

# DATA TO THE AQUATIC MACROINVERTEBRATE FAUNA OF THE NAGY-GYÖP (SZABADKÍGYÓS, SE HUNGARY)

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## ADATOK A SZABADKÍGYÓSI NAGY-GYÖP VÍZI MAKROGERINCTELEN FAUNÁJÁHOZ

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**ABSTRACT:** In 2013 faunistical investigations were carried out three times at 24 sampling points spread over the territory of an alkaline temporary wetland in the protected area of Szabadkígyós (Körös–Maros National Park), called Nagygyöp. 883 new faunistic records of 155 aquatic macroinvertebrate taxa are given. New occurrence data of protected and/or red listed species (*Hirudo*

*verbana*, *Argyroneta aquatica*, *Lestes dryas*, *Orthetrum brunneum*, *Niphargus valachicus*, *N. hrabei*) and further ten rare species are the most valuable results.

**Key words:** faunistics, new records, rare species, lowland marsh

**KIVONAT:** 2013-ban három alkalommal, 24 mintavételi ponton végeztünk faunisztikai vizsgálatokat a védett szabadkígyósi Nagy-gyöp szikes jellegű időszakos mocsarában (Körös–Maros Nemzeti Park). 155 vízi makrogerinctelen faj 883 faunisztikai adatát közöljük. Eredményeink közül kiemelendők a védett és/vagy vörös listás fajok (*Hirudo verbana*, *Argyroneta aquatica*, *Lestes dryas*, *Orthetrum brunneum*, *Niphargus valachicus*, *N. hrabei*), valamint 10 országosan ritka faj előkerülése.

**Kulcsszavak:** faunisztika, új adatok, ritka fajok, alföldi mocsár

## Introduction

Nagy-gyöp located south from Szabadkígyós is one of the most valuable sites of the Körös–Maros National Park. This alkaline wetland has temporary characteristics of water supply, which greatly depends upon underground water stock. However, alkaline marshes are inhabited by diverse and unique wildlife communities. In the 19<sup>th</sup> century the wider vicinity of the Nagy-gyöp, called Kígyósi-pusztá was characterized by permanent water cover, however after water regulation the aquatic habitats almost completely disappeared. Nowadays, the only remaining spot of the former water world is the Nagy-gyöp, which is the most valuable wetland of this relatively dry area. During rainy periods, the extent of the flooded area with marshy vegetation (saltmarsh bulrush, common spike-rush, sedge species) can reach more than 200 hectares. The large water coverage lasts several months, but permanent waterbodies can be found only in the deepest part of the Nagy-gyöp.

So far, aquatic macroinvertebrate fauna of the Nagy-gyöp was almost completely unknown, only ÁDÁM (2001) published occurrence data of ten aquatic beetle taxa from the territory: *Agabus labiatus* (Brahm, 1790) as *Eriglenus labiatus*; *Agabus uliginosus* (Linnaeus, 1761) as *Acatodes uliginosus*; *Cymbiodyta marginella* (Fabricius, 1792); *Enochrus bicolor* (Fabricius, 1792) as *Enochrus caspius* (Kuwert, 1890); *Helophorus aequalis/aquaticus* as *Elophorus aequalis/aquaticus*; *Helophorus brevipalpis* (Bedel, 1881) as *Elophorus brevipalpis*; *Helophorus micans* (Faldermann, 1835) as *Elophorus micans*; *Helophorus paraminutus* Angus, 1986 as *Elophorus paraminutus* (Angus, 1986); *Hydroporus planus* (Fabricius, 1781) as *H. ater* (Forster, 1771); *Peltodytes caesus* (Duftschmid, 1805) as *P. curculinus* (O. F. Müller, 1776).

Our aim was to explore the aquatic macroinvertebrate fauna of this valuable but, at least in relation with aquatic macroinvertebrates, overlooked nature protection area by sampling all characteristic vegetation types and all available aquatic habitats, as far as it can be done by a 'three days in three seasons' faunistic study.

## Material and methods

Aquatic macroinvertebrates were collected at 24 sampling points scattered throughout the area of the Nagy-gyöp in three seasons (6 April, 24 July and 16 October 2013). Not all points were sampled in all seasons because of the highly

fluctuating water level and the scheduled drought which is inherent with the life of such kind of lowland marshy habitats. Sampling points and their main characteristics and geographical positions are listed in Table 1.

The majority of the specimens were captured by sweeping with long handled pond-nets just above the substrate, on water surface, and among the submerged or emergent vegetation. Chironomid pupal exuviae were collected from the water surface and from the accumulated floating debris using a pond-net and a small sampling tray. In the case of specimens, which could be identified on field (e.g. dragonfly adults, leeches, large body sized beetles) observational data also were taken into consideration. All samples were presorted in the field; selected individuals were preserved in 70% ethyl-alcohol.

