

**PREDACEOUS DIVING BEETLES (COLEOPTERA: DYTISCIDAE) FROM MONTENEGRO
WITH NEW RECORDS AND DESCRIPTION OF THE FEMALE OF
HYDROPORUS MACEDONICUS FERY & PEŠIĆ, 2006**

ANA PAVIĆEVIĆ and V. PEŠIĆ

Department of Biology, University of Montenegro, 81000 Podgorica, Montenegro

Abstract – This paper deals with the aquatic beetle species of the family Dytiscidae collected from various freshwaters habitats in Montenegro. In total 39 water beetle species were collected from 56 localities in Montenegro between 2007 and 2010. Twelve species and one subspecies are reported for the first time for Montenegro: *Agabus sturmii* (Gyllenhal, 1808), *A. paludosus* (Fabricius, 1801), *Deronectes moestus inconspectus* (Leprieur, 1876), *D. platynotus* (Germar, 1834), *Dytiscus circumcinctus* Ahrens, 1811, *D. dimidiatus* Bergsträsser, 1778, *Hydroporus macedonicus* Fery & Pešić, 2006, *H. pubescens* (Gyllenhal, 1808), *Ilybius chalconatus* (Panzer, 1797), *I. fuliginosus fuliginosus* (Fabricius, 1792), *I. pseudoneglectus* (Franciscolo, 1972), *Liopterus haemorrhoidalis* (Fabricius, 1787) and *Nebrioporus luctuosus* (Aubé, 1838). The female genitalia of *Hydroporus macedonicus* Fery & Pešić, 2006, a rare water beetle previously known only from southern Macedonia, are illustrated. The present state of knowledge of the Montenegrin diving beetle fauna and its ecological characteristics is discussed.

Key words: Coleoptera, Dytiscidae, faunistics, new records, Montenegro

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INTRODUCTION

Water beetles of the family Dytiscidae are cosmopolitan in distribution, but reach their highest diversity in the tropical climatic zone. Knowledge of the fauna of diving beetles of the family Dytiscidae from Montenegro is still limited and only a few papers deal with the diversity of this group (e.g., Guéorguiev, 1971; Mikšić, 1977; Pešić and Pavićević, 2005). Pešić (2008) listed 51 species of Dytiscidae in 23 genera in his checklist of diving beetles of Montenegro.

During a survey of the aquatic beetle fauna of Montenegro, 40 diving beetle species of the Dytiscidae were collected, including 12 species and one subspecies new for national fauna. The aim of this paper is to contribute to the knowledge about the

diversity of predaceous diving beetles (Dytiscidae) and their current geographic distribution in Montenegro.

MATERIAL AND METHODS

The study of diving beetles was carried out on material collected from 56 sampling localities in different types of water bodies: 18 springs, 11 rivers, 13 streams, 4 lakes, 1 pool, 6 ponds and 1 flood meadow, from 2007 to 2010. The basic features of the sampling sites are presented in Table 1. Aquatic beetles were collected by hand netting. The beetles were sorted on the spot from other living material and conserved in 70% alcohol. The specimens were investigated under the stereomicroscope in order to remove their aedeagus by dissecting needles, after which they were kept for one to two hours in 10% KOH solution.

Materials have been deposited in the University of Montenegro, Department of Biology, Podgorica and partly in the collection of Hans Fery (Berlin). The following abbreviations are used in the text: TL: total body length; TL-H: total length without head; MW: maximum body width; WPr: width of pronotum at base; IOD: interocular distance.

RESULTS

Systematics

Liopterus Dejean, 1833

1. *Liopterus haemorrhoidalis* (Fabricius, 1787)
Material examined: MNE 15 (7 specimens).
Remarks: New for fauna of Montenegro.
Distribution: Palaearctic.

Laccophilus Leach, 1817

2. *Laccophilus hyalinus* (De Geer, 1774)
Material examined: MNE2 (2 specimens); MNE8 (21 specimens); MNE16 (2 specimens); MNE25 (19 specimens); MNE30 (4 specimens); MNE40 (19 specimens); MNE52 (10 specimens); MNE55 (1 specimen).
Distribution: Palaearctic.
3. *Laccophilus minutus* (Linnaeus, 1758)
Material examined: MNE15 (1 specimen).
Distribution: Palaearctic.
4. *Laccophilus poecilus* Klug, 1834
Material examined: MNE15 (2 specimens).
Distribution: Palaearctic.

