

**CONTRIBUTION TO THE KNOWLEDGE OF THE ANTS
(HYMENOPTERA, FORMICIDAE) OF THE BOKA KOTORSKA BAY
- MONTENEGRO**

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In this paper 12 species from fauna of Boka Kotorska bay are presented, and 7 of them are new for fauna of Montenegro and 11 are new for fauna of Boka Kotorska bay.

KEY WORDS: Formicidae, fauna, Montenegro, Boka Kotorska.

INTRODUCTION

Several authors investigated Myrmecofauna in Boka-Kotorska bay: MÜLLER 1923, SOUDEK 1925, ZIMMERMANN 1934, PETROV 1995, KARAMAN M.G *et al.* 1998, KARAMAN M.G. 1998, COLLINGWOOD & PETROV 1999. There are 77 species registered in Boka-Kotorska bay till now.

We investigated myrmecofauna during the period 1988-1998. Some results we presented in other paper (KARAMAN M.G. *et al.* 1998). In this paper are presented 12 species from fauna of Boka Kotorska bay and 7 of them are new for fauna of Montenegro.

LOCALITY, MATERIAL AND METHODS

Boka Kotorska bay is in the SE part of the Adriatic coast, between broad south part of Adriatic Sea on SW, and high calcareous mountains on

NE with maximal altitude of about 1400 m a.s.l. (Fig. 1). As a part of Adriatic Sea, Boka Kotorska bay is within the Mediterranean climatic region, but the influence of near mountains is remarkable. Summers are hot and dry with scarce rainfall and median monthly temperature of 23°C. The winters are mild and raining with median monthly temperature of 6.5°C (January) to 11.4°C (November).

