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CONTRIBUTION TO THE ODONATA FAUNA OF THE RIVERS IN THE KÖRÖS-MAROS NATIONAL PARK, HUNGARY, WITH SPECIAL EMPHASIS ON GOMPHIDAE. PART II.

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ADATOK A KÖRÖS-MAROS NEMZETI PARK FOLYÓINAK SZITAKÖTŐ-FAUNÁJÁHOZ (ODONATA), KÜLÖNÖS TEKINTETTEL A FOLYAMI SZITAKÖTŐKRE (GOMPHIDAE). II. RÉSZ.

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ABSTRACT: In 2014 systematic collections of Gomphidae exuviae were carried out at altogether 52 sampling sites in the Natura 2000 areas along the Hungarian sections of the Sebes-Körös, Hármas-Körös and Hortobágy-Berettyó rivers. The sampling sites were visited three times, taking into account the phenology of gomphid species. Besides Gomphidae, exuviae of other species were also collected, and observational data on adult specimens were occasionally recorded. During our work 2656 exuviae (from which 2032 were exuviae of Gomphidae) were collected and 1742 adults were observed. A total of 22 species were found, for which detailed records are given. In the Sebes-Körös the co-occurrence of the four Hungarian gomphid species was detected, although only a single exuvia of *Ophiogomphus cecilia* was found. In both the Hármas-Körös and the Hortobágy-Berettyó only the two *Gomphus* species occurred, but while large populations exist in the Hármas-Körös, their occurrence in the Hortobágy-Berettyó is very sporadic. The composition of the Gomphidae assemblages varied widely among rivers and within a given river as well, according to habitat characteristics. Except the Hortobágy-Berettyó, stable and viable populations of Gomphidae exist along the studied rivers with great significance in terms of nature conservation. Accordingly, either the studied reaches of the Sebes- and Hármas-Körös or their Gomphidae populations deserve protection. At the same time, the Hortobágy-Berettyó has little importance in terms of riverine dragonflies.

Key words: Gomphidae, Sebes-Körös, Hármas-Körös, Hortobágy-Berettyó, exuviae, adults, abundances, nature protection

KIVONAT: 2014-ben a Sebes- és a Hármaskörös, valamint a Hortobágy-Berettyó teljes, Natura 2000 területre eső magyarországi szakaszán, összesen 52 mintavételi helyen végeztük el a folyami szitakötők (Odonata: Gomphidae) exuviumainak mennyiségi felmérését, a fajok kirepülési sajátosságainak megfelelően három alkalommal. A folyami szitakötők mellett faunisztikai céllal más fajok exuviumait is összegyűjtöttük, valamint esetenként feljegyeztük a megfigyelt szitakötőimágókat is. Munkánk során összesen 2656 (ebből 2032 Gomphidae) exuviumot gyűjtöttünk be, emellett 1742 példányt figyeltünk meg imágó alakban. Összesen 22 faj jelenlétét mutattuk ki, ezek előfordulási adatait részletesen közöljük. A Sebes-Körösben mind a négy hazai Gomphidae fajt megtaláltuk, bár az *Ophiogomphus cecilia* csak egyetlen példányban került elő. A Hármaskörösben és a Hortobágy-Berettyóban egyaránt csak a két *Gomphus*-faj jellemző, de míg az előbbiben nagy egyedszámú populációik élnek, az utóbbiban előfordulásuk csak szórványos. A folyami szitakötők mennyiségi viszonyai folyónként és folyószakaszonként eltérőnek bizonyultak az élőhelyi sajátosságoknak megfelelően. A Hortobágy-Berettyó kivételével a vizsgált folyókban erős és életképes folyamiszitakötő-populációk élnek, ami természetvédelmi szempontból nagy jelentőséggel bír. Eredményeink alapján a Sebes- és a Hármaskörös vizsgált szakaszai, és azok folyamiszitakötő-populációi védelemre érdemesek, ugyanakkor a Hortobágy-Berettyó a folyami szitakötők szempontjából csekély jelentőséggel bír.