Bidessus Sharp, 1882

- 5 *Bidessus muelleri* Zimmermann, 1927
Material examined: MNE2 (38 specimens); MNE 15 (3 specimens); MNE16 (2 specimens); MNE40 (1 specimen).
Distribution: Mediterranean.

Hydroglyphus Motschulsky, 1853

6. *Hydroglyphus geminus* (Fabricius, 1792)
Material examined: MNE2 (5 specimens); MNE15 (4 specimens); MNE16 (5 specimens); MNE29 (2 specimens); MNE30 (2 specimens); MNE40 (7 specimens); MNE45 (4 specimens); MNE 48 (2 specimens).
Distribution: Palaearctic.

Hygrotus Stephens, 1828

7. *Hygrotus inaequalis* (Fabricius, 1776)
Material examined: MNE3 (4 specimens); MNE14 (9 specimens); MNE 15 (3 specimens).
Distribution: Palaearctic.

Hydroporus Clairville, 1806

8. *Hydroporus discretus* Fairmaire & Brisout de Barneville, 1859
Material examined: MNE7 (8 specimens).
Distribution: Western Palaearctic.
9. *Hydroporus dobrogeanus* Ieniște, 1962
Material examined: MNE 18 (14 specimens); MNE47 (1 specimen); MNE 44 (1 specimens).
Distribution: Mediterranean.
10. *Hydroporus joncus* L. Miller, 1862
Material examined: MNE2 (1 specimen); MNE5 (2 specimens); MNE10 (1 specimen); MNE46 (2 specimens).
Distribution: Mediterranean.
11. *Hydroporus macedonicus* Fery & Pešić, 2006
Material examined: MNE 21 (3 specimens).
Remarks: This species was so far only known from two male specimens from the *locus typicus* in southern Macedonia (Kožuf Mountain, rheohelocrenic spring near village Konopište, Fery and Pešić, 2006). The specimen from Montenegro agrees with the original description, and the collected females are externally similar to males. For an analysis of the di-

agnostic characters of *H. macedonicus* see Fery and Pešić (2006). Gonocoxae as in Fig. 1A, gonocoxosterna as in Fig. 1B. The female has the following values: TL = 3.2 mm; TL-H = 2.7 mm; MW = 1.7 mm; WPr = 1.45 mm; IOD = 0.6 mm.

Distribution: Macedonia, Montenegro.

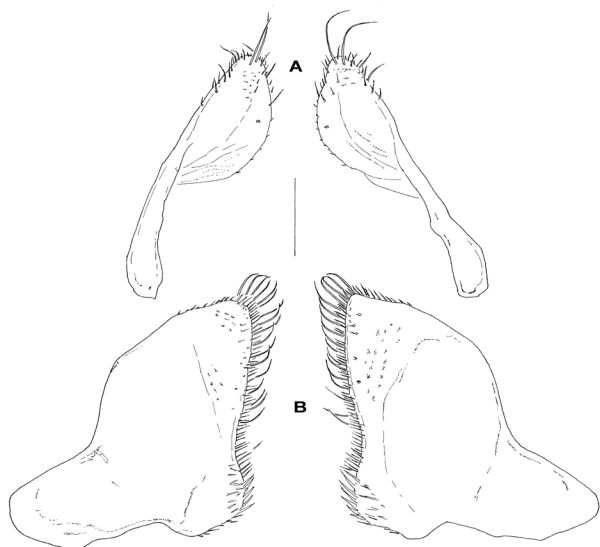


Fig. 1A-B: *Hydroporus macedonicus*, female: gonocoxae (A) and gonocoxosternum (B).

12. *Hydroporus palustris* (Linnaeus, 1761)

Material examined: MNE5 (1 specimen); MNE6 (1 specimen); MNE11 (2 specimens); MNE12 (2 specimens); MNE22 (1 specimen); MNE28 (2 specimens); MNE29 (2 specimens).

Distribution: Palaearctic.

13. *Hydroporus pubescens* (Gyllenhal, 1808)

Material examined: MNE1 (2 specimens); MNE6 (2 specimens); MNE7 (52 specimens); MNE9 (1 specimen); MNE14 (4 specimens); MNE17 (10 specimens); MNE19 (13 specimens); MNE20 (30 specimens); MNE21 (19 specimens); MNE25 (6 specimens); MNE39 (5 specimens); MNE42 (2 specimens); MNE43 (16 specimens); MNE44 (2 specimens); MNE47 (5 specimens).

Remarks: New for fauna of Montenegro.

Distribution: Palaearctic.