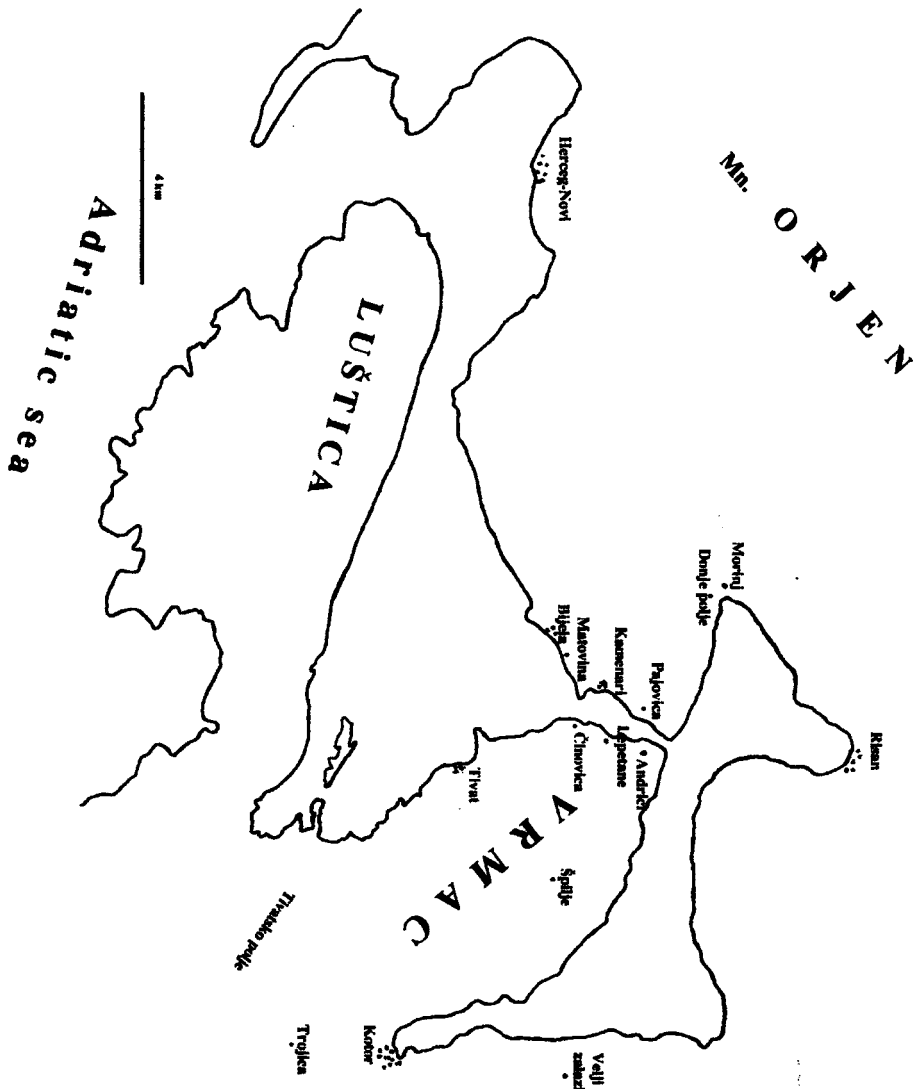


Fig. 1: Map of Boka Kotorska bay

This study is based on specimens collected, during the period 1988-1998, on the various localities: Andrići, Bijela, Činovica, Donje Polje, Kamenari, Lepetane, Matovina, Morinj, Špilje, Tivat, Tivatsko polje, Trojica, Velji Zalazi. The following abbreviations of measurements and indices are used for several species:

HL - maximum head length in median line, excluding the mandibles, in full-face view.

HW - maximum width of the head in full-face view, measured below the eyes.

SL - maximum straight-line length of scape excluding articular bulb.

nBH - number of standing hairs projecting $> 20\mu\text{m}$ from occipital profile of head fronted to hind margin of eye. The number refers to only one half of head and counting is performed in the position in which HL is measured.

nUH - number of standing hairs on underside of head projecting $20\mu\text{m}$ from gular profile seen in lateral view. The number refers to only one half of head.

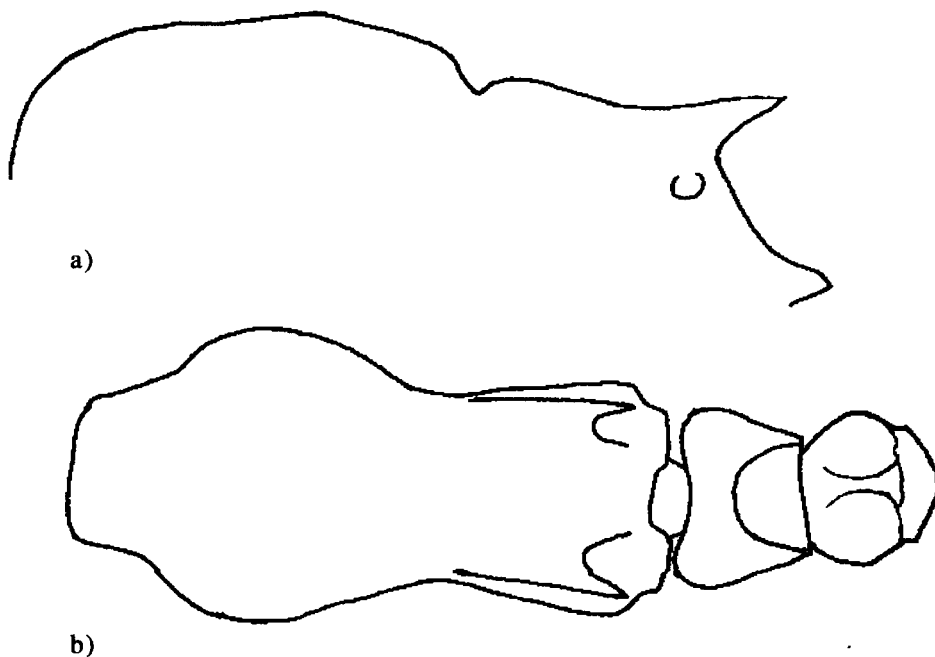


Fig. 2. *Crematogaster jehovae* ♀, a) thorax in lateral view; b) thorax and petiole nodes in dorsal view (orig.).

RESULTS AND COMMENTS

1. *Crematogaster jehovae* Forel, 1907

Crematogaster jehovae Agosti & Collingwood, 1987a: 272; 1987b: 54.

Material examined: Kamenari, 09.08.1988, 1 ♀ (leg. V. Karaman).

