

THE GROUND BEETLES (COLEOPTERA: CARABIDAE) OF THE ZASAVICA SPECIAL NATURE RESERVE (SERBIA)

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Abstract

Adults of ground beetles were collected in the Zasavica Special Nature Reserve (Serbia) from 1996-2010 at 34 localities. Altogether 211 carabid specimens were caught during this period. The carabids were collected predominantly by hand, but a certain number of these beetles were captured by Barber pitfall traps. A total of 72 species and 13 subspecies from 25 genera, 50 subgenera, 15 tribes and six subfamilies were registered. The richest subfamilies according to the number of species are Harpalinae (47 species) and Carabinae (15 species). The highest number of species is found within the tribes Carabini and Harpalini (each with 14 species), while a somewhat lower number is registered in the tribe Pterostichini (13 species). Among the genera, *Carabus* Linnaeus (with 12 species), *Harpalus* Latreille (with nine species) and *Pterostichus* Bonelli (with seven species) are represented by the highest number of species.

One species new for the Serbian fauna is recorded – *Pterostichus (Bothriopterus) quadrifoveolatus* Letzner. The finding of three species and three subspecies are the second new ones for the Serbian territory. Six species and one subspecies are registered for the first time in the province of Vojvodina. Eighteen species and six subspecies of ground beetles are cited as new for western Serbia. Seventy-one species are recorded for the first time for the Zasavica Special Nature Reserve. Two species and two subspecies are protected both nationally and internationally. The fauna of ground beetles of border areas of the province of Vojvodina (especially the southern borders) and northwestern parts of Serbia is insufficiently studied so far. Only after future investigations and the discovery of additional new species for the region will the real state of diversity of this group in the area be known.

KEY WORDS: ground beetles, Carabidae, Coleoptera, diversity, Zasavica Special Nature Reserve, Serbia

Introduction

The Zasavica Special Nature Reserve belongs to the province of Vojvodina and is situated in Northern Mačva (Serbia) east of the Drina River and south of the Sava River, near the city of Sremska Mitrovica (Fig.

1). The investigated area consists of Quaternary sand and other deposits of the Sava and Drina Rivers. The main geomorphological unit is the alluvial plain of the Sava River. The area of Zasavica has a moderately continental climate. It was proclaimed a special nature reserve in 1997.

A total of 596 carabid species from 109 genera inhabit Serbia (ČURČIĆ *et al.*, 2007; GUÉORGUIEV, 2008). Our previous knowledge of the ground beetles from Zasavica is very limited. ČURČIĆ *et al.* (2007) reported just a single species from the Crna Bara locality. Other data on the group from the investigated area are lacking. The same authors noted that northern and southeastern regions of Serbia are not sufficiently studied so far (ČURČIĆ *et al.*, 2007).

Materials and Methods

The samples of ground beetles were collected mostly by hand, while certain specimens were captured by Barber pitfall traps. The second author of the study collected the carabid material analyzed in the paper over a fifteen-year-period (1996-2010). The sampling was done at localities given in both Tab. I and Fig. 1. These beetles were prepared, labelled and determined after the collecting and are deposited in the collections of the Institute of Zoology, Faculty of Biology, University of Belgrade, Belgrade, and the Nature Conservation Movement, Sremska Mitrovica. The ground beetle sample (211 specimens) from 34 localities was identified according to TRAUTNER & GEIGENMÜLLER (1987), HÜRKA (1996), TURIN *et al.* (2003) and FREUDE *et al.* (2004). The newest systematics and nomenclature were used (LÖBL & SMETANA, 2003), together with additional data from other sources (VIGNA TAGLIANTI, 2011).

Table I. Investigated localities in the Zasavica Special Nature Reserve (Serbia) (a - *Genisto elate-Quercetum roboris* association, *Leucoio-Fraxinetum angustifoliae* subassociation; b - *Rusco aculeato-Tilio-Quercetum* association on brown forest soil; c - *Brachypodio sylvatici-Quercetum roboris* association; d - *Genisto elate-Quercetum roboris* association, *Carpinetosum betuli* subassociation; e - *Carpino betuli-Quercetum roboris* association at higher altitude; f - *Rusco aculeati-Tilio-Quercetum* association on brown forest soil degraded by timber cutting; g - fragment of forest with *Genisto elate-Quercetum roboris* association at higher altitude; ar - *Fraxineto-Quercetum typicum* association with arboriculture of hybrid Euro-American poplar on moderately humid marsh chernozem).

No.	Coordinates	Locality	Sublocality	Biotope
1.	44° 55' 31.28" N 19° 28' 21.52" E	Radenković	Batar	Forest (d and e)
2.	44° 55' 43.76" N 19° 28' 26.93" E	Banovo Polje	Batar	Forest (a and c)
3.	44° 57' 10.69" N 19° 30' 27.38" E	Zasavica I	Bačevica	Forest (ar)
4.	44° 55' 01.25" N 19° 26' 36.80" E	Banovo Polje	Trebljevine	Forest (c and g)
5.	44° 54' 56.56" N 19° 25' 43.82" E	Ravnje	Prekopac	Forest (d)
6.	44° 54' 11.65" N 19° 24' 46.29" E	Crna Bara	Jovača Canal	Forest (a)
7.	44° 54' 27.85" N 19° 24' 56.15" E	Crna Bara	Drenova Greda	Forest (a and b)
8.	44° 57' 41.63" N 19° 31' 22.37" E	Zasavica II	Turske Livade	Forest (f and g)
9.	44° 55' 35.00" N 19° 26' 36.98" E	Ravnje	Panjevine	Forest (c)
10.	44° 55' 03.37" N 19° 25' 42.87" E	Ravnje	Batve	Forest (a and c)
11.	44° 54' 54.96" N 19° 25' 12.61" E	Banovo Polje	Prekojovača	Forest (a, c, d and g)
12.	44° 54' 47.30" N 19° 24' 08.23" E	Banovo Polje	Banov Brod	Forest (a and c)
13.	44° 55' 54.54" N 19° 25' 55.68" E	Ravnje	Zovik	Forest (a, c and g)