14. *Hydroporus tessellatus* (Drapiez, 1819)

Material examined: MNE4 (2 specimens); MNE5 (4 specimens); MNE7 (29 specimens); MNE20 (5 specimens); MNE43 (10 specimens); MNE47 (4 specimens).

Distribution: Western Palaearctic.

Graptodytes Seidlitz, 1887

15. *Graptodytes pictus* (Fabricius, 1787)

Material examined: MNE8 (2 specimens), MNE 16 (4 specimens).

Distribution: Europe.

16. *Graptodytes veterator* (Zimmermann, 1918)

Material examined: MNE1 (57 specimens); MNE2 (21 specimens); MNE10 (6 specimens); MNE 14 (8 specimens); MNE35 (9 specimens); MNE 51 (3 specimens).

Distribution: Mediterranean.

Oreodytes Seidlitz, 1887

17. *Oreodytes davisii davisii* (Curtis, 1831)

Material examined: MNE 31 (2 specimens).

Distribution: Europe.

18. *Oreodytes sanmarkii* (C. R. Sahlberg, 1826)

Material examined: MNE 41 (1 specimen).

Distribution: Palaearctic.

19. *Oreodytes septentrionalis* (Gyllenhal, 1826)

Material examined: MNE 50 (2 specimens).

Distribution: Europe.

Deronectes Sharp, 1882

20. *Deronectes latus* (Stephens, 1828)

Material examined: MNE 26 (2 specimens); MNE 33 (3 specimens).

Distribution: Europe.

21. *Deronectes moestus inconspectus* (Leprieur, 1876)

Material examined: MNE6 (1 specimen); MNE13 (3 specimens); MNE14 (2 specimens); MNE42 (1 specimen); MNE 44 (2 specimens).

Remark: New for fauna of Montenegro.
Distribution: Mediterranean.

22. *Deronectes platynotus* (Germar, 1834)
Material examined: MNE17 (3 specimens); MNE27 (1 specimen).
Remark: New for fauna of Montenegro.
Distribution: Europe.

Scarodytes Gozis, 1914

23. *Scarodytes halensis halensis* (Fabricius, 1787)
Material examined: MNE 6 (4 specimens); MNE8 (3 specimens); MNE13 (4 specimens); MNE19 (2 specimens); MNE29 (12 specimens); MNE43 (5 specimens); MNE52 (2 specimens); MNE56 (2 specimens).
Distribution: Palaearctic.

Nebrioporus Règimbart, 1906

24. *Nebrioporus luctuosus* (Aubé, 1838)
Material examined: MNE36 (1 specimen)
Remarks: New for fauna of Montenegro.
Distribution: Palaearctic.

Platambus Thomson, 1859

25. *Platambus maculatus* (Linnaeus, 1758)
Material examined: MNE 6 (11 specimens); MNE8 (19 specimens); MNE11 (4 specimens); MNE32 (6 specimens); MNE49 (3 specimens); MNE55 (6 specimens).
Distribution: Palaearctic.

Agabus Leach, 1817

26. *Agabus bipustulatus* (Linnaeus, 1767)
Material examined: MNE1 (5 specimens); MNE2 (4 specimens); MNE3 (2 specimens); MNE5 (3 specimens); MNE6 (2 specimens); MNE7 (3 specimens); MNE8 (5 specimens); MNE9 (11 specimens); MNE10 (11 specimens); MNE15 (4 specimens); MNE19 (12 specimens); MNE20 (3 specimens); MNE21 (6 specimens); MNE29 (1 specimen); MNE43 (5 specimens); MNE44 (3

specimens); MNE 47 (1 specimen); MNE56 (2 specimens).
Distribution: Palaearctic.

27. *Agabus biguttatus* (Olivier, 1795)
Material examined: MNE11 (2 specimens); MNE28 (4 specimens).
Distribution: Palaearctic.

28. *Agabus guttatus guttatus* (Paykull, 1798)
Material examined: MNE5 (4 specimens); MNE7 (2 specimens); MNE11 (4 specimens); MNE13 (1 specimen); MNE21 (1 specimen); MNE23 (3 specimens); MNE24 (2 specimens); MNE37 (6 species); MNE39 (7 species); MNE43 (2 specimens); MNE44 (3 specimens); MNE53 (4 specimens); MNE54 (2 specimens); MNE56 (2 specimens).
Distribution: Western Palaearctic.

29. *Agabus nebulosus* (Forster, 1771)
Material examined: MNE 7 (1 specimen); MNE19 (1 specimen).
Distribution: Mediterranean.