Description: ♀: L= 4 mm (Fig. 2). Larger in comparison with morphologically similar *C. auberti* Emery. Head, thorax, petioles and scapula brown-reddish. Funiculus lighter except last funiculi segment which is brown-reddish. Head shining, with micropunctures. Lower part of genae with remarkable longitudinal rugosity. Pro-, meso- and epinotum are punctually structured. Epinotum, in lateral view, with longitudinal rugosity, and between spines is smooth. Postpetiolus and gaster dark brown. Whole body covered with short setae.

2. *Crematogaster sordidula mayri* (Mayr, 1853)

Acrocoelia Mayri Mayr, 1853: 114;

Crematogaster sordidula Mayri Müller, 1923: 74;

Crematogaster sordidula mayri (=var. *flachi* Forel) Zimmermann, 1934: 26.

Material examined: Morinj, 11.06.1998, 1 ♀, nest is in the gravel soil, at the wood border. At the same locality, we found another nest in the wood, under the stone (leg. M.G.Karaman).

Špilje, 30.04.1994, 15 ♀, nest is at the wood border (leg. M.G.Karaman).

Description: ♀: L= 3-3,3 mm (Fig. 3). This species is darker, brown to black, and promesonotum is smooth in compare with forma tipica *C. sordidula* which always has irregularly rugae on promesonotum.

Remarks: Mediterranean halophilous species, nesting on places exposed to the sun. It is Mediterranean east-balkan subspecies of palearctic species. Extended from Trieste to Istanbul (Baroni Urbani, 1971).

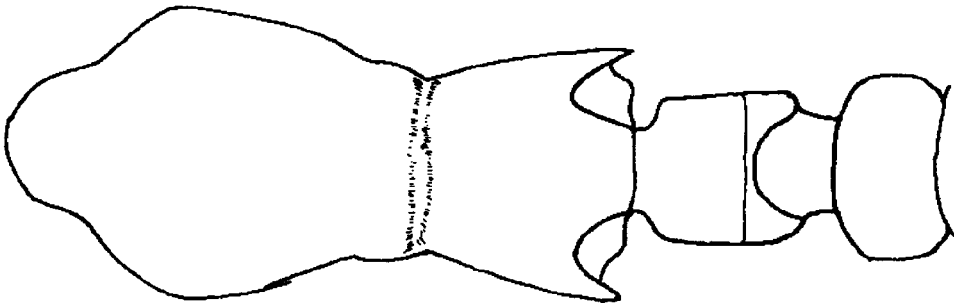


Fig. 3. *Crematogaster sordidula mayri* ♀, thorax and petiole nodes in dorsal view (orig.).

3. *Leptothorax nylanderi* (Foerster, 1850)

Myrmica Nylanderi Foerster, 1850: 53;

Leptothorax Nylanderi Nylanderi Müller, 1923: 95;

Leptothorax nylanderi Bernard, 1968: 214, fig. 200; Baroni-Urbani, 1971: 118; Kutter, 1977: 133, fig. 250.

Material examined: Donje Polje, 11.06.1998, 1 ♀, nest is in the soil under the dead leaves at the grove border (leg. M.G. Karaman); Trojica, 10.09.1998, 1 ♀, 19 ♂, nest is in the soil, in the forest (leg. M.G. Karaman);
Description: ♀: L= 2mm (Fig. 4b). Head, thorax, legs and petioles yellow-reddish. Surface of head from the lower edge of eyes to mandible, post-petiolus and abdomen are darker. Head and thorax longitudinally striate. Interspaces between striae punctuate. At the first abdominal segment, there is black or dark brown band.

♀: L= 4,8 mm (Fig. 4a). Head, thorax and abdomen uniformly brown. Mandibles, scapes and legs with yellow shade. Head with remarkable parallel rugae. Mesonotum and scutelum with less clearly parallel rugae. Abdomen smooth.