## Results

### General remarks

Altogether more than 2811 specimens were collected or observed, which belonged to 155 aquatic macroinvertebrate taxa (2 Hirudinoidea, 5 Gastropoda, 6 Crustacea, 1 Araneae, 2 Ephemeroptera, 12 Odonata, 18 Heteroptera, 80 Coleoptera, 7 Trichoptera, 22 Diptera: Chironomidae). Three species are protected in Hungary (*Argyroneta aquatica*, *Lestes dryas*, *Orthetrum brunneum*) (VM 2012), another species (*Hirudo verbena*) is listed as EU species of community interest (VM 2012) and in CITES (II), further two (*Niphargus valachicus*, *N. hrabei*) are listed as vulnerable in the IUCN Redlist (Sket 1996a, 1996b). From faunistic point of view, because of their nationwide rarity and/or special ecological requirements, further ten species are worth to mention: *Proasellus pribenicensis*, *Anisops sardeus*, *Mesovelia thermalis*, *Agabus nebulosus*, *Hydroporus melanarius*, *Enochrus ater*, *Hydrochara dichroma*, *Ochthebius lividipennis*, *Clinotanytus* cf. *pinguis*, *Cricotopus ornatus*, *Chironomus uliginosus*, *Paratanytarsus grimmii*. Except two beetle species which are detailed below, they were discussed in detail in CSABAI et al. (2015).

Based on the list of new records, the aquatic macroinvertebrate fauna of the Nagy-gyöp can be characterized as a common fauna of a slightly alkaline temporary lowland marsh with some additional rare and valuable taxa. Latter taxa almost exclusively occur in or close to the outlet channel, which have prominent role in enhancing the aquatic biodiversity of the territory.

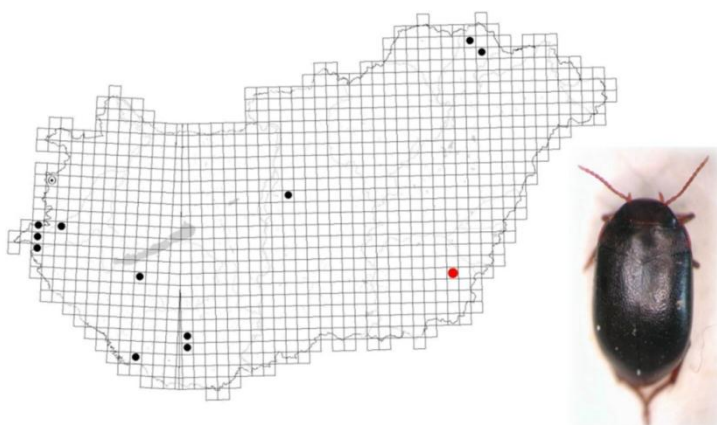
### Notes on selected taxa

***Hydroporus melanarius*** Sturm 1835 – Fig 1 – Palearctic species, known from almost all over Europe (except South and East Balkan), eastwards to Northwestern Siberia. From Hungary it has been only known from a few localities: Barcs, Csörötnék, Háromhuta, Kőszegi-Mountain, Középrigóc, Nádasd, Ócsa, Orfű, Óriszentpéter, Pellérd, Regéc and Táská (Fig. 1), mainly based on more than 20 years old data (CSABAI 2000, LÖKKÖS 2010). The species generally lives in bogs and swamps (with or without *Sphagnum*) in the main part of its range, but southwards – including Hungary – it can be found in other types of aquatic habitats, such as temporary forest pools, springs and marshes. Surprisingly, a single specimen was captured during spring in the outlet channel of the marsh, which is absolutely not appropriate habitat for the species. According to NILSSON and HOLMEN (1995), the species is characterized by flexible reproductive features and has ability to fly, but rarely disperses. However, the occurrence of the species in this territory might be a result of a spring dispersal flight; a stable population of *H. melanarius* unlikely exists in the Nagy-gyöp.

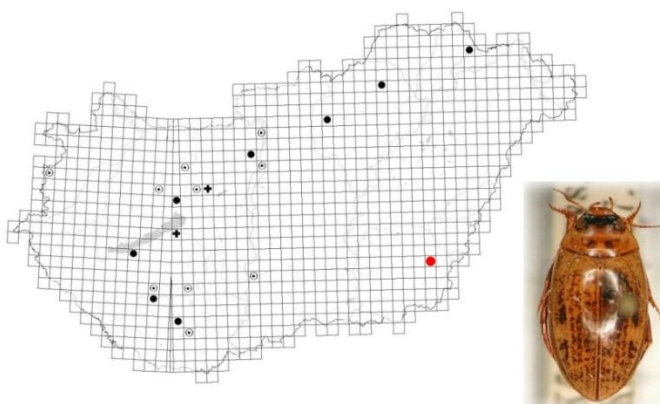
**Table 1.** List of sampling points in Nagy-gyöp with short description, geo-coordinates and seasonality. EO V X and Y: geo-coordinates given using Hungarian Unified National Projection Grid system, Sp: spring, Su: summer, Au: autumn, X: sampled, -: no data (not sampled), D: dried up.

