Formica pratensis Retzius, 1783

MATERIAL EXAMINED: - Dubašnica, forest (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 1 worker (L= 7.0 mm);
- Mali Krš Mt., Vrkanje village (Bor reg.), 23.08.1996 (leg. G. & B. Karaman), 15 workers (L= 6.5 - 7.7 mm);
- Homoljske Mts, the hill above the spring of Mlava river, 07/07/1993 (leg. M. Karaman), 24 workers (L= 6.0 - 8.0 mm);
- Glavica, Fruska Gora Mt., 25.04.1993, nest in the soil (leg. M. Karaman), 19 workers (L= 7.5 - 8.0 mm).

REMARKS: The nests of this species were found in the soil, usually on the places with more dense vegetation.

Formica rufa Linnaeus, 1761

MATERIAL EXAMINED: - Near Kumustaka torrent above Borsko jezero lake, mountain, forest (Bor reg.), 20.08.1996 (leg. G. & B. Karaman), 55 workers (L= 7.0 - 8.0 mm).

REMARKS: The nest of this species forming one elevated pile of nearly 30 cm. high.

Formica rufibarbis Fabricius, 1793

MATERIAL EXAMINED: - Near Vernikica cave above Zlot village (Bor reg.), 14.07.1993 (leg. G. & B. Karaman), 5 workers (L= 5.0 - 6.5 mm);
- Near Vodena pečina cave, several km above Zlot village, Mikuljska reka (Bor reg.), 15.07.1993 (leg. G. & B. Karaman), 7 workers (L= 5.0 mm); Ibid., 15.07.1993 (leg. G. & B. Karaman), 8 workers (L= 5.0 - 6.0 mm);
- Zlot, near Lazareva pečina cave (Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 2 workers (L= 6.0 - 6.5 mm);
- Buk, Homoljske Mts., 10.07.1993 (leg. M. Karaman), 1 female (L= 10.5 mm), 27 workers (L= 5.0 mm -6.5 mm);
- Sremska Kamenica near Novi Sad, park, nest at the foot of lime tree, 25.06.1993 (leg. M. Karaman). 23 workers (L= 5.0 - 5.5 mm);
- Goransko ribolovno jezero Lake near Mačvanska Mitrovica, 16.08.2002 (leg. G. & B. Karaman), 15 workers (L= 5.0 - 6.0 mm);
- Trebljevina near Banovo Polje, Zasavica (Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 1 worker (L= 6.0 mm);
- Sremska Mitrovica, nest at hill at bank of Sava river, 25.08.2001 (leg. G. & B. Karaman), 29 workers (L= 5.0 - 6.0 mm), collected in the nest intermixed with *Polyergus rufescens*.

REMARKS. Nest was in the soil of the embankment, scarce vegetation in the vicinity.

Formica sanguinea Latreille, 1798

MATERIAL EXAMINED: - Glavica, Fruška Gora Mt., under the dried tree rami, 29.05.1994 (leg. M. Karaman), 9 workers (L= 6.0 - 7.0

mm);
- Dubašnica, mountain, forest, 2 km NW of forest house, nest in the soil (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 30 workers (L= 5.0 - 7.0 mm);
- Veliki Krš Mt. (Dubašnica, Bor reg.), 04.06.1993 (leg. G. & B. Karaman), 35 workers (L= 5.0 - 7.0 mm);
- Gornji Ribari, Homoljske Mts., 06.07.1993 (leg. M. Karaman), 7 workers (L= 5.5 - 7.5 mm).

Formica truncorum Fabricius, 1804

MATERIAL EXAMINED: - Dubašnica, forest (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 34 workers (L= 6.0 - 8.5 mm); Ibid, another nest, 10 workers (L= 5.5 - 7.5 mm); Ibid., other nest, 2 workers (L= 6.5 - 8.0 mm); - Bank near Lazareva reka river, above Lazareva pečina cave (Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 1 female (L= 9.5 mm).

REMARKS: Usually in the dried rami of the trees. This is the new species for the fauna of Serbia.

Lasius alienus (Foerster, 1850)

MATERIAL EXAMINED: - Beljevina near Zlot, dense vegetation (Bor reg.), nest near the road, 06.06.1993 (leg. G. & B. Karaman), 10 workers;
- Near Borsko jezero Lake above Bor, 22.04.1993 (leg. G. & B. Karaman), 2 workers;
- Ribarac in soil at bank of Danube river (Novi Sad reg.), 30.05.1995 (leg. M. Karaman), 20 workers (L= 3.0 mm).

REMARKS. Nesting in various types of soil, usually at open field and places with scarce vegetation.

Lasius brunneus (Latreille, 1798)

MATERIAL EXAMINED: - Iriški Venac, Fruška Gora Mt., under rotten wood, 20.05.1994 (leg. M. Karaman), 6 workers (L= 2.5 - 3.0 mm);
- Buk, Homoljske Mts., 12 km. S. of Žagubica, under the leaves in the forest, 12.07.1993 (leg. M. Karaman), 41 workers (L= 3.5 - 4.0 mm).