Kulcsszavak: Gomphidae, Sebes-Körös, Hármaskörös, Hortobágy-Berettyó, exuvium, imágó, mennyiségi viszonyok, természetvédelem

Introduction

The gomphid species are of great importance in riverine Odonata assemblages being the most abundant representatives of anisopteran dragonflies in larger running waters. All four species that occur in Hungary [Gomphidae: *Gomphus flavipes* (Charpentier, 1825), *Gomphus vulgatissimus* (Linnaeus, 1758), *Onychogomphus forcipatus forcipatus* (Linnaeus, 1758), *Ophiogomphus cecilia* (Fourcroy, 1785)] are protected [100/2012. (IX. 28.) VM regulation], and *G. flavipes* and *O. cecilia* are also species of community interest according to Annexes II and IV of the Habitats Directive of the European Union (COUNCIL OF THE EUROPEAN UNION 2006). Several earlier faunistical studies, involving Gomphidae as well, have been carried out in the operational area of the Körös–Maros National Park Directorate: some of them concentrated generally on aquatic macroinvertebrates (JUHÁSZ et al. 1998, 2000; MÓRA et al. 2001), while others only on dragonflies (AMBRUS and OLAJOS 2000; AMBRUS et al. 1998b; OLAJOS et al. 1998; SZILÁGYI 1988). In addition, further sporadic data on the riverine Odonata fauna of this area were recorded in many other studies (e.g. AMBRUS et al. 1996, 1998a; KOVÁCS and AMBRUS 2010; KOVÁCS et al. 2004, 2006; MOLNÁR et al. 1987; MÜLLER and MÁTYUS 2009; MÜLLER et al. 2006; VIZSLÁN and PINGITZER 1998–99). Thus, either odonates or only gomphids of the rivers located here seem apparently well-studied. However, our extensive collections made along the Maros, Fehér-Körös, Fekete-Körös and Kettős-Körös rivers in 2013 (see FARKAS et al. 2014) resulted in several new localities (among them the first records of *O. forcipatus* and *O. cecilia* from the Fehér-Körös and Kettős-Körös), which rather highlighted that our knowledge on the distribution of gomphid species is still far from exhaustive. Moreover, their abundances is even more scarcely studied, whereas our earlier study in 2013 revealed that large populations exist along the Maros, Fehér-Körös, Fekete-Körös and Kettős-Körös rivers (see FARKAS et al. 2014).

In 2014 we carried on our extensive collections in the Natura 2000 areas along the Hungarian sections of the Sebes-Körös, Hármas-Körös and Hortobágy-Berettyó rivers. Our main aims were to explore the occurrence of gomphid species in details and to estimate their abundances. Besides Gomphidae, faunistical data of other Odonata species were also recorded.

Materials and methods

Our study was mainly based on systematic collection of exuviae. Collections were carried out at altogether 52 sampling sites (Sebes-Körös: 15; Hármas-Körös: 27; Hortobágy-Berettyó: 10), which covered the entire Natura 2000 sections of the studied rivers (Table 1, Fig. 1). Collections were made in 2014 at three occasions, taking into account the phenology of gomphid species and timed near their emergence peaks: (1) 12–17 May; (2) 23–27 May; (3) 13–17 June. At the first occasion, because of the heavy rains that soaked through the embankment, four sampling sites along the Hármas-Körös (Hármas-13, 16, 25, 27) could not be approached, and therefore these sites were visited only two times.