Code	Description	EOV X	EOV Y	Sp	Su	Au
N01	outlet channel section with temporarily fast-flowing water, no vegetation	809136.17	142125.15	X	X	X
N02	outlet channel section with temporarily slow-flowing water, scarce vegetation along the shore	809086.64	142086.80	X	X	X
N03	temporarily flooded meadow	809037.10	141965.37	X	D	D
N04	outlet channel with temporarily slow-flowing water, scarce vegetation along the shore	809001.23	141986.73	-	X	D
N05	outlet channel with temporarily slow-flowing water, scarce vegetation along the shore	808947.63	141879.08	X	X	D
N06	outlet channel with temporarily slow-flowing water, scarce vegetation along the shore	808868.18	141785.82	-	X	X
N07	temporarily flooded area at the edge of a sedge stand	808805.42	141740.07	X	D	D
N08	small temporary pond within a large sedge stand	808803.97	141701.96	-	X	D
N09	small temporary pond within a large sedge stand	808796.03	141712.56	-	X	D
N10	starting point of the outlet channel with dense vegetation	808783.63	141722.42	-	X	D
N11	dense marshy vegetation	808738.31	141717.70	X	D	D
N12	small temporary pond within a large bulrush stand	808762.08	141700.23	-	X	D
N13	larger pond with dense vegetation	808750.70	141679.54	-	X	D
N14	small temporary pond within a large bulrush stand	808699.89	141636.80	-	X	X
N15	marshy area with dense vegetation (bulrush, sedge)	808704.75	141625.03	X	D	D
N16	shallow ditch	808671.16	141620.29	-	X	D
N17	shallow ditch	808729.66	141589.71	-	X	D
N18	marshy area with dense vegetation (sedge)	808720.19	141577.42	-	X	X
N19	marshy area with dense vegetation (saltmarsh bulrush)	808615.28	141553.13	X	D	D
N20	temporarily flooded area at the edge of a reed stand	808465.08	141500.40	X	D	D
N21	temporarily flooded area at the edge of a sedge stand	808369.21	141377.36	X	D	D
N22	temporarily flooded area at the edge of a sedge stand	808535.38	141348.60	X	D	D
N23	marshy area with dense vegetation (sedge)	808859.74	141473.23	X	D	X
N24	marshy area with dense vegetation (sedge)	808844.81	141590.91	-	X	D

***Agabus nebulosus*** (Forster, 1771) – Fig 2 – Mediterranean species but its range extends almost all over Europe. Rare in Hungary, mostly found in mountainous or hilly area and from stream habitats. These surprising new records represent the first occurrences from the Great Hungarian Plain (Fig 2). Adults are good fliers, and easily colonize new habitats (NILSSON and HOLMEN 1995), but no suitable habitats that resembling the former Hungarian localities are known in the close vicinity of the Nagy-gyöp. Four specimens were collected during the autumn period, when the marsh was almost completely dried up; only some residual pools were available as aquatic habitats.



**Figure 1.** Habitus (right) and known Hungarian localities (left) of *Hydroporus melanarius*. Red dot: Nagy-Gyöp, black dot: recent data (after 1960), circle with small dot: old records (before 1960). picture: Z. Csabai.



**Figure 2.** Habitus (right) and known Hungarian localities (left) of *Agabus nebulosus*. Red dot: Nagy-Gyöp, black dot: recent data (after 1960), circle with small dot: old records (before 1960), cross: questionable old records. picture: Z. Csabai.

## List of species and new records

In the list below new records (n = 883) contain the following information: code of the locality (according to Table 1), abbreviated date of collection and number of captured individuals. The dates of collection and the collectors on the different sampling dates were as follows: 2013.04.06: Endre Bajka, Zoltán Csabai, Tibor Danyik, Anna Farkas, Arnold Móra; 2013.07.24: Endre Bajka, Pál Boda, Réka Boda, Zoltán Csabai, Anna Farkas, Arnold Móra and Péter Mauchart; 2013.10.16: Pál Boda, Réka Boda and Péter Mauchart. The three dates were abbreviated in the list below as 'A', 'B' and 'C', respectively. In the cases of two groups the stage of development (L = larvae, e = pupal exuviae for Chironomidae and L = larvae, i = adults for Odonata) is also indicated after the numbers of individuals. In case of Ephemeroptera and Trichoptera all data refer to larvae, Heteroptera and Coleoptera data refer to adults exclusively.

## ANNELIDA

## HIRUDINOIDEA (identified by collectors)

## HAEMOPIIDAE

*Haemopsis sanguisuga* (Linnaeus, 1758) – N09: B, 2; N24: B, 1.

## HIRUDINIDAE

*Hirudo verbana* Carena, 1820 – N01: B, 1; C, 2; N04: B, 1; N05: B, 1; N08: B, 1; N13: B, 1; N16: B, 1; N17: B, 4.

## MOLLUSCA

## GASTROPODA (identified by Erika Bódis)

## PLANORBIDAE

*Anisus spirorbis* (Linnaeus, 1758) – N01: A, 3; B, 10; C, 9; N02: A, 9; B, 2; N03: A, 3; N04: B, 3; N05: A, 11; B, 1; N07: A, 14; N08: B, 4; N10: B, 2; N11: A, 7; N12: B, 2; N15: A, 4; N16: B, 2; N18: B, 1; N19: A, 15; N20: A, 8; N21: A, 2; N22: A, 9; N23: A, 7; C, 1; N24: B, 2.

*Anisus vortex* (Linnaeus, 1758) – N06: B, 4.

*Planorbarius corneus* (Linnaeus, 1758) – N01: A, 1; B, 1; C, 2; N02: C, 1; N05: B, 1; N06: B, 3; N08: B, 1; N09: B, 1; N13: B, 1; N18: B, 3; C, 1; N20: A, 1; N23: A, 1; C, 1; N24: B, 1.

*Planorbis planorbis* (Linnaeus, 1758) – N02: C, 2; N14: C, 1.

*Segmentina nitida* (O.F. Müller, 1774) – N03: A, 1; N07: A, 2; N14: C, 1; N15: A, 1; N19: A, 1; N20: A, 1; N20: A, 1.

## ARTHROPODA

## CRUSTACEA (identified by Péter Mauchart)

## TRIOPSIDAE

*Lepidurus apus* (Linnaeus, 1758) – N03: A, 2.