REMARKS. Nesting often in the humid places, under woods or in the soil in the shadow of the trees.

Lasius emarginatus (Olivier, 1792)

MATERIAL EXAMINED: - Iriški Venac, Fruška Gora Mt., 20.05.1994 (leg. M. Karaman), 10 workers (L= 4.0 mm);
- Veliki Krš Mt., Dubašnica, forest (Bor region), 06.06.1993 (leg. G. & B. Karaman), 10 workers;
- Near Vernikica cave above Zlot village (Bor reg.), 14.07.1993 (leg. G. & B. Karaman), 33 workers;
- Near Vodena pečina cave, several km above Zlot village, 15.07.1993 (leg. G. & B. Karaman), 10 workers (L= 4.2 - 4.5 mm); Ibid., other nest, 1 female, 1 worker;
- Mikoljska reka river near Vodena pečina cave (Zlot, Bor reg.), 15.07.1993 (leg. G. & B. Karaman), 11 workers (L= 3.5 - 4.0 mm);
- Zlot near Lazareva pečina cave (Bor reg.), 16.07.1993 (leg. G. & B. Karaman), 21 workers (L= 3.5 - 4.0 mm), 19 females (L= 8.0 mm), 25 males (L= 4.0 mm); Ibid., 14,07.1993, 42 workers, 1 female (L= 8.0 mm);
- Savača on Borsko jezero Lake (Bor region), 18.07.1993 (leg. G. & B. Karaman), 2 females, 6 workers;
- Motel "Vrelo", Žagubica, near spring of Mlava river, 10.07.1993 (leg. M. Karaman). 13 males, 25 workers;
- Canyon of Tisnica river, Homoljske Mts., 11.07.1993 (leg. M. Karaman), 20 workers (L= 3.3 - 4.0 mm).

REMARKS. The nests are in the soil near the road or in the fields or near forest, on dried or humid places.

Lasius flavus (Fabricius, 1782)

MATERIAL EXAMINED: - The forest near Cerova reka river, under Crvena Stena (Krivelj reg.), 25.08.1996 (leg. G. & B. Karaman), 30 workers (L= 2.7 - 3.0 mm). 1 female (L= 7.5 mm), 4 males (L= 3.2 mm);
- Veliki Krš Mt., Dubašnica (Bor reg.), 04.06.1993 (leg. G. & B. Karaman), 42 workers (L= 2.5 - 3.0 mm);

- Goransko ribolovačko jezero - lake near Mačvanska Mitrovica, 16.08.2002 (leg. G. & B. Karaman), 15 workers (L= 2.8 - 3.2 mm).

Lasius fuliginosus (Latreille, 1798)

MATERIAL EXAMINED: - The forest near Cerova Reka river, below Crvena Stena, near spring of Bušotina (Bor reg.), 25.08. 1996 (leg. G. & B. Karaman), 13 workers (L= 5.0 mm);
- Savača on Borsko jezero lake (Bor reg.), 18.07.1993 (leg. G. & B. Karaman), 21 workers (L=4.8 - 5.2 mm);
- Right bank of Brestovačka reka river, below Brestovac village (Bor reg.), 21.08.1996 (leg. G. & B. Karaman), 1 worker (L= 5.0 mm);
- Lipovača, Fruška Gora Mt., 15.06.1994 (leg. M. Karaman), 20 workers (L= 4.7 - 5.0 mm);
- Trebljevina near Banovo Brdo, Zasavica (Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman), 1 worker (L= 5.2 mm);
- Raševića Ćuprija by Banovo Polje, Zasavica (Sremska Mitrovica reg.), 14.08.2002 (leg. G. & B. Karaman),1 worker (L=5.0 mm);
- Radenkovići village, Zasavica (Sremska Mitrovica reg.), 15.08.2002 (leg. G. & B. Karaman), 3 workers (L= 5.0 mm).

Lasius niger (L. 1758)

MATERIAL EXAMINED: - Žagubica, hill above spring of Mlava river, 17.07.1993 (leg. M. Karaman), 25 workers (L= 3.2 - 3.5 mm);
- Near Vodena pečina cave, several km above Zlot village (Bor reg.), 15.07.1993 (leg. G. & B. Karaman), 6 workers (L= 3.5 mm);
- At bank of Crni Timok river, near bridge towards Bogovina (Bor reg.), 24.08.1996 (leg. G. & B. Karaman), 1 female (L= 9.5 mm);
- Sremska Kamenica, park, nest in the soil, 25.06.1993 (leg. M. Karaman), 20 workers (L= 3.5 mm); Ibid., 26.06.1993, 20 workers (L= 3.5 - 4.0 mm);
- Novi Sad, in the garden, 19.04.1992 (leg. M. Karaman), 12 workers (L= 3.0 - 4.0 mm);
- Zasavica, Šumareva Ćuprija (Sremska Mitrovica reg.), nest in the humid soil covered by green vegetation, 13.08.2002 (leg. G. & B. Karaman), 25 workers (L= 3.5 - 4.0 mm).