No.	Coordinates	Locality	Sublocality	Biotope (Table I – continued)
14.	44° 56' 22.23" N 19° 29' 05.61" E	Radenković	Skelice	Forest (c)
15.	44° 55' 47.69" N 19° 28' 40.72" E	Radenković	Poljane	Forest (a and c)
16.	44° 57' 07.08" N 19° 28' 51.71" E	Radenković	Vrbovac	Forest (a, b and c)
17.	44° 56' 48.71" N 19° 29' 43.23" E	Radenković	Pačija Bara	Forest (c)
18.	44° 56' 12.40" N 19° 24' 27.91" E	Ravnje	Staniševac	Forest (b and e)
19.	44° 54' 33.21" N 19° 31' 12.60" E	Glušci	Bitva	Forest (a)
20.	44° 56' 07.19" N 19° 27' 32.01" E	Ravnje	Zelena Bara	Forest (c and g)
21.	44° 57' 57.31" N 19° 33' 10.02" E	Salaš Nočajski	Ostrovac	Forest (a and c)
22.	44° 57' 26.50" N 19° 28' 26.51" E	Radenković	Vrbovac	Arboriculture (ar)
23.	44° 55' 29.50" N 19° 24' 49.99" E	Ravnje	Široka Bara	Forest (c and g)
24.	44° 56' 09.26" N 19° 30' 46.16" E	Zasavica I	Valjevac	Forest (a and c)
25.	44° 54' 38.31" N 19° 24' 36.95" E	Banovo Polje	Ribnjača Pool	Forest (c and g)
26.	44° 57' 46.06" N 19° 33' 29.52" E	Salaš Nočajski	Cerik	Forest (a, c and g)
27.	44° 54' 48.78" N 19° 24' 04.87" E	Crna Bara	Banov Brod	Forest (a, c and g)
28.	44° 55' 15.47" N 19° 25' 16.81" E	Banovo Polje	Prekopac	Forest (c)
29.	44° 54' 34.61" N 19° 24' 29.12" E	Crna Bara	Ribnjača Pool	Boscage
30.	44° 56' 01.67" N 19° 31' 20.72" E	Nočaj	Preseka	Forest (a, c and f)
31.	44° 57' 54.08" N 19° 34' 01.92" E	Salaš Nočajski	Lug	Forest (a and c)
32.	44° 57' 34.42" N 19° 32' 14.69" E	Salaš Nočajski	Sadžak	Forest (a and c)
33.	44° 56' 22.39" N 19° 26' 07.56" E	Ravnje	Bostanište	Forest (a, c, and g)
34.	44° 57' 54.86" N 19° 35' 05.12" E	Mačvanska Mitrovica	Modran	Forest (a and c)

Results and Discussion

This study contains data on 72 species and 13 subspecies of ground beetles belonging to 25 genera, 50 subgenera, 15 tribes and six subfamilies found in Zasavica by the second author of this paper (M.S.). The distribution of the species in Zasavica is shown in Fig. 1. All the recorded taxa are listed below.

The species reported herein belong to the following six subfamilies: Brachininae (with one tribe, one genus, two subgenera and three species), Carabinae (with two tribes, three genera, 13 subgenera, 15 species and 12 subspecies), Cicindelinae (with one tribe, two genera, two subgenera and three species), Harpalinae (with nine tribes, 17 genera, 29 subgenera, 47 species and one subspecies), Nebriinae (with one tribe, one genus, one subgenus and one species) and Trechinae (with one tribe, one genus, three subgenera and three species).

The highest number of species is found in the Harpalinae (47 species) and Carabinae (15 species) subfamilies, while the Carabini, Harpalini (each with 14 species) and Pterostichini (13 species) tribes are the most numerous in species. Genera *Carabus* Linnaeus (with 12 species), *Harpalus* Latreille (with nine species) and *Pterostichus* Bonelli (with seven species) have the highest number of species among all the genera analyzed.

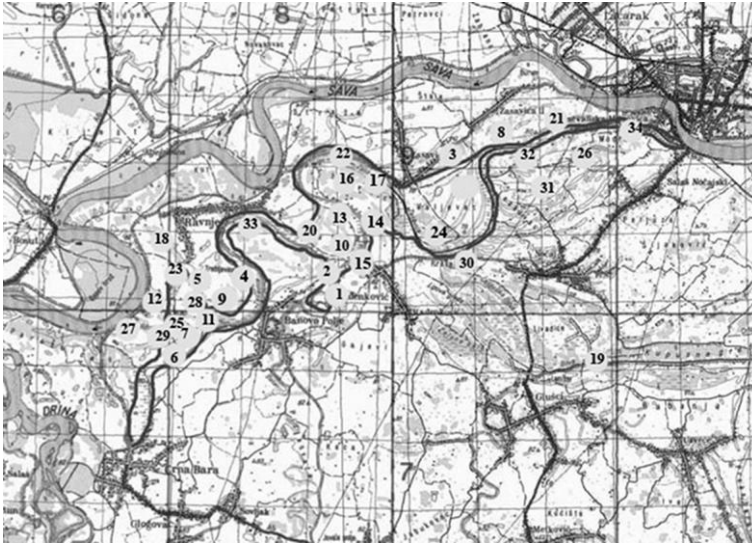


Figure 1. Distribution of the collected ground beetles from the Zasavica Special Nature Reserve (Serbia). The numbers represent serial numbers of the visited sites listed in Tab. I.