## BRANCHIPODIDAE

*Branchipus* cf. *schaefferi* Fischer, 1834 – N02: A, 2; N03: A, 3; N22: A, 3.

## ASELLIDAE

*Asellus aquaticus* (Linnaeus, 1758) – N01: A, 18; B, 3; C, 6; N02: A, 25; N05: A, 7; N06: B, 1; N07: A, 19; N10: B, 2; N11: A, 19; N13: B, 3; N15: A, 17; N16: B, 3; N18: C, 10; N19: A, 18; N20: A, 14; N21: A, 5; N22: A, 7; N23: A, 13; C, 1; N24: B, 1.

*Proasellus pribenicensis* Flasarova, 1977 – N01: B, 16; C, 12; N02: A, 5; B, 1; N03: A, 2; N04: B, 1; N05: A, 2; N07: A, 6; N08: B, 3; N10: B, 1; N11: A, 5; N12: B, 7; N13: B, 1; N14: C, 2; N15: A, 9; N18: B, 1; C, 1; N19: A, 8; N20: A, 3; N21: A, 3; N22: A, 3; N23: A, 6; C, 5.

## NIPHARGIDAE

*Niphargus hrabei* S. Karaman, 1932 – N01: B, 1; C, 2; N02: A, 1.

*Niphargus valachicus* Dobrea et Manolache, 1933 – N02: B, 1.

## ARANEAE (identified by collectors)

## CYBAEIDAE

*Argyroneta aquatica* (Clerck, 1757) – N011: A, 1; N020: A, 1; N022: A, 1.

## INSECTA

## EPHEMEROPTERA (identified by Csaba Deák)

## BAETIDAE

*Cloeon dipterum* (Linnaeus, 1761) – N01: B, 31; C, 13; N02: A, 1; B, 15; N04: B, 3; N05: B, 3; N06: B, 2; N08: B, 9; N10: B, 7; N13: B, 17; N14: B, 5; N16: B, 18; N17: B, 8; N18: B, 12; N24: B, 3.

## CAENIDAE

*Caenis robusta* Eaton, 1884 – N02: B, 1.

## ODONATA (identified by Arnold Móra and Anna Farkas)

## LESTIDAE

*Lestes barbarus* (Fabricius 1798) – N04: B, 1i; N05: B, 12i; N06: B, 4i; N08: B, 2i; N09: B, 2i; N10: B, 4i; N13: B, 2i; N16: B, 2i; N24: B, 2i.

*Lestes dryas* Kirby 1890 – N17: B, 1i; N24: B, 2i.

## COENAGRIONIDAE

*Ischnura elegans* (Vander Linden, 1820) – N02: B, 2i+10L; N04: B, 1i+7L; N05: B, 4i+4L; N06: B, 3i+6L; N09: B, 2i; N10: B, 3i; N13: B, 1L; N16: B, 2L; N17: B, 1L; N18: B, 4L; N24: B, 1L.

*Ischnura pumilio* (Charpentier, 1825) – N13: B, 1i; N16: B, 1i; N17: B, 2i; N18: B, 1i; N24: B, 2i.

## AESHNIDAE

*Aeshna affinis* Vander Linden, 1820 – N04: B, 1i; N05: B, 1i; N06: B, 3i; N08: B, 1i; N09: B, 2i; N10: B, 3i+1L; N13: B, 7i; N14: B, 2i; N16: B, 2i; N17: B, 3i; N18: B, 1i; N24: B, 15i.

*Anax imperator* Leach, 1815 – N02: B, 1L; N05: B, 1i; N10: B, 1i; N13: B, 1i;

*Anax parthenope* (Selys, 1839) – N16: B, 1L; N17: B, 2L; N24: B, 1L.

*Brachytron pratense* (Müller, 1764) – N18: C, 1L.

## LIBELLULIDAE

*Libellula depressa* Linnaeus, 1758 – N02: B, 1L; N05: B, 6L; N06: B, 2L.

*Orthetrum albistylum* (Selys, 1848) – N02: B, 2i; N04: B, 1i; N05: B, 5i; N06: B, 14i; C, 1L; N10: B, 1i.

*Orthetrum brunneum* (Fonscolombe, 1837) – N01: B, 2i; N05: B, 1i.

*Sympetrum sanguineum* (Müller, 1764) – N04: B, 1i; N05: B, 1i; N06: B, 1i; N09: B, 2i; N10: B, 2i; N24: B, 1i+1L.

## HETEROPTERA (identified by Pál Boda)

## NEPIDAE

*Ranatra linearis* (Linnaeus, 1758) – N02: B, 2; N04: B, 2; N05: B, 2; N06: B, 1; N08: B, 1; N09: B, 2; N10: B, 4; N16: B, 2; N17: B, 2; N18: B, 1.

*Nepa cinerea* Linnaeus, 1758 – N01: B, 1; C, 1; N02: B, 1; N04: B, 2; N05: B, 1; N06: B, 1.

## CORIXIDAE

*Corixa affinis* Leach, 1817 – N01: C, 2; N06: C, 3.

*Corixa panzeri* Fieber, 1848 – N14: B, 1.

*Corixa punctata* (Illiger, 1807) – N01: C, 1; N08: B, 1; N13: B, 2; N14: B, 10; N24: B, 4.