Remarks: nesting under the bark or in the dry tree branches, sometimes in the stone fissures, forming monoginuous colony with 100-200 ♀. Species are

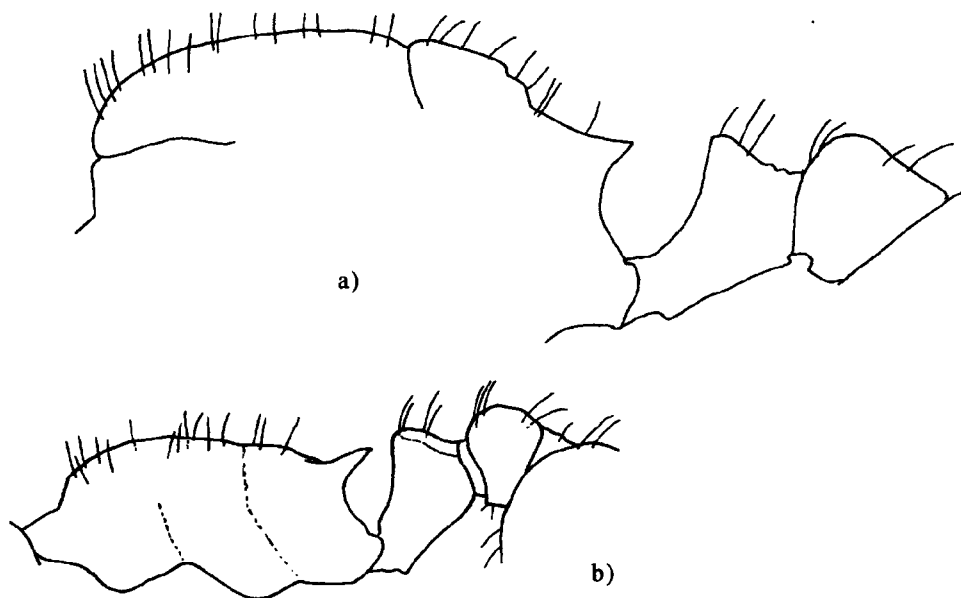


Fig. 4. *Leptothorax nylanderi* a) ♀ thorax and petiole nodes in lateral view; b) ♂ thorax and petiole nodes in lateral view (orig.).

present in South and Central Europe.

4. *Leptothorax rottenbergii* (Emery, 1870)

Macromischa Rottenbergii Emery, 1870: 199;

Leptothorax rottenbergii Bernard, 1968: 206; Baroni Urbani, 1971: 121.

Material examined: Velji Zalazi, 23.10.1998, 10 ♀, nest is under the stone, in the soil at 700 m a.s.l. (leg. M.G. Karaman);

Description: ♀: L= 4,2-4,4 mm (Fig. 5). Whole body black, with reddish shade at thorax, petiole and postpetiole. Head with longitudinal rugae between eyes, and reticule structures at genae. Thorax and petiole nodes irregularly sculptured. Propodeal spines, in dorsal view, divergent. Head and thorax shining. Femur, tibia and tarsus brown.

Remarks: nesting in the soil or in the stone fissures. Species are registered on Iberian Peninsula, in Italy and east coast of Adriatic Sea. Several subspecies are present on Sardinia, Magreb, Bulgaria and Asia Minor (Baroni Urbani, 1971).

5. *Tetramorium impurum* (Foester, 1850)

Tetramorium impurum Agosti & Collingwood, 1986b: 277; Seifert, 1996: 270.

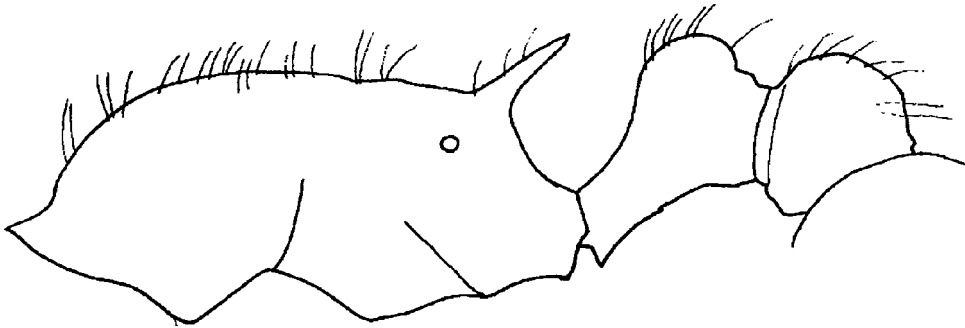


Fig. 5. *Leptothorax rottenbergii* ♀, thorax and petiole nodes in lateral view (orig.).