Family Carabidae

Subfamily Brachininae

Tribe Brachinini

Genus *Brachinus* Weber, 1801

1. *Brachinus (Brachinus) crepitans* (Linnaeus, 1758)

Material examined: Banov Brod, Crna Bara (1♀, 07.08.2010); Bostanište (1♀, 07.08.2009); Prekopac, Banovo Polje (1♀, 10.08.1997); Preseka (1♀, 17.09.2009); Zovik (1♀, 02.08.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, West and Central Asia, Siberia, Baikal area.

Note: Species widely distributed in Serbia.

2. *Brachinus (Brachinus) plagiatus* Reiche, 1868

Material examined: Valjevac (1♀, 02-06.08.2010).

World distribution: South Europe, Balkan Peninsula, Asia Minor, Mt. Caucasus, Iran, Syria, Northwest Africa.

Note: First data from Western Serbia.

3. *Brachinus (Brachynidius) explodens* Duftschmid, 1812

Material examined: Jovača Canal (1♀, 29.05.2006); Sadžak (1♀, 29.09.2004); Turske Livade (1♀, 25.07.2003; 1♂, 28.05.2009); Valjevac (1♀, 23.09.2009); Zovik (1♀, 02.08.2009).

World distribution: Central, South and East Europe, Balkan Peninsula, Asia Minor, Mt. Caucasus, Southwest and Central Asia, Baikal area, Siberia.

Note: Species widely distributed in Serbia.

Subfamily Carabinae

Tribe Carabini

Genus *Calosoma* Weber, 1801

4. *Calosoma (Calosoma) inquisitor* (Linnaeus, 1758)

Material examined: Ribnjača Pool, Banovo Polje (1♀, 10.08.1997); Valjevac (1♀, 03.08.2009).

World distribution: Europe, Asia Minor, Iran, North Africa, East Asia, Japan.

Note: First data from Western Serbia.

5. *Calosoma (Calosoma) sycophanta* (Linnaeus, 1758)

Material examined: Bitva (1♀, 01.08.2008); Drenova Greda (1♀, 30.07.2008).

World distribution: Europe, West Asia, Mt. Caucasus, Siberia, North Africa, North America (introduced).

Note: Species widely distributed in Serbia.

Genus *Carabus* Linnaeus, 1758

6. *Carabus (Archicarabus) montivagus montivagus* Palliardi, 1825

Material examined: Prekopac, Banovo Polje (1♀, 14.09.2009).

World distribution: Balkan Peninsula, Italy, Hungary, Slovakia.

Note: Present in Serbia except its southern part.

7. *Carabus (Carabus) granulatus interstitialis* Duftschmid, 1812

Material examined: Batve (1♂, 04.08.2010); Valjevac (1♀, 01.04.2006); Zovik (1♂, 09.09.2000).

World distribution: Austria, Italy, Corsica, Balkan Peninsula, Asia Minor.

Note: First data from western Serbia and second finding in Serbia.

8. *Carabus (Chaetocarabus) intricatus intricatus* Linnaeus, 1761

Material examined: Jovača Canal (1♂, 28.04.2006); Valjevac (1♀, 13.09.2009).

World distribution: Central Europe, France, North Italy, Balkan Peninsula.

Note: Widely distributed in Serbia. Species cited from IUCN Red List of Threatened Species (IUCN, 2011).

9. *Carabus (Eucarabus) arcensis arcensis* Herbst, 1784

Material examined: Zovik (1♂, 02.08.2009).

World distribution: Europe.

Note: First data from western Serbia for both the species and subspecies. Second finding in Serbia.

10. *Carabus (Hygrocarabus) variolosus variolosus* Fabricius, 1787

Material examined: Batve (1♂, 05.05.2010).

World distribution: Carpathian mountain range, Bulgaria, Czech Republic.

Note: First data from western Serbia. Species listed in Annexes II and IV of the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (EU, 1992).

11. *Carabus (Limnocarabus) clathratus auraniensis* Müller, 1903

Material examined: Bitva (1♂, 29.07.2008).

World distribution: Austria, Czech Republic, Hungary, France, Italy, Balkan Peninsula, Asia Minor, Mt. Caucasus, Armenia.

Note: First data from western Serbia for both the species and subspecies.

12. *Carabus (Megodontus) violaceus azurescens* Dejean, 1826

Material examined: Ostrovac (1♂, 11.05.2010); Valjevac (1♀, 03.08.2009).

World distribution: Balkan Peninsula (endemic).

Note: First data from the province of Vojvodina for the subspecies inhabiting central, western and southern parts of Serbia. Strictly protected wild subspecies by the Rulebook on the Declaration and Protection of Protected and Strictly Protected Wild Species of Plants, Animals and Fungi of the Republic of Serbia (ANONYMOUS, 2010).

13. *Carabus (Oreocarabus) hortensis hortensis* Linnaeus, 1758

Material examined: Batar, Banovo Polje (1♂, 1♀, 02.08.2010).

World distribution: Central, North and East Europe, Balkan Peninsula.

Note: First data from western Serbia.