*Hesperocorixa linnaei* (Fieber, 1848) – N01: C, 5; N05: B, 1; N06: B, 2; N08: B, 6; N10: B, 4; N13: B, 6; N14: B, 2; N16: B, 8; N17: B, 2; N24: B, 4.

*Sigara falleni* (Fieber, 1848) – N06: B, 3; N13: B, 1.

*Sigara lateralis* (Leach, 1818) – N01: A, 1; C, 4; N02: B, 1; N05: B, 2; N06: B, 13; C, 12; N10: B, 5; N13: B, 4; N14: B, 2; N16: B, 4.

***Sigara striata*** (Linnaeus, 1758) – N02: B, 1; N05: B, 1; N06: B, 1; N10: B, 1; N13: B, 1; N16: B, 2; N21: A, 1.

#### NAUCORIDAE

***Ilyocoris cimicoides*** (Linnaeus, 1758) – N01: B, 8; C, 1; N02: A, 1; B, 5; N04: B, 2; N06: B, 1; N08: B, 2; N12: B, 1; N13: B, 1; N14: B, 4; N16: B, 2; N17: B, 4; N18: B, 3; N23: C, 1; N24: B, 3.

#### NOTONECTIDAE

***Anisops sardeus*** Herrich-Schäffer, 1849 – N02: C, 2; N05: B, 7; N06: B, 5; N10: B, 3; N13: B, 8; N14: B, 1; N16: B, 1; N17: B, 1.

***Notonecta glauca*** Linnaeus, 1758 – N01: B, 3; C, 6; N08: B, 4; N14: B, 9; N16: B, 1; N23: C, 3; N24: B, 4.

***Notonecta viridis*** Delcourt, 1909 – N01: C, 1; N17: B, 1; N24: B, 2.

#### PLEIDAE

***Plea minutissima*** Leach, 1817 – N01: B, 37; N02: B, 8; N04: B, 1; N06: B, 1; N08: B, 3; N10: B, 1; N13: B, 1; N14: B, 3; N16: B, 2; N17: B, 2; N24: B, 2.

#### MESOVELIIDAE

***Mesovelis thermalis*** Horvath, 1915 – N10: B, 1.

#### VELIIDAE

***Microvelis reticulata*** (Burmeister, 1835) – N01: B, 1; N04: B, 1; N05: B, 1; N06: B, 1; N14: B, 2; N16: B, 1; N17: B, 1; N18: B, 1.

#### GERRIDAE

***Gerris argentatus*** Schummel, 1832 – N14: B, 2; N17: B, 1; N24: B, 1.

***Gerris odontogaster*** (Zetterstedt, 1828) – N04: B, 1; N08: B, 5; N10: B, 3; N13: B, 2; N14: B, 3; N16: B, 10; N17: B, 3; N18: B, 8; N21: A, 1; N24: B, 6.

#### COLEOPTERA

##### HALIPLIDAE (identified by András Kálmán)

***Haliphus furcatus*** Seidlitz 1887 – N11: A, 1; N21: A, 3; N22: A, 2.

***Haliphus heydeni*** Wehncke, 1875 – N17: B, 1.

***Peltodytes caesus*** (Duftschmid, 1805) – N05: B, 1; N06: B, 1; N08: B, 2; N16: B, 5; N17: B, 3; N18: B, 2; N24: B, 3.

##### DYTSICIDAE (identified by Zoltán Csabai)

***Liopterus haemorrhoidalis*** (Fabricius, 1787) – N01: A, 2; B, 2; N02: A, 2; B, 3; N03: A, 1; N04: B, 1; N05: B, 2; N06: B, 1; N11: A, 1; N12: B, 1; N18: B, 2; N24: B, 2.

***Bidessus nasutus*** Sharp, 1887 – N06: B, 2; N12: B, 1; N13: B, 4; N16: B, 1; N17: B, 1; N24: B, 2.

***Bidessus unistriatus*** (Goeze, 1777) – N01: C, 1; N12: B, 5; N18: C, 1.

***Hydroglyphus geminus*** (Fabricius, 1792) – N01: B, 3; N06: C, 4; N08: B, 1; N12: B, 7; N13: B, 3; N16: B, 2; N18: C, 1.

***Graptodytes bilineatus*** (Sturm, 1835) – N01: A, 39; B, 2; C, 1; N02: A, 2; B, 5; N03: A, 3; N05: B, 2; N07: A, 1; N08: B, 1; N11: A, 2; N12: B, 1; N13: B, 2; N14: B, 2; N16: B, 2; N18: B, 1; N18: B, 4; C, 1; N21: A, 2; N22: A, 2; N23: A, 1; N24: B, 2.

***Graptodytes pictus*** (Fabricius, 1787) – N04: B, 3.

***Hydroporus melanarius*** Sturm 1835 – N01: A, 1.

***Hydroporus planus*** (Fabricius, 1781) – N01: A, 2; B, 1; N02: A, 1; N14: C, 4; N23: C, 1.

***Porhydrus obliquesignatus*** (Bielz, 1852) – N01: A, 1; N06: B, 1; N08: B, 3; N13: B, 4; N14: B, 2; N16: B, 3; N18: B, 1.

***Hygrotus decoratus*** (Gyllenhal, 1808) – N01: A, 2; B, 1; C, 3; N11: A, 3; N18: B, 1; C, 3; N21: A, 2.

***Hygrotus inaequalis*** (Fabricius, 1776) – N01: B, 1; N06: B, 1; N08: B, 6; N10: B, 1; N13: B, 11; N14: B, 5; N16: B, 12; N17: B, 2; N18: B, 6; N24: B, 6.