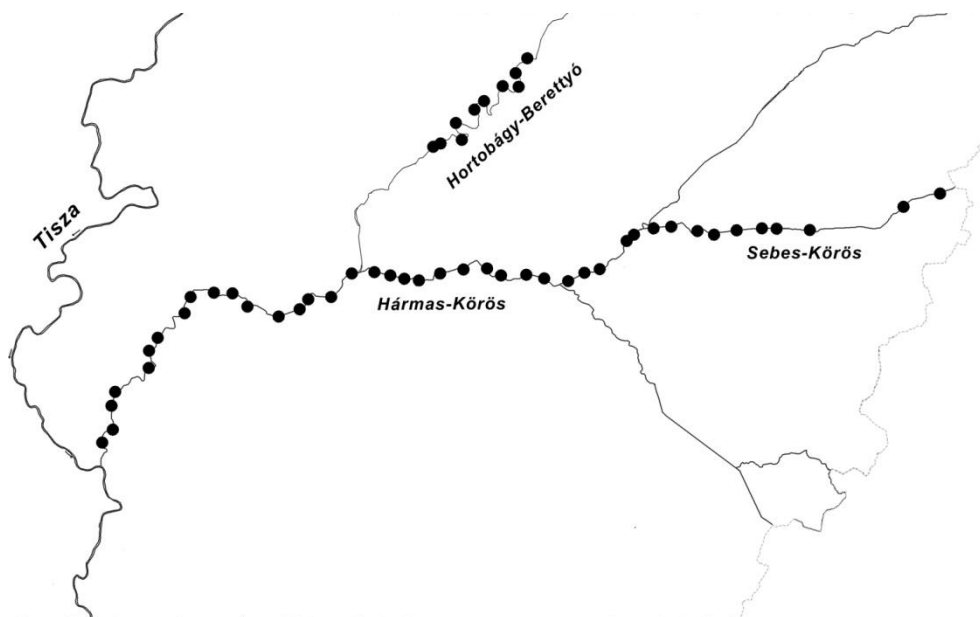


Figure 1. Sampling sites along the studied rivers.

Each sampling site consisted of a 20 metre long stretch of the river bank. The sampling sites along a given river differed in characteristics of the river bed (e.g. sediment, paving) and river bank (e.g. slope, riparian vegetation) representing various habitat types. During collections the riverside ground and the vegetation were searched intensively for the exuviae in an area of the bank 5–10 metre in width (depending on the bank characteristics) and all the gomphid exuviae found were collected. This method allowed us to roughly estimate the abundances of the species. Besides Gomphidae, exuviae of other species were also collected with faunistical aims. In addition, observational data on adult specimens were occasionally recorded as well.

Table 1. Sampling sites along the studied rivers (listed downstream) with their administrative units, the exact geographical co-ordinates and the 2,5×2,5 km UTM-grid codes(rb = right bank; lb = left bank).