30. *Agabus paludosus* (Fabricius, 1801)
Material examined: MNE29 (1 specimen).
Remarks: New for fauna of Montenegro.
Distribution: Western Palaearctic.

31. *Agabus sturmii* (Gyllenhal, 1808)
Material examined: MNE 22 (1 specimen); MNE 28 (1 specimen).
Remarks: New for fauna of Montenegro.
Distribution: Palaearctic.

Ilybius Erichson, 1832

32. *Ilybius chalconatus* (Panzer, 1797)
Material examined: MNE32 (2 specimens); MNE 42 (4 specimens).
Remarks: New for fauna of Montenegro.
Distribution: Palaearctic.

33. *Ilybius fuliginosus fuliginosus* (Fabricius, 1792)
Material examined: MNE6 (5 specimens); MNE7 (2 specimens); MNE8 (3 specimens); MNE20 (2 speci-

mens); MNE21 (1 specimen); MNE25, (1 specimen); MNE29 (15 specimens); MNE34 (2 specimens); MNE 38 (3 specimens).

Remarks: New for fauna of Montenegro.

Distribution: Palaearctic.

34. *Ilybius pseudoneglectus* (Franciscolo, 1972)

Material examined: MNE5 (2 specimens).

Remarks: New for fauna of Montenegro.

Distribution: Europe.

Hydaticus Leach, 1817

35. *Hydaticus transversalis* (Pontoppidan, 1763)

Material examined: MNE 8 (1 specimen).

Distribution: Western Palaearctic.

Acilius Leach, 1817

36. *Acilius sulcatus* (Linnaeus, 1758)

Material examined: MNE 43 (1 specimen).

Distribution: Palaearctic.

Dytiscus Linnaeus, 1758

37. *Dytiscus circumcinctus* Ahrens, 1811

Material examined: MNE 8 (2 specimens).

Remark: New for fauna of Montenegro.

Distribution: Holarctic.

38. *Dytiscus dimidiatus* Bergsträsser, 1778

Material examined: MNE 8 (1 specimen); MNE 44 (1 specimen).

Remark: New for fauna of Montenegro.

Distribution: Western Palaearctic.

Cybister Curtis, 1827

39. *Cybister lateralimarginalis* (De Geer, 1774)

Material examined: MNE14 (1 specimen); MNE43 (1 specimen).

Distribution: Palaearctic.

DISCUSSION

During a three-year-long study of the freshwaters of

Montenegro, 39 diving beetles of the family Dytiscidae were collected. The updated list of the Montenegrin predaceous diving beetle now includes sixty-five species belonging to eighteen genera. Of these, the species: *Agabus sturmii* (Gyllenhal, 1808), *A. paludosus* (Fabricius, 1801), *Deronectes moestus inconspicuosus* (Leprieur, 1876), *D. platynotus* (Germar, 1834), *Dytiscus circumcinctus* Ahrens, 1811, *D. dimidiatus* Bergsträsser, 1778, *Hydroporus macedonicus* Fery & Pešić, 2006, *H. pubescens* (Gyllenhal, 1808), *Ilybius chalconatus* (Panzer, 1797), *I. fuliginosus fuliginosus* (Fabricius, 1792), *I. pseudoneglectus* (Franciscolo, 1972), *Liopterus haemorrhoidalis* (Fabricius, 1787) and *Nebrioporus luctuosus* (Aubé, 1838) are recorded from the Montenegro for the first time.

Hydroporus pubescens, *Agabus bipustulatus* and *A. guttatus* were the most widespread species found in our survey. These three species were found respectively: *A. bipustulatus* in 18 sites, *H. pubescens* and *A. guttatus* in 14 sites. In contrast to this the species: *Agabus paludosus*, *Acilius sulcatus*, *Dytiscus circumcinctus*, *Hydaticus transversalis*, *Hydroporus discretus*, *H. macedonicus*, *Ilybius pseudoneglectus*, *Laccophilus poecilus*, *L. minutes*, *Liopterus haemorrhoidalis*, *Nebrioporus luctuosus*, *Oreodytes davisii davisii*, *O. sanmarkii*, and *O. septentrionalis* were restricted to a single site each.

Examination of 851 specimens of family Dytiscidae revealed that the most numerous species (in parentheses are given % of total number of specimens) were: *Hydroporus pubescens* (20%), *Graptodytes veterator* (12%) and *Agabus bipustulatus* (10%). On the other hand, the species: *Agabus paludosus*, *Acilius sulcatus*, *Hydaticus transversalis*, *Laccophilus minutes*, *Nebrioporus luctuosus* and *Oreodytes sanmarkii* represent less than 1% of all specimens.