***Hygrotus impressopunctatus*** (Schaller, 1783) – N01: A, 2; C, 2; N02: B, 1; N06: B, 1; N08: B, 3; N10: B, 1; N13: B, 1; N14: B, 1; C, 1; N16: B, 3; N18: B, 22; C, 4; N24: B, 1.

***Hygrotus parallelogrammus*** (Ahrens, 1812) – N13: B, 1; N14: B, 1; N16: B, 1.

***Hyphydrus ovatus*** (Linnaeus, 1761) – N02: A, 1.

***Hydrovatus cuspidatus*** Kunze, 1818 – N08: B, 2; N15: A, 1.

***Laccophilus hyalinus*** (De Geer, 1774) – N02: C, 1.

***Laccophilus minutus*** (Linnaeus, 1758) – N01: A, 1; B, 4; N02: B, 1; C, 4; N08: B, 2; N10: B, 1; N16: B, 1.

***Laccophilus poecilus*** Klug, 1834 – N01: B, 4; N02: B, 3; N04: B, 1; N06: B, 1; N18: B, 1.

***Agabus labiatus*** (Brahm, 1791) – N01: A, 3; N07: A, 1.

***Agabus uliginosus*** (Linnaeus, 1761) – N01: A, 2; N02: A, 5; N03: A, 4; N05: A, 1; N11: A, 2; N15: A, 1.

***Agabus undulatus*** (Schrank, 1776) – N16: B, 1.

***Agabus bipustulatus*** (Olivier, 1795) – N14: C, 2; N18: C, 1; N23: C, 6.

***Agabus nebulosus*** (Forster, 1771) – N06: C, 2; N23: C, 2.

***Colymbetes fuscus*** (Linnaeus, 1758) – N01: A, 3; B, 1; C, 1; N02: A, 2; B, 1; N05: A, 2; N06: C, 3; N14: C, 1; N18: B, 2; C, 2; N19: A, 2; N21: A, 1; N22: A, 1; N23: A, 1; C, 7.

***Rhantus grapii*** (Gyllenhal, 1808) – N02: A, 1.

***Rhantus bistriatus*** (Bergsträsser, 1778) – N08: B, 1.

***Rhantus frontalis*** (Marsham, 1802) – N24: B, 2.

***Rhantus suturalis*** (MacLeay, 1825) – N18: B, 1; N24: B, 1.

***Graphoderus austriacus*** (Sturm, 1834) – N05: B, 1; N16: B, 1; N18: B, 1; N24: B, 1.

***Graphoderus cinereus*** (Linnaeus, 1758) – N07: A, 1; N14: B, 1; N16: B, 1; N24: B, 1.

***Cybister lateralimarginalis*** (De Geer, 1774) – N02: B, 1; N04: B, 1; N05: B, 8; N06: B, 2; N09: B, 3; N10: B, 6; N13: B, 1; N14: B, 4; N16: B, 1; N17: B, 2; N18: B, 1; N24: B, 2.

***Dytiscus dimidiatus*** Bergsträsser, 1778 – N01: B, 1.

***Dytiscus marginalis*** Linnaeus, 1758 – N05: A, 1.

***Hydaticus transversalis*** (Pontoppidan, 1763) – N01: B, 1; N04: B, 2; N05: B, 1; N24: B, 2.

#### NOTERIDAE (identified by Zoltán Csabai)

***Noterus clavicornis*** (De Geer, 1774) – N01: B, 2; N02: A, 2; B, 6; N04: B, 3; N10: B, 1; N19: A, 4.

***Noterus crassicornis*** (O.F.Müller, 1776) – N01: A, 7; B, 21; C, 4; N02: A, 5; B, 9; N03: A, 2; N04: B, 12; N05: A, 3; B, 2; N06: B, 2; N07: A, 17; N08: B, 14; N10: B, 3; N11: A, 17; N12: B, 3; N14: B, 3; N15: A, 3; N16: B, 5; N17: B, 1; N18: B, 1; C, 8; N20: A, 1; N21: A, 4; N22: A, 4; N23: A, 7.

#### GYRINIDAE (identified by Zoltán Csabai)

***Gyrinus distinctus*** Aube, 1836 – N02: A, 1.

#### SPERCHEIDAE (identified by Zoltán Csabai)

***Spercheus emarginatus*** (Schaller, 1783) – N11: A, 2; N22: A, 1; N23: A, 2.

#### HYDROCHIDAE (identified by Zoltán Kálmán)

***Hydrochus crenatus*** (Fabricius, 1792) – N01: B, 5; N02: B, 8; N04: B, 5; N05: B, 2; N06: B, 5; N08: B, 11; N10: B, 8; N13: B, 1; N14: B, 7; N16: B, 1; N17: B, 4; N18: B, 1; N24: B, 7.