Sampling site	River	Administrative unit	Co-ordinate		UTM code
			North	East	
Sebes-01	Sebes-Körös, lb	Körösnagyharsány	47°00'53.33"	21°38'00.06"	ET40C4
Sebes-02	Sebes-Körös, lb	Biharugra	47°00'01.07"	21°34'10.24"	ET40A4
Sebes-03	Sebes-Körös, lb	Körösújfalú	46°58'36.26"	21°24'28.21"	ET30B1
Sebes-04	Sebes-Körös, lb	Vésztő	46°58'45.53"	21°21'03.92"	ET20D1
Sebes-05	Sebes-Körös, lb	Vésztő	46°58'49.57"	21°19'33.97"	ET20B3
Sebes-06	Sebes-Körös, lb	Vésztő	46°58'43.47"	21°16'58.56"	ET20B1
Sebes-07	Sebes-Körös, lb	Szeghalom	46°58'27.40"	21°14'38.44"	ET10D4
Sebes-08	Sebes-Körös, lb	Szeghalom	46°58'45.86"	21°12'56.30"	ET10D1
Sebes-09	Sebes-Körös, lb	Szeghalom	46°59'06.07"	21°10'16.46"	ET10B3
Sebes-10	Sebes-Körös, lb	Szeghalom	46°59'02.10"	21°08'26.66"	ET10B1
Sebes-11	Sebes-Körös, rb	Körösladány	46°58'37.55"	21°06'25.45"	ET00D3
Sebes-12	Sebes-Körös, rb	Körösladány	46°58'11.02"	21°05'38.41"	ET00D2
Sebes-13	Sebes-Körös, rb	Körösladány	46°56'14.63"	21°02'48.34"	ES09A3
Sebes-14	Sebes-Körös, rb	Körösladány	46°56'01.49"	21°01'14.76"	ES09A1
Sebes-15	Sebes-Körös, rb	Köröstarcsa	46°55'27.60"	20°59'32.69"	DS99C4
Hármas-01	Hármas-Körös, rb	Csárdaszállás	46°55'41.32"	20°57'06.26"	DS99C2
Hármas-02	Hármas-Körös, rb	Gyomaendrőd	46°55'58.54"	20°55'15.15"	DS99A3
Hármas-03	Hármas-Körös, rb	Gyomaendrőd	46°55'58.39"	20°52'39.97"	DS99A1
Hármas-04	Hármas-Körös, rb	Gyomaendrőd	46°56'29.86"	20°51'14.97"	DS89C3
Hármas-05	Hármas-Körös, lb	Gyomaendrőd	46°56'27.84"	20°48'49.31"	DS89C1
Hármas-06	Hármas-Körös, lb	Gyomaendrőd	46°56'13.52"	20°46'25.20"	DS89A3
Hármas-07	Hármas-Körös, rb	Gyomaendrőd	46°55'45.56"	20°44'13.21"	DS89A2
Hármas-08	Hármas-Körös, lb	Mezőtúr	46°55'54.07"	20°42'44.20"	DS79C3
Hármas-09	Hármas-Körös, lb	Mezőtúr	46°56'08.60"	20°41'18.75"	DS79C1
Hármas-10	Hármas-Körös, lb	Mezőtúr	46°56'24.42"	20°39'41.37"	DS79A3
Hármas-11	Hármas-Körös, lb	Mezőtúr	46°56'21.05"	20°37'22.17"	DS79A1
Hármas-12	Hármas-Körös, lb	Szarvas	46°54'42.91"	20°35'12.45"	DS69C4
Hármas-13	Hármas-Körös, lb	Szarvas	46°54'34.70"	20°32'49.30"	DS69C2
Hármas-14	Hármas-Körös, lb	Békésszentandrás	46°53'54.08"	20°31'56.35"	DS69B3
Hármas-15	Hármas-Körös, lb	Békésszentandrás	46°53'24.98"	20°29'45.86"	DS69B1
Hármas-16	Hármas-Körös, lb	Öcsöd	46°54'09.40"	20°26'35.90"	DS59D3
Hármas-17	Hármas-Körös, rb	Mesterszállás	46°55'05.60"	20°25'04.08"	DS59C2
Hármas-18	Hármas-Körös, rb	Öcsöd	46°55'10.76"	20°23'09.05"	DS59A4
Hármas-19	Hármas-Körös, lb	Öcsöd	46°54'53.30"	20°20'46.76"	DS59A2
Hármas-20	Hármas-Körös, lb	Öcsöd	46°53'45.72"	20°20'07.56"	DS49D3
Hármas-21	Hármas-Körös, rb	Kunszentmárton	46°52'03.85"	20°17'19.62"	DS49D2
Hármas-22	Hármas-Körös, rb	Kunszentmárton	46°51'09.24"	20°16'24.41"	DS48A3
Hármas-23	Hármas-Körös, lb	Kunszentmárton	46°49'56.77"	20°16'21.98"	DS48A4
Hármas-24	Hármas-Körös, rb	Szelevény	46°48'18.11"	20°12'53.86"	DS48B1
Hármas-25	Hármas-Körös, rb	Szelevény	46°47'19.20"	20°12'29.80"	DS38D4

(Table 1. continued)