14. *Carabus (Procerus) gigas* Creutzer, 1799

Material examined: Bačevica (1 specimen, 30.07.1997); Banov Brod, Banovo Polje (1 specimen, 13.04.2002; 1 specimen, 10.09.2009); Batar, Banovo Polje (1 specimen, 19.08.1997); Batar, Radenković (1 specimen, 11.07.1996; 1 specimen, 25.06.2000; 1 specimen, 23.08.2003); Batve (1 specimen, 01.07.2000; 1 specimen, 10.07.2010); Bitva (1 specimen, 08.08.2006; 1 specimen, 10.08.2008); Drenova Greda (1 specimen, 10.06.1998; 1 specimen, 16.06.2001); Jovača Canal (1 specimen, 10.07.1998); Ostrovac (1 specimen, 14.06.2008); Pačija Bara (1 specimen, 03.06.2005); Panjevina (1 specimen, 13.03.2009); Poljane (1 specimen, 25.07.2004); Prekojovača (1 specimen, 29.07.2002); Prekopac, Ravnje (1 specimen, 13.08.1998); Skelice (1 specimen, 14.09.2004); Staniševac (1 specimen, 19.09.2006; 1 specimen, 07.08.2008); Široka Bara (1♀, 10.08.1997); Trebljevina (1 specimen, 07.06.1997; 1 specimen, 19.09.2003; 1 specimen, 07.07.2009); Turske Livade (1 specimen, 11.05.2000); Vrbovac, Radenković (1 specimen, 11.10.2005; 1 specimen, 11.07.2010); Zelena Bara (1 specimen, 10.08.2007); Zovik (1 specimen, 17.07.2003).

World distribution: Balkan Peninsula, Austria, Italy, Hungary.

Note: Present in Serbia except its southern part.

15. *Carabus (Procrustes) coriaceus hopffgarteni* Kraatz, 1877

Material examined: Bitva (1♀, 29.07.2008); Cerik (1♂, 15.07.2006); Ribnjača Pool, Banovo Polje (1♀, 24.05.2007); Turske Livade (1♀, 30.06.2006; 1♀, 05.08.2009).

World distribution: Serbia (endemic).

Note: First data from western Serbia.

16. *Carabus (Tachypus) cancellatus intermedius* Dejean, 1826

Material examined: Banov Brod, Crna Bara (1♂, 07.08.2010); Batve (1♂, 04.08.2010); Široka Bara (1♀, 10.07.1997).

World distribution: Balkan Peninsula, Austria, Hungary.

Note: First data from western Serbia.

17. *Carabus (Tomocarabus) convexus dilatatus* Dejean, 1826

Material examined: Prekopac, Banovo Polje (1♀, 04.08.2009).

World distribution: South Europe, Balkan Peninsula, Austria, Italy.

Note: First data from western Serbia and second finding in Serbia.

Tribe Cychrini

Genus *Cychrus* Fabricius, 179418. *Cychrus semigranosus semigranosus* Palliardi, 1825

Material examined: Prekopac, Banovo Polje (1♀, 04.08.2009).

World distribution: Balkan Peninsula, Moldova, Ukraine, South Russia.

Note: Widely distributed in Serbia.

Subfamily Cicindelinae

Tribe Cicindelini

Genus *Cicindela* Linnaeus, 175819. *Cicindela (Cicindela) campestris* Linnaeus, 1758

Material examined: Turske Livade (1♀, 22.04.2007; 1♀, 23.05.2009).

World distribution: Europe, Near East, East Palaearctic, North Africa.

Note: Widely distributed in Serbia (MATIĆ, 1922; ADAMOVIĆ, 1950; DROVENIK & PEKS, 1999).

20. *Cicindela (Cicindela) hybrida* Linnaeus, 1758

Material examined: Trebljevine (1♀, 28.07.2008).

World distribution: Europe.

Note: Widely distributed in Serbia (MATIĆ, 1922; ADAMOVIĆ, 1950; DROVENIK & PEKS, 1999).

Genus *Cylindera* Westwood, 1831

21. *Cylindera (Cylindera) germanica* (Linnaeus, 1758)

Material examined: Bitva (1♀, 29.07.2008).

World distribution: Europe, East Palaearctic.

Note: Widely distributed in Serbia (MATIĆ, 1922; ADAMOVIĆ, 1950; DROVENIK & PEKS, 1999).

Subfamily Harpalinae

Tribe Chlaeniini

Genus *Chlaenius* Bonelli, 1810

22. *Chlaenius (Chlaeniellus) nigricornis* (Fabricius, 1787)

Material examined: Lug (1♀, 02.08.2006).

World distribution: Europe, Asia Minor, Kazakhstan, West Siberia, North Africa.

Note: Present in Serbia except its southern part.

23. *Chlaenius (Chlaeniellus) tristis* (Schaller, 1783)

Material examined: Lug (1♀, 20.08.2006).

World distribution: Europe, Asia Minor, Uzbekistan, Kazakhstan, Turkmenistan, Siberia, Russian Far East, North Africa.

Note: First data from western Serbia.

24. *Chlaenius (Chlaenius) festivus* (Panzer, 1796)

Material examined: Valjevac (1♂, 25.06.2010).

World distribution: Central, East and South Europe, Balkan Peninsula, Asia Minor, Mt. Caucasus, the Transcaucasian area, Iran, Israel, Central Asia, West Siberia, North Africa.

Note: First data from western Serbia.

Tribe Dryptini

Genus *Drypta* Latreille, 1796

25. *Drypta (Drypta) dentata* (Rossi, 1790)

Material examined: Zovik (1♀, 02.08.2009).

World distribution: Europe, Asia Minor, Southwest Asia, Turkmenistan, Northeast and South Africa.

Note: Present in Serbia except its southern part.