***Hydrochus elongatus*** (Schaller, 1783) – N14: B, 2; N23: C, 1; N24: B, 3.

***Hydrochus flavipennis*** Küster, 1852 – N06: B, 1.

#### HELOPHORIDAE (identified by Zoltán Kálmán)

***Helophorus aquaticus/laeualis*** – N01: C, 2; N02: A, 2; N06: C, 1; N23: C, 13.

***Helophorus liguricus*** Angus, 1970 – N02: A, 1.

***Helophorus brevipalpis*** Bedel, 1881 – N02: A, 3.

***Helophorus montenegrinus*** Kuwert, 1885 – N23: C, 9.

***Helophorus griseus*** Herbst, 1793 – N02: A, 2; B, 3; N04: B, 2; N10: B, 1; N14: B, 1; N23: A, 1; C, 7.

*Helophorus minutus/paraminutus* – N01: B, 2; C, 4; N02: A, 2; B, 3; N03: A, 3; N04: B, 4; N05: B, 1; N08: B, 2; N14: B, 1; C, 1; N16: B, 1; N21: A, 1; N22: A, 1; N23: C, 14; N24: B, 1.

#### HYDROPHILIDAE (identified by Zoltán Csabai)

*Coelostoma orbiculare* (Fabricius, 1775) – N06: B, 1; N11: A, 2; N19: A, 1.

*Cercyon marinus* Thomson, 1853 – N05: B, 1; N12: B, 1.

*Cercyon tristis* (Illiger, 1801) – N02: A, 1.

*Anacaena limbata* (Fabricius, 1792) – N01: A, 1; B, 9; N04: B, 1; N04: B, 1; N23: C, 2.

*Cymbiodyta marginella* (Fabricius, 1792) – N01: A, 1; B, 15; C, 1; N02: A, 5; B, 5; N03: A, 1; N04: B, 8; N05: B, 6; N06: B, 3; N08: B, 4; N10: B, 1; N11: A, 13; N12: B, 43; N13: B, 1; N15: A, 5; N18: B, 2; N19: A, 11; N20: A, 1; N21: A, 3; N22: A, 1; N23: A, 5; C, 1.

*Enochrus ater* (Kuwert, 1888) – N22: A, 1.

*Enochrus bicolor* (Fabricius, 1792) – N01: B, 1; N02: B, 3; N05: A, 1; B, 1; N06: B, 1.

*Enochrus ochropterus* (Marsham, 1802) – N01: A, 1; C, 3; N02: A, 1; B, 3; N03: A, 1; N05: A, 1; N08: B, 1; N16: B, 2; N18: C, 2; N21: A, 2; N22: A, 1; N23: C, 2.

*Enochrus quadripunctatus* (Herbst, 1797) – N01: B, 1; N02: A, 3; N04: B, 4; N05: B, 2; N06: B, 1; N08: B, 3; N12: B, 1; N13: B, 1; N14: B, 1; N16: B, 8; N24: B, 1.

*Enochrus testaceus* (Fabricius, 1801) – N02: B, 2; N05: B, 4; N08: B, 1; N11: A, 2; N14: B, 4; N17: B, 1.

*Enochrus affinis* (Thunberg, 1794) – N01: B, 3; N02: B, 6; N04: B, 3; N06: B, 2; N08: B, 3; N10: B, 2; N12: B, 6; N14: B, 3; N16: B, 1; N18: B, 2; N24: B, 1.

*Enochrus coarctatus* (Gredler, 1863) – N02: A, 1; B, 4; N04: B, 4; N05: B, 1; N06: B, 3; N07: A, 1; N11: A, 1; N12: B, 2; N24: B, 1.

*Helochares obscurus* (O.F.Müller, 1776) – N02: B, 5; N04: B, 6; N05: B, 4; N06: B, 5; N08: B, 6; N10: B, 1; N12: B, 1; N13: B, 1; N14: B, 4; N16: B, 3; N18: B, 1; N24: B, 1.

*Hydrobius fuscipes* (Linnaeus, 1758) – N01: A, 10; B, 15; C, 1; N02: A, 8; B, 1; N03: A, 6; N04: B, 2; N05: A, 2; N08: B, 1; N11: A, 5; N12: B, 1; N18: B, 1; C, 6; N21: A, 1; N22: A, 1; N23: A, 1; C, 2.

*Limnoxenus niger* Zschach, 1788 – N01: A, 1; B, 6; C, 2; N02: A, 3; B, 3; N03: A, 3; N04: B, 1; N05: A, 1; N07: A, 6; N08: B, 5; N10: B, 2; N11: A, 1; N12: B, 6; N14: B, 2; N16: B, 1; N18: B, 13; N21: A, 2; N24: B, 2.

*Hydrochara caraboides* (Linnaeus, 1758) – N01: A, 1; B, 4; N02: A, 1; N05: A, 1; B, 4; N07: A, 2; N08: B, 1; N11: A, 1; N13: B, 1; N15: A, 1; N18: B, 1; N24: B, 1.

*Hydrochara dichroma* (Fairmaire, 1892) – N01: B, 1; N02: A, 1; N05: B, 1; N06: B, 1.

*Hydrochara flavipes* (Steven, 1808) – N01: A, 1; B, 1; C, 1; N08: B, 2; N11: A, 1; N12: B, 2; N13: B, 1; N14: B, 1; N17: B, 1; N18: B, 3; N21: A, 1; N24: B, 5.

*Hydrophilus aterrimus* Eschscholtz, 1822 – N10: B, 1; N18: B, 2; N23: C, 1; N24: B, 2.

*Hydrophilus piceus* (Linnaeus, 1758) – N01: B, 1; N02: B, 1; N03: A, 1; N05: B, 2; N09: B, 1; N16: B, 4; N17: B, 1; N24: B, 2.

*Berosus luridus* (Linnaeus, 1761) – N01: C, 1.