Sampling site	River	Administrative unit	Co-ordinate		UTM code
			North	East	
Hármas-26	Hármas-Körös, lb	Magyartés (Szentés)	46°45'38.85"	20°12'35.20"	DS37C3
Hármas-27	Hármas-Körös, lb	Magyartés (Szentés)	46°44'43.60"	20°11'29.40"	DS37C4
HB-01	Hortobágy-Berettyó, rb	Kisújszállás	47°11'14.59"	20°55'54.00"	DT92A4
HB-02	Hortobágy-Berettyó, rb	Ecsegfalva	47°10'12.08"	20°54'39.19"	DT92B3
HB-03	Hortobágy-Berettyó, rb	Ecsegfalva	47°09'14.67"	20°54'56.29"	DT92B4
HB-04	Hortobágy-Berettyó, rb	Ecsegfalva	47°09'18.48"	20°53'18.33"	DT92B2
HB-05	Hortobágy-Berettyó, rb	Túrkeve	47°08'17.11"	20°51'19.50"	DT82D4
HB-06	Hortobágy-Berettyó, rb	Túrkeve	47°07'42.39"	20°50'18.78"	DT81C3
HB-07	Hortobágy-Berettyó, rb	Túrkeve	47°06'48.58"	20°48'22.25"	DT81C1
HB-08	Hortobágy-Berettyó, lb	Túrkeve	47°05'35.62"	20°48'57.74"	DT81C2
HB-09	Hortobágy-Berettyó, lb	Túrkeve	47°05'22.33"	20°46'46.04"	DT81A4
HB-10	Hortobágy-Berettyó, lb	Túrkeve	47°05'08.50"	20°46'00.92"	DT81B1

Exuviae and adults were identified using keys and descriptions by ASKEW (2004), CHAM (2007, 2009), DIJKSTRA (2006) and GERKEN and STERNBERG (1999). The exuviae of *Lestes parvidens* and *L. viridis* are not distinguishable by morphological characters; accordingly we used the term *L. viridis/parvidens* in this case.

In the species list new records contain the following information: locality (as the code of the sampling site according to Table 1), date of collection, total number of individuals and, in brackets, the numbers of males and females as well (a third number, if it is presented, indicates the number of individuals with undetermined sex). The dates of collection are listed according to the Hungarian order (YYYY.MM.DD). The collections and observations were made by two persons in each case: Anna Farkas and Arnold Móra.

Results and discussion

Faunistics

General remarks – A total of 2656 exuviae (from which 2032 were exuviae of Gomphidae) representing 16 species were collected. In addition, a total of 1742 specimens belonging to 18 species were observed as adults. Altogether 22 species were collected and/or observed, which is about one third of the Hungarian Odonata fauna (65 species, see DÉVAI 1978).

Sebes-Körös – 1092 exuviae were collected and further 1115 adult individuals were observed representing altogether 13 species. The exuviae of all four gomphid species were found along the Sebes-Körös. Out of them *O. cecilia* was recorded from the river for the second time: a single exuvia was found at a new locality (Sebes-09, Szeghalom). This species was previously known from only one upper site along the river at Körösújfalú, where larvae were collected (AMBRUS and OLAJOS 2000). Thus, our data support that *O. cecilia* exists in the Sebes-Körös, however, its occurrence seems rather local and sporadic along the river. Furthermore, it is notable that *O. forcipatus*, which has the most sporadic occurrence in Hungary, was recorded at all sampling sites with the exception of two sites

(Sebes-13 and 15) along the lower reach of the Sebes-Körös. The larvae of this species have already been collected from the river, but the few known localities were limited to the middle section of the river (AMBRUS and OLAJOS 2000; JUHÁSZ et al. 1998, 2000; MÓRA et al. 2001; OLAJOS et al. 1998), therefore our study revealed several new localities both along the upper and the lower reaches. The exuviae of the two *Gomphus* species were collected at all sampling sites of the Sebes-Körös, which is in accordance with former studies that have also detected these species from the river (AMBRUS and OLAJOS 2000; AMBRUS et al. 1998a, 1998b; JAKAB and DÉVAI 2008; JUHÁSZ et al. 1998, 2000; MÓRA et al. 2001; MÜLLER et al. 2006; OLAJOS et al. 1998; SZILÁGYI 1988). Nevertheless, our collections resulted in some new localities also for the two *Gomphus* species, which may be due to that we had much more sampling sites than in previous studies and exuvial collections may be more effective than sampling for adults and larvae.