Tribe Harpalini

Genus *Harpalus* Latreille, 180226. *Harpalus (Cryptophonus) melancholicus* (Dejean, 1829)

Material examined: Prekopac, Banovo Polje (1♂, 04.08.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Iran, Turkmenistan, Algeria.

Note: First data from Western Serbia and second finding in Serbia.

27. *Harpalus (Harpalus) caspius* (Steven, 1806)

Material examined: Turske Livade (1♂, 22.07.2003).

World distribution: Central and East Europe, Balkan Peninsula, Asia Minor, Iran.

Note: First data from western Serbia and second finding in Serbia.

28. *Harpalus (Harpalus) distinguendus* (Duftschmid, 1812)

Material examined: Prekopac, Banovo Polje (1♀, 04.08.2009); Preseka (1♂, 26.07.2003); Turske Livade (1♂, 19.07.2003; 1♀, 25.07.2003; 1♀, 26.07.2003; 1♂, 22.05.2009; 1♂, 29.05.2009; 1♀, 05.07.2009; 1♀, 06.06.2010); Valjevac (1♀, 01.04.2006).

World distribution: Palaearctic.

Note: Widely distributed in Serbia.

29. *Harpalus (Harpalus) honestus* (Duftschmid, 1812)

Material examined: Jovača Canal (1♂, 28.04.2006).

World distribution: Europe, Asia Minor, Iran, Syria.

Note: Widely distributed in Serbia.

30. *Harpalus (Harpalus) hospes* Sturm, 1818

Material examined: Zelena Bara (1♀, 20.06.2007).

World distribution: Central, East and Southeast Europe, Asia Minor, Iran.

Note: First data from western Serbia.

31. *Harpalus (Harpalus) latus* (Linnaeus, 1758)

Material examined: Drenova Greda (1♂, 06.08.2010).

World distribution: Eurasia.

Note: Present in Serbia except its southern part.

32. *Harpalus (Pseudophonus) calceatus* (Duftschmid, 1812)

Material examined: Valjevac (1♀, 02-06.08.2010).

World distribution: Eurasia.

Note: Widely distributed in Serbia.

33. *Harpalus (Pseudophonus) griseus* (Panzer, 1796)

Material examined: Batar, Radenković (1♀, 29.07.2008); Prekopac, Banovo Polje (1♂, 04.08.2009); Valjevac (1♀, 05.05.2007).

World distribution: Palaearctic, Oriental Region.

Note: Widely distributed in Serbia.

34. *Harpalus (Pseudophonus) rufipes* (De Geer, 1774)

Material examined: Batve (1♂, 04.05.2007); Bitva (1♀, 29.07.2008; 1♂, 08.08.2008); Cerik (1♂, 13.06.2001); Jovača Canal (1♂, 09.07.2006; 1♀, 06.06.2007; 1♂, 30.07.2008); Lug (1♀, 20.08.2006); Prekopac, Banovo Polje (1♂, 04.08.2009; 1♂, 14.09.2009); Ribnjača Pool, Banovo Polje (1♀, 24.05.2007); Široka Bara (1♀, 06.08.2006); Turske Livade (1♀, 19.07.2003; 1♂, 20.07.2003; 1♀, 21.07.2003; 1♀, 25.07.2003; 1♂, 26.07.2003; 1♀, 27.07.2003; 1♂, 31.07.2006); Valjevac (6♂, 8♀, 02-06.08.2010).

World distribution: Palaearctic, North America (introduced).

Note: Widely distributed in Serbia.

Genus *Ophonus* Dejean, 1821

35. *Ophonus (Hesperophonus) cribricollis* (Dejean, 1829)

Material examined: Modran (1♀, 14.07.2005).

World distribution: Euro-Turanian.

Note: Widely distributed in Serbia.

36. *Ophonus (Metophonus) rupicola* (Sturm, 1818)

Material examined: Prekopac, Banovo Polje (1♀, 04.08.2009).

World distribution: Europe, Asia Minor.

Note: Widely distributed in Serbia.

37. *Ophonus (Ophonus) diffinis* (Dejean, 1829)

Material examined: Prekopac, Banovo Polje (1♀, 04.08.2009).

World distribution: Europe (except its north), Asia Minor, Iran, Israel, Lebanon.

Note: First data from western Serbia.

38. *Ophonus (Ophonus) sabulicola* (Panzer, 1796)

Material examined: Turske Livade (1♀, 27.05.2009).

World distribution: Europe, Asia Minor, Iran, Iraq, Israel, Syria.

Note: First data from the province of Vojvodina and western Serbia.

Genus *Stenolophus* Dejean, 1821

39. *Stenolophus (Stenolophus) teutonius* (Schrank, 1781)

Material examined: Batar, Radenković (1♂, 19.06.2002).

World distribution: Europe, Asia Minor, Transcaspiian area, Israel, Syria, Turkmenistan, North Africa.

Note: Widely distributed in Serbia.

Tribe Lebiini

Genus *Demetrias* Bonelli, 1810

40. *Demetrias (Demetrias) atricapillus* (Linnaeus, 1758)

Material examined: Trebljevine (1♀, 28.07.2008).

World distribution: Europe, Asia Minor, Syria, Israel, Northwest Africa.

Note: First data from the province of Vojvodina and western Serbia.

Tribe Licinini

Genus *Badister* Clairville, 1806

41. *Badister (Badister) unipustulatus* Bonelli, 1813

Material examined: Jovača Canal (1♂, 09.09.2007); Prekopac, Banovo Polje (1♀, 04.08.2009).

World distribution: Europe, Asia Minor, Kazakhstan, Uzbekistan, West Siberia.