*Berosus signaticollis* (Charpentier, 1825) – N01: A, 5; N03: A, 1; N07: A, 1; N21: A, 1; N22: A, 1.

*Berosus frontifoveatus* Kuwert, 1888 – N06: B, 1; N10: B, 2; N13: B, 1; N16: B, 3.

#### DRYOPIDAE (identified by Zoltán Kálmán)

*Dryops ernesti* Des Gozis, 1886 – N21: A, 1; N23: A, 2.

#### HYDRAENIDAE (identified by Andor Lökkös)

*Hydraena palustris* Erichson, 1837 – N02: B, 1.

*Limnebius atomus* (Duftschmid, 1805) – N02: B, 1; N04: B, 1.

*Ochthebius bernhardi* Jäch et Delgado, 2008 – N04: B, 1.

*Ochthebius lividipennis* Peyron, 1857 – N02: B, 2; N04: B, 1.

*Ochthebius minimus* (Fabricius, 1792) – N01: B, 1; N02: B, 3; N04: 013.07.24., 3; N08: B, 1; N18: B, 1; N23: C, 2.

*Ochthebius pusillus* Stephens, 1835 – N02: B, 1.

## TRICHOPTERA (identified by Arnold Móra)

## LIMNEPHILIDAE

*Grammotaulius nigropunctatus* (Retzius, 1783) – N07: A, 1.

*Limnephilus affinis/incisus* – N01: A, 4; N05: A, 1; N07: A, 1; N11: A, 3; N19: A, 4; N21: A, 2; N23: A, 10.

*Limnephilus auricula* Curtis, 1834 – N19: A, 2; N23: A, 3.

*Limnephilus bipunctatus* Curtis, 1834 – N02: A, 4; N05: A, 1.

*Limnephilus flavicornis* (Fabricius, 1787) – N07: A, 1; N23: A, 2.

*Limnephilus griseus* (Linnaeus, 1758) – N11: A, 2.

*Limnephilus vittatus* (Fabricius, 1798) – N01: A, 2; N02: A, 10; N04: B, 1; N05: A, 3;

## DIPTERA (identified by Arnold Móra)

## CHIRONOMIDAE

*Clinotanypus* cf. *pinguis* (Loew, 1861) – N02: B, 2L; N04: B, 2L; N05: B, 2L.

*Psectrotanypus varius* (Fabricius, 1787) – N02: B, 1L.

*Tanypus kraatzi* (Kieffer, 1912) – N04: B, 1L; N06: B, 2L; N08: B, 7L; N10: B, 1L; N13: B, 6e+11L; N16: B, 1L; N24: B, 1L.

*Corynoneura scutellata* Winnertz, 1846 – N01: C, 2L.

*Cricotopus ornatus* (Meigen, 1818) – N13: B, 1e.

*Cricotopus sylvestris* (Fabricius, 1794) – N02: B, 1L; N06: B, 1L; N14: B, 1L.

*Metriocnemus cavicola* Kieffer, 1921 – N03: A, 9; N07: A, 1.

*Chironomus annularius* agg. – N02: B, 3L; C, 1L; N04: B, 3L; N05: B, 3L; N06: B, 16L; N08: B, 6L; N10: B, 7L; N13: B, 4L; N17: B, 3L; N24: B, 1L.

*Chironomus balatonicus* Dévai, Wülker et Scholl, 1983 – N06: B, 1e.

*Chironomus nudatarsis* Keyl, 1961 – N13: B, 1L+1e.

*Chironomus pallidivittatus* Edwards, 1929 – N02: B, 2L; N05: B, 1L; N06: B, 2L; N13: B, 25L+3e; N16: B, 7L.

*Chironomus piger/riparius* – N01: A, 4L; C, 1L.

*Chironomus uliginosus* Keyl, 1960 – N01: C, 3L; N02: C, 1L; N08: B, 2L; N12: B, 1L; N16: B, 5L; N18: B, 11L; N24: B, 1L.

*Dicortendipes nervosus* (Staeger, 1839) – N02: B, 1L;

*Endochironomus tendens* (Fabricius, 1775) – N08: B, 2L; N10: B, 3; N13: B, 1e+1L; N16: B, 1L; N17: B, 1L; N24: B, 1L.

*Glyptotendipes cauliginellus* (Kieffer, 1913) – N04: B, 2L; N13: B, 1L; N14: B, 1L; N17: B, 1p.

*Glyptotendipes pallens* (Meigen, 1804) – N02: B, 2L; N04: B, 1L; N06: B, 1L.

*Kiefferulus tendipediformis* (Goetghebuer, 1921) – N02: B, 8L; N04: B, 1L; N06: B, 3e; N08: B, 1L; N17: B, 1L.

*Paratanytarsus grimmii* (Schneider, 1885) – N06: B, 1e; N13: B, 4e.

*Phaenopsectra flavipes* (Meigen, 1818) – N04: B, 1L.

*Polypedilum sordens* (van der Wulp, 1875) – N02: B, 2L.

*Synendotendipes impar* (Walker, 1856) – N05: B, 2L; N08: B, 1L; N16: B, 1L; N18: B, 2L.

**Acknowledgement:** This study was funded by the Körös–Maros National Park Directorate. Authors' thanks are due to Réka Boda and Endre Bajka for extensive help during field works, Éva Horváth-Tihanyi for sorting samples and András Kálmán for identification of Haliploidea, Zoltán Kálmán for identification of *Hydrochus*, *Helophorus* and *Dryops* specimens.

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