The genera with most species are as follow: *Hydroporus* (7), *Agabus* (6), *Oreodytes* (3), *Deronectes* (3), *Laccophilus* (3) and *Ilybius* (3). Of each of the remaining genera we have found less than 3 species.

The highest number of water beetles was collected from different types of springs (31). A large pro-

Table 1. Sampling sites

Abbr.	Sampling site	Co-ordinates	Alt. (m)	habitat
MNE 1	Podgorica area, village Bandići, spring “Vriješko vrelo”	42°29'03"N, 19°09'14"E	35	rheocrenic spring
MNE 2	Podgorica area, village Bandići, spring “Crno oko”	42°28'52.69"N, 19°08'46.63"E	32	limnocrenic spring
MNE 3	Skadar Lake area, Rijeka Crnojevića vil- lage, pond near the river	42°21'19.10"N, 19°01'14.77"E	8	pond
MNE 4	Ulcinj area, stream in village Mrkojevici (on road to Šasko Lake)	42°02'58.60"N, 19°14'03.73"E	652	middle-order stream
MNE 5	Skadar Lake area, Virpazar, flood meadow	42°14'56.58"N, 19°05'21.61"E	9	flood meadow
MNE 6	Lukavica Mt., Bare Bojovića, stream	42°42.823'N, 19°13.983'E	1475	middle-order stream
MNE 7	Lukavica Mt., spring “Babino sicelo”	42°48.436'N, 19°11.328'E	1597	limnocrenic spring
MNE 8	Danilovgrad, River Sušica near Oraška jama	42°31.820'N, 19°06.162'E	22	high-order stream
MNE 9	Podgorica region, Piperi, village Gornji Crnci, spring	42°31.787'N, 19°13.867'E	440	rheocrenic spring
MNE 10	Podgorica area, village Pričelje, a small stream tributary of Zeta river	42°30.471'N, 19°13.347'E	50	first order stream
MNE 11	Durmitor Mt., Žabljak, stream near Black Lake	43°08'54.44"N, 19°05'42.26"E	1430	middle-order stream
MNE 12	Plav, River Lim	42°37'05.53"N, 19°55'51.39"E	907	river
MNE 13	Danilovgrad, village Martinići, Rimanić stream, downstream	42°32.529' N, 19°11.419'E	52	middle-order stream
MNE 14	Ulcinj, Šasko Lake	41°59'02.58"N, 19°19'04.25"E	2	lake
MNE15	Danilovgrad, village Lazine, pond	42°33'05.94"N 19°07'30.58"E	48	pond
MNE 16	Podgorica area, spring “Kaluderovo oko”	42°22.661'N, 19°08.947'E	8	limnocrenic spring
MNE 17	Kolasin area, village Velje Duboko, rijeka Mrtvica	42°46.686'N, 19°17.233'E	757	river
MNE 18	Skadar Lake area, village Vranjina, spring near Monastir	42°16'36.46"N, 19°08'06.13"E	96	limnocrenic spring

Table 1. Continued

Abbr.	Sampling site	Co-ordinates	Alt. (m)	habitat
MNE 19	Ponikvica Mt., Brajovička Ponikvica	42°38.861'N, 19°17,520'E	1455	pool
MNE 20	Ponikvica Mt., Martinička Ponikvica, spring I	42°40.617'N, 19°15.475'E	1403	rheohelocrenic spring
MNE 21	Ponikvica Mt., Martinička Ponikvica, spring II	42°39.830'N, 19°16.245'E	1394	rheohelocrenic spring
MNE 22	Pljevlja, pond in village Kozica	43°14' 36.91"N 19°32' 43.95"E	1329	pond
MNE 23	Pljevlja, Vrulja village, Derovina, spring	43°13' 44,11"N, 19° 27' 57.26"E	973	rheocrenic spring
MNE 24	Pljevlja, Kozička rijeka near village Kozica	43°14'12.00"N, 19°30'36.71"E	1059	middle-order stream
MNE 25	Lukavica Mt., Kapetanovo Lake	42°48.542'N, 19°13.534'E	1640	lake
MNE 26	Pivsko Lake near Plužine	43°09'09.7"N, 18°50'22.2"E	661	lake
MNE 27	Mojkovac, Tara River near to bridge	42°55'18.04"N, 19°34'41.57"E	838	river
MNE 28	Žabljak, pond near Black Lake	43°08'30.49"N, 19°05'04.85"E	1465	pond
MNE 29	Pljevlja, Čehotina River	43°20'22.44"N, 19°21'36.48"E	757	river
MNE 30	Danilovgrad, Zeta River	42°33'18.73"N, 19°06'13.65"E	51	river
MNE 31	Kolašin, Tara River, 2 km from entrance to NP "Biogradka Gora"	42°49'30.54"N, 19°30'50.28"E	934	river
MNE 32	National Park "Biogradsko Gora", Bi-ogradsko Lake	42°54'01.97"N, 19°35'46.12"E	1119	lake
MNE 33	Tara River near Kolašin	42°49'28.22"N, 19° 30' 36.89" E	945	river
MNE 34	Nikšić, village Zavrh, Zeta River	42°48'39.13"N, 18°55'29.99"E	619	river
MNE 35	Podgorica, Mareza, pond	42°28'35.23"N, 19°11'08.84" E	42	pond
MNE 36	Podgorica, Morača River near Duklja	42°27'59.57"N, 19°15'59.76"E	36	river