Material examined: Lepetane, 15.08.1991, 1 ♀ (leg. G.S. Karaman); Andrići, 30.04.1994, 19 ♀, nest in the fissure of the stone (leg. M.G. Karaman);

Description: ♀: L= 3,5-4,5 mm (Fig. 6). Body structure as in *T. caespitum* (Linné), but centre dorsum of petiole node has a smaller smooth patch, and worker are larger, in compare with *T. caespitum*.

Remarks: Kutter (1977) cited that this species is present on the coast of

Adriatic sea and in Central Europe is described as *T. staerckei* Roeszl. Seifert (1996) cited that this species is present in whole Germany.

6. *Tetramorium perspicax* Radchenko, 1992

Tetramorium caespitum st. *ferox* var. *perspicax* Santschi, 1921: 111.

Tetramorium sp. 1 Agosti & Collingwood, 1987a: 57; 1987b: 277;

Tetramorium perspicax Radchenko, 1992a: 48, Fig. 6z; 1992b: 56.

Material examined: Bijela, 10.06.1998, 9 ♀, nest is in the soil, under the bush (leg. M.G. Karaman);
Matovina, 11.06.1998, 19 ♀, nest is in the soil, on the sandy meadow (leg. M.G. Karaman);

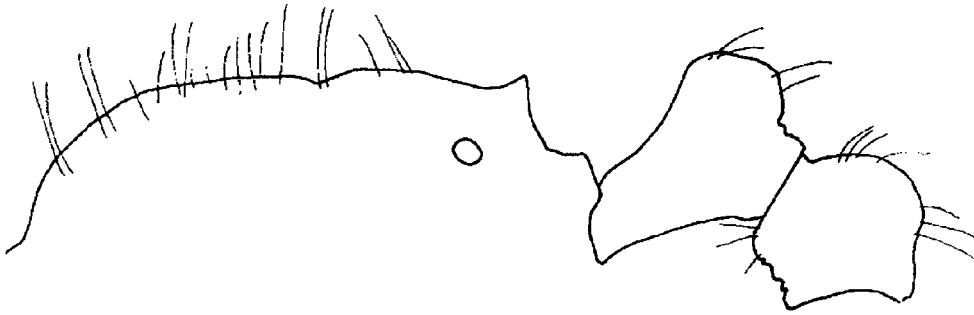


Fig. 6. *Tetramorium impurum* ♀, thorax and petiole nodes in lateral view (orig.).

Description: ♀: L=4-4,2 mm (Fig. 7). Dark brown, with some black patches. Head strongly longitudinally striated, including its ventral side. Funiculus and thorax paler than head. In dorsal view pro- and mesonotum longitudinally rugulose. Space between propodeal spines punctually structured. Petiole and postpetiole dark brown to black, coarsely rugulose on

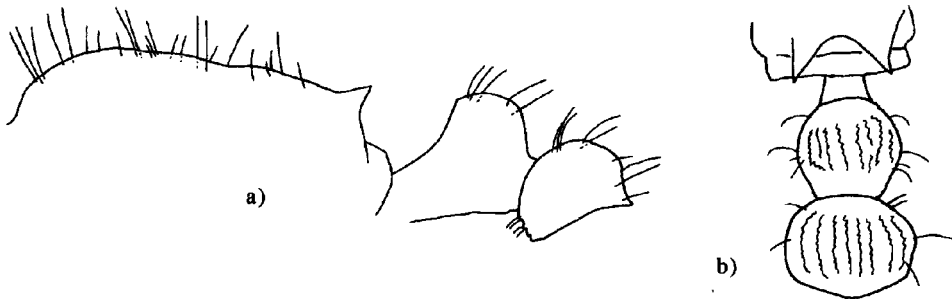


Fig. 7. *Tetramorium perspicax* ♀ a) thorax and petiole nodes in lateral view; b) petiole nodes in dorsal view.

whole surface. Gaster dark browns to black, smooth and shining. First abdominal segment covered with long hairs. On the other abdominal segments, hairs are present on posterior borders of each segment, only.

Remarks: This species is registered in Asia Minor and Caucasus (Radchenko, 1992). Agosti & Collingwood (1986) cited this species as *Tetramorium* sp.1 for Balkan (pers.com.).