REMARKS: See sub Conclusions for details.

Lasius paralienus Seifert, 1992

MATERIAL EXAMINED: - Borsko jezero lake near Bor, 22.04.1993 (leg. G. & B. Karaman), 13 workers (L= 3.0 - 3.3 mm);
- Homoljske Mts., above the canyon of Tisnica river, 08.07.1993 (leg. M. Karaman), 1 worker (L= 3.2 mm);
- Dubašnica, Veliki Krš Mt., forest (Bor reg.), 04.06.1993 (leg. G. & B. Karaman), 30 workers (L= 3.0 - 4.0 mm);
- Dubašnica, mountain (Bor reg.), 05.06. 1993 (leg. G. & B. Karaman), 49 workers (L= 3.0 - 3.5 mm).

REMARKS: This species is new for the fauna of Serbia.

Lasius platythorax Seifert, 1991

MATERIAL EXAMINED: - Dubašnica, forest, mountain (Bor reg.), 05.06.1993 (leg. G. & B. Karaman), 20 workers (L= 3.5 - 4.0 mm);
- Lipovača, Fruška Gora Mt., 15.06.1994 (leg. M. Karaman), 10 workers (L= 3.5 - 4.0 mm);
- Goransko ribolovačko jezero - Lake near Mačvanska Mitrovica, 16.08.2002 (leg. G. & B. Karaman), 18 workers (L= 3.5 - 4.0 mm); Ibid., 16.08.2003 other nest, 52 workers (L= 3.5 - 4.0 mm);
- Šumareva Ćuprija in Zasavica (Sremska Mitrovica reg.), 13.08.2002 (leg. G. & B. Karaman), 27 workers (L= 3.5 - 4.0 mm).

REMARKS: This species is new for the fauna of Serbia.

Plagiolepis pygmaea (Latreille, 1798)

MATERIAL EXAMINED: - Under calcareous stone near Lazareva (= Zlotska) pečina cave, Zlot village (Bor region), 16.07.1993 (leg. G. & B. Karaman). 11 workers (L= 1.2 - 1.5 mm);
- Near Vodena pečina cave, several km above Zlot village, nest under calcareous stone in the red soil, 15.07.1993 (leg. G. & B. Karaman), 3 workers (L=1.2 - 1.5 mm).

REMARKS: The nests are often between the large calcareous rocks, and the specimens are visible walking on the white surface of the rocks.

Polyergus rufescens (Latreille, 1798)

MATERIAL EXAMINED: - Sremska Mitrovica, nest at hill on the bank of Sava river, 25.08.2001 (leg. G. & B. Karaman), 9 workers (L= 6.5 - 7.0 mm), collected in the nest mixed with *Formica rufibarbis*.

REMARKS: This aggressive species of ants attack various species of genus Formica, taking their larvae into his nest as slaves.

Prenolepis nitens (Mayr, 1853)

MATERIAL EXAMINED: - Ribarac, Novi Sad, 30.05.1995 (leg. M. Karaman), 1 worker (L= 3.3 mm);
- Novi Sad, park in the town, 30.05.1995 (leg. M. Karaman), 1 worker (L=3.3 mm).

REMARKS. Both specimens have been collected on the dried soil among vegetation.

CONCLUSIONS

The fauna of ants (Hymenoptera, Formicidae) in Serbia is relatively very rich, but only partially known, especially the endogen and parasitic taxa. This so large diversity is due to the very different ecological conditions and historical-geological events in the past on this part of Balkan peninsula. We suppose that still one third of the existing ant species in Serbia (known or unknown for the science) is waiting to be discovered. During our recent investigations of the ants in Serbia, we established in our samples 42 species of ants belonging to 18 genera and 4 subfamilies. Among these taxa, 3 species are new for the fauna of Serbia: *Lasius paralienus* Seifert, 1992, *Lasius platythorax* Seifert, 1991 and *Formica truncorum* Fabricius, 1804. *Lasius paralienus* Seifert, 1992 belongs to *Lasius alienus*-complex of European species. This species is known recently in the adjacent regions also [Hungary, Macedonia, Montenegro (=Crna Gora), Bulgaria], and the discovery of this species in Serbia is not surprising at all. SEIFERT (1992) considered that the distributive center of *L. paralienus* is Balkan, although this species is known also from Austria, Check, Germany, Slovakia, Greece, Italy, Slovenia, Sweden, Switzerland and Turkey. *Lasius platythorax* Seifert, 1991 is only recently described as a distinct new species clearly

separated from the similar species *Lasius niger* (SEIFERT, 1991). *L. platythorax* differs from *L. niger* by remarkably longer setae on thorax and by rather larger body size. This species is known also from some adjacent countries (Romania, Greece, Italy, Slovenia). *Formica truncorum* Fabricius, 1804 is with Euro-Siberian distribution, except the most southern parts of Europe. This species is also mentioned for several adjacent countries (Hungary, Bulgaria, Croatia, Slovenia).

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