Table 1. Continued

Abbr.	Sampling site	Co-ordinates	Alt. (m)	habitat
MNE 37	Skadar Lake area, Virpazar, spring “Dobra voda”	42°13’58.85”N, 19°05’18.17”E	60	rheocrenic spring
MNE 38	Nikšić, village Vidrovan, stream	42°51’13.73”N, 18°56’29.15”E	651	high-order stream
MNE 39	Nikšić, village Vidrovan, spring “Vukovo Vrelo”	42°51’11.50”N, 19°55’51.26”E	631	rheocrenic spring
MNE 40	Nikšić, village Zavrh, Zeta River	42°48’39.13”N, 18°55’29.99”E	619	river
MNE 41	Šavnik, Bukovica stream	42°58’11.55”N, 19°09’15.98”E	1388	middle-order stream
MNE 42	Danilovgrad, village Martinići, Rimanić stream, downstream 2	42°31.566’N, 19°11.607’E	103	middle-order stream
MNE 43	Danilovgrad, village Martinići, spring of Rimanić stream	42°33’10.70”N, 19°11’38.67”E	172	rheocrenic spring
MNE 44	Danilovgrad, village Gornji Martinići, Glizica, spring	42° 33’ 24.24”N, 19°11’44.53”E	224	rheocrenic spring
MNE 45	Podgorica, village Daljam, spring “Kraljićino oko”	42°29’15.47”N, 19°10’13.41”E	35	limnocrenic spring
MNE 46	Podgorica, Mareza, spring on road to Daljam village	42°28’37.77”N, 19°11’10.79”E	39	limnocrenic spring
MNE 47	Podgorica, Piperi, spring “Mrtvak”	42°31’04.00”N, 19°15’17.37”E	453	rheocrenic spring
MNE 48	Budva, village Jaz, stream	42°17’06.97”N, 18°48’26.05”E	30	low-order stream
MNE 49	Pljevlja region, village Barice, Barička rijeka	43°06’03,92” N, 19°27’55.53” E	1447	middle-order stream
MNE 50	Plav, Gusinje, rijeka Grnčar	42°33’27,72”N, 19°50’17.56”E	920	low-order stream
MNE 52	Podgorica region, Spuž, Zeta River	42°30.604’N, 19°12.095’E	40	river
MNE 53	Pljevlja, village Zenica, Malov potok, spring	43°21’30.32”N, 19°21’53.16”E	820	rheocrenic spring
MNE 54	Rumija Mt., Međuriječke planine, spring	42°03’30.36”N, 19°14’12.96”E	761	rheocrenic spring
MNE 55	Podgorica area, pond near spring “Kaluderovo oko”	42°22.316’N, 19°09.646’E	11	pond
MNE 56	Danilovgrad, village Gornji Martinići, spring “Pištet”	42°30’53.24”N, 19°11’49.13”E	113	rheocrenic spring

portion of these species are known from limnocrenic (13) and rheocrenic (12) springs, while only 6 species (mostly of the *Hydroporus* species) were found in a rheohelocrenic spring. The fauna of standing water bodies, such as lakes, ponds, pools and flooded meadows, includes 33 diving beetle species; the greatest number of species was found in ponds (17), and most of these species (9) are found in mountain areas. In contrast to this, only 6 species were found in a flooded meadow near Skadar Lake. Additional field work is greatly needed for an appropriate evaluation of the biodiversity of extant diving beetles in Montenegro.

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