7. *Tetramorium* cf. *perscipax* Radchenko, 1992

Material examined: Bijela, 10.09.1998, 20 ♀, nest in the soil, in the base of dwelling wall (leg. M. G. Karaman); Donje Polje, 11.06.1998, 2 ♀, nest is in the soil, under the dead leaves (leg. M. G. Karaman).

Description: ♀: L=2,9-3,1 mm (Fig. 8). Uniformly dark brown. Tibia and tarsus paler. In compare with *T. perscipax* Radchenko, propodeal spines are shorter, and mesopropodeal furrow shallower.

Remarks: Both species (*T. perscipax* and *T. cf. perscipax*) nesting in the soil. Entrances of the nest from the both species are raised from the ground

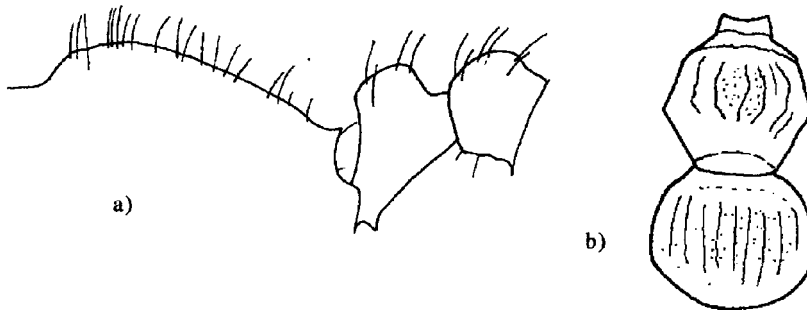


Fig. 8. *Tetramorium* cf. *perscipax* ♀, a) thorax and petiole nodes in lateral view; b) petiole nodes in dorsal view (orig.).

level about 10 cm and consist from the soil fragments.

8. *Bothriomyrmex meridionalis* (Roger, 1863)

Bothriomyrmex meridionalis Müller, 1923: 110; Agosti & Collingwood, 1987b: 279.

Material examined: Velji Zalazi, 23.10.1998, 22 ♀, under the stone, on rocky meadow (900 a.s.l.) (leg. M. G. Karaman).

Description: ♀: L= 3-3,5 mm (Fig. 9). Uniformly pale brown, with abdomen somewhat darker. Head finely punctulate, thorax somewhat stronger punctulate. Mesopropodeal furrow distinct. Whole body, except

posterior side of petiole, covered with pubescent hairs.

Remarks: Nesting in the soil, under the stone, or in the sand on the seashore. They are often in mixed colony with *Tapinoma erraticum* (Latr.).

9. *Plagiolepis vindobonensis* Lomnicki, 1925

Plagiolepis vindobonensis Lomnicki, 1925: 77; Baroni Urbani, 1971: 172; Collingwood, 1979: 110; Kutter, 1977: 189.

Material examined: Tivatsko polje, 06.1994, 3 ♀, nest is under the stone, on the seashore (leg. M. G. Karaman).

Description: ♀: L= 1,8-2,1 mm. Whole body uniformly dark brown to black. Appendages yellowish. Antennal scape exceeding occipital margin by 1/6 of its length. Funiculus segment 2 quadrate, clearly shorter than 3rd and 4th, which are subequal (Fig. 10). Body surface smooth, with scarce setae. Abdomen with setae on posterior edge of each segment.

Remarks: this species forming a small colony in the soil, under the stone, with several queens (Collingwood, 1979). Species is present in Central