Note: First data from western Serbia.

42. *Badister (Baudia) collaris* Motschulsky, 1844

Material examined: Prekopac, Banovo Polje (1♂, 04.08.2009).

World distribution: Palaearctic.

Note: First data from western Serbia.

Tribe Platynini

Genus *Agonum* Bonelli, 1810

43. *Agonum (Agonum) gisellae* Csiki, 1931

Material examined: Prekopac, Ravnje (1♀, 10.08.1998).

World distribution: Central and South Europe, Asia Minor, Mt. Caucasus, Iran.

Note: First data from the province of Vojvodina and western Serbia.

44. *Agonum (Agonum) longicorne* Chaudoir, 1846

Material examined: Trebljevine (1♂, 28.07.2008).

World distribution: Austria, Hungary, France, Germany, Italy, Ukraine, Balkan Peninsula, Asia Minor, Mt. Caucasus.

Note: First data from the province of Vojvodina and western Serbia. Second finding in Serbia.

45. *Agonum (Agonum) lugens* (Duftschmid, 1812)

Material examined: Zovik (1♂, 02.08.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Iran, Central Asia, North Africa.

Note: First data from the province of Vojvodina and western Serbia.

46. *Agonum (Agonum) marginatum* (Linnaeus, 1758)

Material examined: Valjevac (1♀, 05.08.2006).

World distribution: Europe, Asia Minor, North Africa.

Note: First data from western Serbia.

47. *Agonum (Agonum) sexpunctatum* (Linnaeus, 1758)

Material examined: Zovik (1♂, 1♀, 02.08.2009).

World distribution: Eurasia.

Note: Widely distributed in Serbia.

Genus *Anchomenus* Bonelli, 1810

48. *Anchomenus (Anchomenus) dorsalis* (Pontoppidan, 1763)

Material examined: Turske Livade (1♂, 24.07.2003; 1♀, 22.05.2009); Zovik (1♀, 02.08.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Near East, Central Asia, Siberia, Morocco.

Note: Widely distributed in Serbia.

Genus *Limodromus* Motschulsky, 1864

49. *Limodromus assimilis* (Paykull, 1790)

Material examined: Prekopac, Banovo Polje (1♂, 04.08.2009); Turske Livade (2♂, 29.05.2009; 1♂, 09.06.2010); Valjevac (1♀, 30.06.2006).

World distribution: Eurasia.

Note: Present in Serbia except its southern part.

Tribe Pterostichini

Genus *Abax* Bonelli, 1810

50. *Abax (Abacopercus) carinatus* (Duftschmid, 1812)

Material examined: Valjevac (3♀, 02-06.08.2010).

World distribution: Central and southeast Europe, Italy, Asia Minor.

Note: Widely distributed in Serbia.

51. *Abax (Abax) parallelus* (Duftschmid, 1812)

Material examined: Cerik (1♀, 13.06.2001).

World distribution: west, central and southeast Europe.

Note: Present in Serbia except its southern part.

Genus *Molops* Bonelli, 1810

52. *Molops (Molops) piceus balcanicus* Mlynář, 1977

Material examined: Valjevac (1♂, 03.09.2009).

World distribution: Balkan Peninsula (endemic).

Note: Present in Serbia except its eastern part. Strictly protected wild subspecies by the Rulebook on the Declaration and Protection of Protected and Strictly Protected Wild Species of Plants, Animals and Fungi of the Republic of Serbia (ANONYMOUS, 2010).

Genus *Poecilus* Bonelli, 1810

53. *Poecilus (Macropoecilus) lepidus* (Leske, 1785)

Material examined: Valjevac (1♂, 03.08.2009).

World distribution: Europe, Siberia, northeast China.

Note: Present in Serbia except its southern part.

54. *Poecilus (Poecilus) cupreus* (Linnaeus, 1758)

Material examined: Trebljevine (2♂, 28.07.2008).

World distribution: Europe, Asia Minor, Mt. Caucasus, Syria, Central Asia, Siberia.

Note: Widely distributed in Serbia.

Genus *Pterostichus* Bonelli, 1810

55. *Pterostichus (Bothriopterus) oblongopunctatus* (Fabricius, 1787)

Material examined: Prekopac, Banovo Polje (1♂, 04.08.2009).

World distribution: Europe, Mt. Caucasus, Siberia, Transbaikal area, Japan.

Note: Widely distributed in Serbia.

56. *Pterostichus (Bothriopterus) quadrifoveolatus* Letzner, 1852

Material examined: Valjevac (1♀, 23.09.2009).

World distribution: Europe, East Palaearctic.

Note: New species for Serbian fauna.

57. *Pterostichus (Cophosus) cylindricus* (Herbst, 1784)

Material examined: Prekopac, Banovo Polje (1♂, 04.08.2009); Preseka (1♂, 07.08.2009); Ribnjača Pool, Crna Bara (1♂, 22.07.2010); Turske Livade (1♂, 21.07.2003; 1♀, 30.06.2006; 1♂, 22.04.2007).

World distribution: Central and east Europe, Balkan Peninsula, Asia Minor.

Note: Present in Serbia except its southern part. It was already noted from the Zasavica Special Nature Reserve (Crna Bara) (ČURČIĆ *et al.*, 2007).

58. *Pterostichus (Morphnosoma) melanarius* (Illiger, 1798)

Material examined: Drenova Greda (1♀, 05.08.2009); Prekopac, Banovo Polje (1♂, 04.08.2009); Sadžak (1♂, 23.06.2000); Široka Bara (1♂, 06.06.2006; 1♂, 25.05.2010); Turske Livade (2♀, 20.07.2003; 1♂, 23.07.2003; 1♀, 24.07.2003; 1♀, 30.06.2006); Valjevac (2♂, 1♀, 02-06.08.2010).