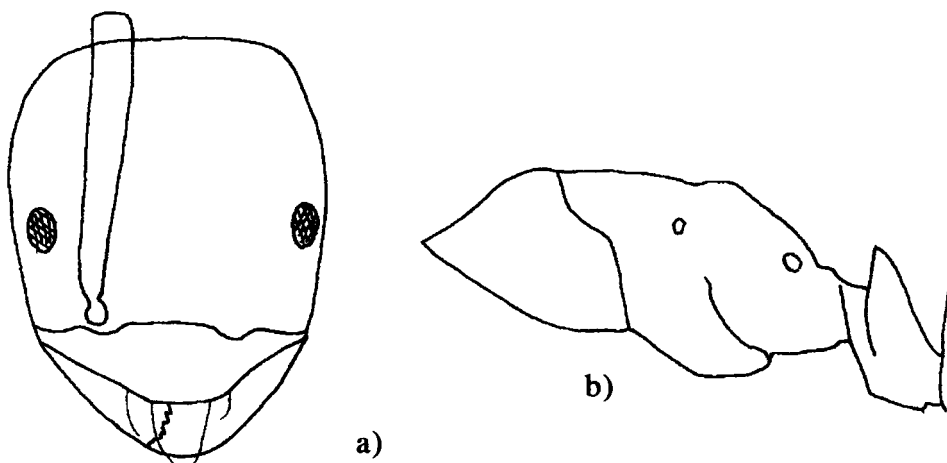


Fig. 9. *Bothriomyrmex meridionalis* ♀, a) head in front view; b) thorax and petiole in lateral view (orig.).

Europe and on Balkan Peninsula.

10. *Lasius paralienus* Seifert, 1992

Lasius paralienus Seifert, 1992: 16, figs. 5, 6, 12; Galle 1997: 211.

Material examined: Tivat, 26.03.1991, 12 ♀ (leg. G. S. Karaman).

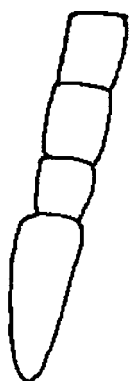


Fig. 10. *Plagiolepis vindobonensis* ♀, proximal four segments of funiculus (orig.).

Description: ♀: L= 3-4 mm (Fig. 11). Head dark reddish-brown, on occiput darker, to the mandible more reddish. Mandible, scapula and proximal segments of funicula with yellow shade, the rest of funicula reddish. Occiput with 12-15 erected hairs distributed to upper margin of eye. Erected hairs present on the front part of the head and on the clypeus, they are absent on the genae. Antenna with pubescens only, with several standing short hairs on distal end of scape. Thorax reddish-brown with many standing hairs longer than those on head. Gaster is of the same color as head.

Dorsal and ventral surface of gaster with clearly visible microrugae. The same structure presents on head and thorax. Whole body shining.

From collected specimens, 2 of them investigated morphometrically:

HL/HW = 1,079; SL/HL = 0,966; nBH = 12,2; nUH = 2,5;

Remarks: *Lasius paralienus* belongs to the *Lasius alienus* complex of species of Europe. SEIFERT (1992) asserts that the distributional center of this species is probably the Balkans. Commonly founding places are xerothermous grasslands and steppe-heath and this species has not been recorded from regions below 400m a.s.l, till now. We collected this species on locality Tivat at 10 m a.s.l., only.

11. *Camponotus oertzeni* Forel, 1888

Camponotus maculatus oertzeni Emery, 1908: 200;

Camponotus oertzeni Agosti & Collingwood, 1987a: 59; 1987b: 284; Radchenko, 1997: 809.

Material examined: Kamenari, 09.08.1988, 1 ♀ (leg. V. Karaman).

Description: ♀: L= 6 mm. Head and abdomen brownish-black. Thorax reddish-brown. Appendages yellowish-red. Head and thorax finely structured, abdomen smooth. Gene and ventral surface of head with several erected setae.

Remarks: nesting in the soil, in regions with steppe and semi-desert vegetation. Recorded in Greece, Aegean islands, Asia Minor, South Caucasus and in Iran (Radchenko, 1997).

12. *Camponotus pilicornis* (Roger, 1859)

Formica marginata var. *pilicornis* Roger, 1859: 228;

Camponotus maculatus pilicornis Emery, 1908: 197;

Camponotus pilicornis Agosti & Collingwood, 1987b: 284.

Material examined: Činovica, 08.1988, 1 ♀ (leg. G. S. Karaman);
Lepetane, 16.08.1995, 1 ♀ (leg. M. G. Karaman).

Description: ♀: L= 8-10 mm. Head and thorax dark-reddish, finely structured, shining. Masticatory border of mandible with 6 dents. Ventral surface of head with several erected hairs. Short erected setae present on genae. Abdomen black, shining, covered with long yellow hairs.

Remarks: species is registered in France, on Iberian peninsula, in Italy and on Mediterranean island (BARONI URBANI, 1971).