World distribution: Europe, Siberia, North America (introduced).

Note: Present in Serbia except its southern part.

59. *Pterostichus (Platysma) niger* (Schaller, 1783)

Material examined: Turske Livade (1♂, 30.06.2006; 1♀, 08.07.2007; 1♂, 24.05.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Siberia, Iran, Central Asia.

Note: Present in Serbia except its southern part.

60. *Pterostichus (Pseudomaseus) anthracinus* (Illiger, 1798)

Material examined: Bitva (1♀, 29.07.2008); Trebljevine (1♂, 28.07.2008); Valjevac (1♀, 01.04.2006; 1♂, 11.06.2006).

World distribution: Europe, Asia Minor, Mt. Caucasus, West Siberia, Iran, Kyrgyzstan.

Note: Present in Serbia except its southern part.

61. *Pterostichus (Pseudomaseus) nigrita* (Paykull, 1790)

Material examined: Turske Livade (1♂, 23.05.2009; 1♂, 28.05.2009); Valjevac (1♂, 13.09.2009; 1♀, 23.09.2009).

World distribution: Palaearctic.

Note: First data from the province of Vojvodina.

Genus *Stomis* Clairville, 1806

62. *Stomis (Stomis) pumicatus* (Panzer, 1796)

Material examined: Prekopac, Banovo Polje (1♀, 14.09.2009); Valjevac (1♀, 23.09.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, North America (introduced).

Note: Present in Serbia except its southern part.

Tribe Sphodrini

Genus *Calathus* Bonelli, 181063. *Calathus (Calathus) fuscipes* (Goeze, 1777)

Material examined: Sadžak (1♀, 06.05.2006); Turske Livade (1♀, 28.05.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Iran, North Africa, North America (introduced).

Note: Widely distributed in Serbia.

64. *Calathus (Neocalathus) melanocephalus* (Linnaeus, 1758)

Material examined: Batve (1♀, 05.05.2010); Prekopac, Banovo Polje (1♀, 04.08.2009); Turske Livade (1♀, 12.05.2009).

World distribution: Europe, Asia Minor, Mt. Caucasus, Siberia, Central Asia, North Africa.

Note: Widely distributed in Serbia.

Tribe Zabryni

Genus *Amara* Bonelli, 181065. *Amara (Amara) aenea* (De Geer, 1774)

Material examined: Turske Livade (1♂, 02.05.2009).

World distribution: Palaearctic, Afrotropical Region (introduced), North America (introduced).

Note: Widely distributed in Serbia.

66. *Amara (Amara) montivaga* Sturm, 1825

Material examined: Turske Livade (1♀, 16.05.2010).

World distribution: Europe, Mt. Caucasus, Siberia, Central Asia.

Note: Present in Serbia except its central part.

67. *Amara (Amara) saphyrea* Dejean, 1828

Material examined: Turske Livade (1♀, 22.07.2006).

World distribution: Central, east and southeast Europe.

Note: Present in Serbia except its southern part.

68. *Amara (Amara) similata* (Gyllenhal, 1810)

Material examined: Turske Livade (1♂, 27.05.2009).

World distribution: Palaearctic.

Note: Present in Serbia except its southern part.

Subfamily Nebriinae

Tribe Nebriini

Genus *Nebria* Latreille, 180269. *Nebria (Nebria) brevicollis* (Fabricius, 1792)

Material examined: Jovača Canal (1♀, 28.04.2006).

World distribution: Europe, Asia Minor, Mt. Caucasus, Iran, North America (introduced).

Note: Widely distributed in Serbia.

Subfamily Trechinae

Tribe Bembidiini

Genus *Bembidion* Latreille, 180270. *Bembidion (Bembidionetolitzkya) tibiale* (Duftschmid, 1812)

Material examined: Bitva (1♀, 29.07.2008); Prekopac, Banovo Polje (1♂, 14.09.2009); Široka Bara (1♂, 08.05.2007).

World distribution: Europe, Asia Minor.

Note: First data from western Serbia.

71. *Bembidion (Metallina) lampros* (Herbst, 1784)

Material examined: Valjevac (1♂, 02-06.08.2010).

World distribution: Palaearctic.

Note: Widely distributed in Serbia.

72. *Bembidion (Peryphus) tetracolum* Say, 1823

Material examined: Zovik (1♀, 02.08.2009).

World distribution: Europe, Asia Minor, West Siberia, North Africa, North America (introduced).

Note: Widely distributed in Serbia.

A single species is new for the carabidofauna of Serbia – *Pterostichus (Bothriopterus) quadrifoveolatus* Letzner. Some taxa are rare in Serbia and our findings are the second ones for the territory of the country: *Harpalus (Cryptophonus) melancholicus* (Dejean), *H. (Harpalus) caspius* (Steven), *Agonum (Agonum) longicorne* Chaudoir, *Carabus (Carabus) granulatus interstitialis* Duftschmid, *C. (Eucarabus) arcensis arcensis* Herbst and *C. (Tomocarabus) convexus dilatatus* Dejean. Additionally, in the paper six species [*Ophonus (Ophonus) sabulicola* (Panzer), *Demetrius (Demetrius) atricapillus* (Linnaeus), *Agonum (Agonum) gisellae* Csiki, *A. (A.) longicorne* Chaudoir, *A. (A.) lugens* (Duftschmid) and *Pterostichus (Pseudomaseus) nigrata* (Paykull)] and a subspecies [*Carabus (Megodontus) violaceus azurescens* Dejean] are recorded in the province of Vojvodina for the first time. Furthermore, eighteen species and six subspecies of carabids are

cited here as new for western Serbia. Seventy-one species are recorded for the first time for the Zasavica Special Nature Reserve.

As far as endemics are concerned, one Serbian endemic subspecies [*Carabus (Procrustes) coriaceus hopffgarteni* Kraatz] and two Balkan endemic subspecies [*Carabus (Megodontus) violaceus azurescens* Dejean and *Molops (Molops) piceus balcanicus* Mlynář] were found in the area studied.

Table II. Review of registered protected species and subspecies in Zasavica, with status of the protection and/or endangerment (RDPW - subspecies protected by the Rulebook on the Declaration and Protection of Protected and Strictly Protected Wild Species of Plants, Animals and Fungi of the Republic of Serbia; IUCN - species from the IUCN Red List of Threatened Species; EU - species included in the Council Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora; SP - strictly protected subspecies; LR - lower risk; NT - near threatened species; Ann. II - species of community interest whose conservation requires the designation of special areas of conservation; Ann. IV - species of community interest in need of strict protection).

Species/Subspecies	RDPW	IUCN	EU
<i>Carabus (Chaetocarabus) intricatus</i> Linnaeus, 1761	-	LR/NT	-
<i>Carabus (Hygrocarabus) variolosus</i> Fabricius, 1787	-	-	Ann. II and IV
<i>Carabus (Megodontus) violaceus azurescens</i> Dejean, 1826	SP	-	-
<i>Molops (Molops) piceus balcanicus</i> Mlynář, 1977	SP	-	-

In the territory of Zasavica, two species [*Carabus (Chaetocarabus) intricatus* Linnaeus and *C. (Hygrocarabus) variolosus* Fabricius] and two subspecies of ground beetles [*Carabus (Megodontus) violaceus azurescens* Dejean and *Molops (Molops) piceus balcanicus* Mlynář] are recognized as taxa protected both nationally (ANONYMOUS, 2010) and internationally (EU, 1992; IUCN, 2011) (Tab. II).

Conclusions

Altogether 72 species and 13 subspecies from 25 genera, 50 subgenera, 15 tribes and six subfamilies of ground beetles are recorded from the Zasavica Special Nature Reserve so far, representing almost one eighth (12.08%) and one fourth (22.94%) of the total number of species and genera of ground beetles in Serbia, respectively (ĆURČIĆ *et al.*, 2007; GUÉORGUIEV, 2008). Zasavica occupies an area of approximately 670 ha, so the registered number of carabid taxa is high for such a small area.

The presence of numerous forest carabid species (especially the ones belonging to the genera *Carabus* Linnaeus and *Pterostichus* Bonelli) at localities in Zasavica is explainable by the presence of conserved deciduous forests in the area (especially with oak), the richness of plant associations and soil types, and the border position of the site between the Pannonian Plain in the province of Vojvodina and the Mačva region in Serbia. Therefore, the total number of forest, endemic and rare species is relatively high as compared with most localities from the province of Vojvodina and some other similar regions in Serbia. Both northern and western parts of the country are not yet thoroughly studied, so the findings of new taxa for the areas were expected. In the territory of the reserve we found four carabid taxa protected by both national and international legislation.

The current richness of ground beetles of Zasavica is not completely known. We therefore may expect findings of new taxa for the site and country in future.

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ТРЧУЉЦИ (COLEOPTERA: CARABIDAE) СПЕЦИЈАЛНОГ РЕЗЕРВАТА ПРИРОДЕ „ЗАСАВИЦА“ (СРБИЈА)

СРЕЋКО ЂУРЧИЋ и МИХАЈЛО СТАНКОВИЋ

Извод

Адулти трчуљака су сакупљани у оквиру Специјалног резервата природе „Засавица“ (Србија) од 1996. до 2010. године са укупно 34 локалитета. Током тог периода сакупљено је укупно 211 јединки трчуљака углавном ручно, али је одређен број јединки ухваћен и уз помоћ Барберових клопки. Регистровано је укупно 72 врсте и 13 подврста класификованих у 25 родова, 50 подродова, 15 трибуса и 6 подфамилија. Најбогије потпородице по броју врста су Harpalinae (47 врста) и Carabinae (15 врста). Највећи број врста је евидентиран у оквиру трибуса Carabini и Harpalini (по 14 врста из сваког од њих), док је нешто мањи број врста констатован у оквиру трибуса Pterostichini (13 врста). Када су родови у питању, *Carabus* Linnaeus (са 12 врста), *Harpalus* Latreille (са 9 врста) и *Pterostichus* Bonelli (са 7 врста) су са највећим бројем регистрованих врста.

Pterostichus (Bothriopterus) quadrioveolatus Letzner представља врсту нову за фауну карабида Србије. Три врсте и три подврсте су по други пут евидентирани на територији Србије. Шест врста и једна подврста је констатовано по први пут у фауни Војводине. Поред тога, 18 врста и 6 подврста трчуљака је ново за фауну западне Србије. Укупно 71 врста трчуљака је нова за територију Специјалног резервата природе „Засавица“. Две врсте и две подврсте заштићене су на међународном и националном нивоу. Фауна трчуљака граничних подручја Аутономне Покрајине Војводине (посебно јужних) и северозападних делова Србије је до сада недовољно студирана. Након будућих истраживања и открића других нових врста за фауну региона биће познато право стање разноврсности трчуљака у испитиваној области.

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