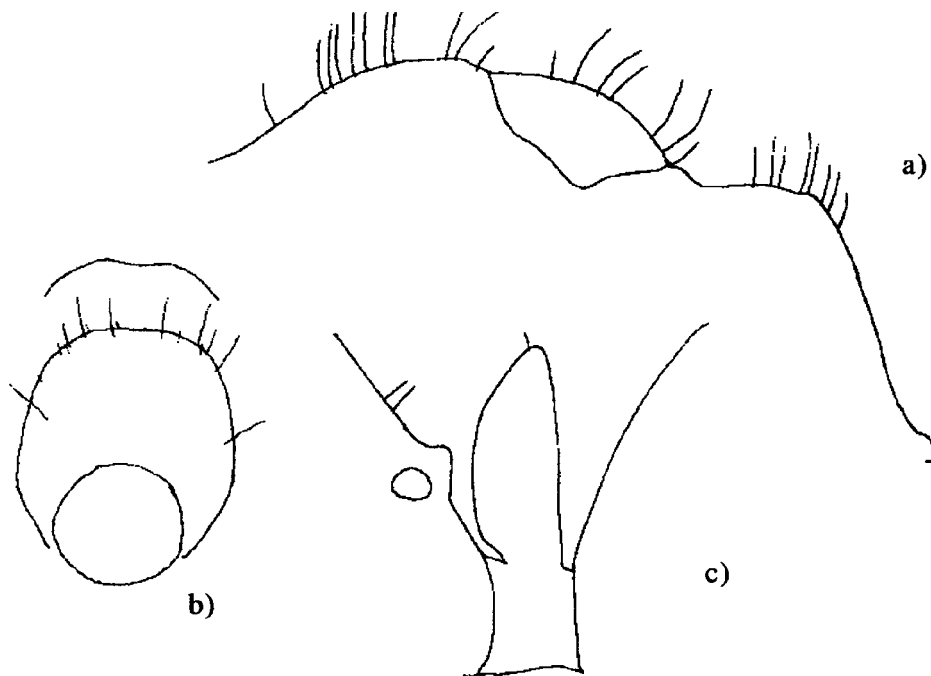


Fig. 11. *Lasius paralienus* ♀, a) thorax in lateral view, b) petiole in side view, c) petiole in lateral view (orig.).

CONCLUSION

Among 12 species presented in this paper, 11 species are new for the fauna of Boka Kotorska bay (*Crematogaster sordidula mayri*, *Leptothorax nylanderii*, *Leptothorax rottenbergii*, *Tetramorium impurum*, *T. perspicax*, *T. cf. perspicax*, *Bothriomirmex meridionalis*, *Plagiolepis vindobonensis*, *Lasius paralienus*, *Camponotus oertzeni* and *Camponotus pilicornis*), and 7 species are new for the fauna of Montenegro (*Crematogaster sordidula mayri*, *Leptothorax rottenbergii*, *Tetramorium impurum*, *T. perspicax*, *T. cf. perspicax*, *Lasius paralienus* and *Camponotus pilicornis*).

In this way, the number of 98 recent taxa of Formicidae known from Montenegro is elevated to 103 taxa.

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ПРИЛОГ ПОЗНАВАЊУ ФАУНЕ МРАВА (HYMENOPTERA, FORMICIDAE) БОКОКОТОРСКОГ ЗАЛИВА - ЦРНА ГОРА

М. КАРАМАН

И з в о д

У раду су описане 12 врста мрава, од којих су 11 нове за фауну Бококоторског залива ((*Crematogaster sordidula mayri*, *Leptothorax nylanderi*, *Leptothorax rottenbergii*, *Tetramorium impurum*, *T. perspicax*, *T. cf. perspicax*, *Bothriomirmex meridionalis*, *Plagiolepis vindobonensis*, *Lasius paralienus*, *Camponotus oertzeni* и *Camponotus pilicornis*), при чему је 7 врста нових и за фауну мрава Црне Горе (*Crematogaster sordidula mayri*, *Leptothorax rottenbergii*, *Tetramorium impurum*, *T. perspicax*, *T. cf. perspicax*, *Lasius paralienus* и *Camponotus pilicornis*). На овај начин, број врста регистрованих на територији Црне Горе повећан је на 103 таксона.

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