Besides Gomphidae, some common dragonfly species were collected and/or observed at all (*C. splendens*, *P. pennipes*) or at the majority (*I. elegans*) of the sampling sites, while other species typical for both slow-flowing and standing waters were recorded only at few localities. The latter included two protected species, *A. isosceles* and *L. fulva* [100/2012. (IX. 28.) VM regulation], but these were observed only as adults, which do not indicate unambiguously that their larvae developed in the river. The occurrence of *E. lindeni* should also be noted: it was found at four sampling sites (Sebes-01, 02, 03 and 06), among them being fairly abundant at one site (Sebes-02) indicating that this species has stable population in the Sebes-Körös, even though it was first recorded from Hungary (MÓRA and FARKAS 2015).

Hármas-Körös – 1468 exuviae were collected and 515 adult individuals were observed belonging to altogether 14 species. Similarly to other studies (AMBRUS and OLAJOS 2000; AMBRUS et al. 1998a, 1998b; JUHÁSZ et al. 1998; KOVÁCS et al. 2004; MÜLLER and MÁTYUS 2009; MÜLLER et al. 2006; OLAJOS et al. 1998), only the two frequent *Gomphus* species were found along the Hármas-Körös, while neither *O. cecilia* nor *O. forcipatus* could have been detected. The exuviae of *G. vulgatissimus* and *G. flavipes* were collected at all sampling sites, and therefore for both species new localities were revealed. Although there is also one record on the occurrence of *O. cecilia* along the Hármas-Körös in the literature, this data was based on a single adult specimen (at Öcsöd; see AMBRUS et al. 1998b). Moreover, this observation was made in late July, while that time only mature adults of this species are most likely to encounter, which usually cover great distances from their emergence site. Accordingly, this single literature data does not support the actual occurrence of *O. cecilia* in the Hármas-Körös. It is suggested that the quite uniform habitat conditions of the Hármas-Körös are poorly favourable for the development both of *O. cecilia* and *O. forcipatus*, thus specimens that drifted down from the Kettős-Körös (see FARKAS et al. 2014) and the Sebes-Körös may occur at the most.

Among the other dragonfly species *P. pennipes* was found at all sampling sites, while *C. splendens* and *I. elegans* were recorded at several localities. *Orthetrum albistylum* was also relatively frequent along the Hármas-Körös, this species was collected or observed at a total of nine localities. In addition, further nine species were detected from the river, which occurred at few sampling sites. Among them some species that were only observed as adults (*A. affinis*, *C. aenea* and the protected *L. fulva*) are likely to not being developed in the river but emerged from other nearby water bodies.

Hortobágy-Berettyó – 96 exuviae were collected and further 112 specimens were observed as adults belonging to altogether 13 species. *Gomphus vulgatissimus* was first recorded from the Hortobágy-Berettyó, although only one

exuvia was found at the lowest sampling site (HB-10). Based on previous studies, *G. flavipes* was the only gomphid species known from the river, but was collected (as larvae) at a single site at Ecsefalva (MÓRA et al. 2001). In our study one-one exuvia or adult of *G. flavipes* was found at altogether four sampling sites (HB-02, HB-04, HB-05, HB-09), thus some new localities were revealed for this species. In contrast, neither *O. cecilia* nor *O. forcipatus* could have been detected, however, occurrence of these species that prefer higher current velocity and coarser sediment is largely unexpected in the Hortobágy-Berettyó. On the other hand, based on the data available, it is suggested that the occurrences of *G. flavipes* and *G. vulgatissimus* are also only sporadic in the river.

Besides gomphid species, similarly to the Sebes-Körös and the Hármas-Körös, *C. splendens* and *P. pennipes* were collected and/or observed at the majority of sampling sites. Furthermore, *I. elegans* and *O. albistylum* were also frequently found. The occurrence of other species were limited to few sites, however, among them the single exuvia of *B. pratense* (at HB-09) presents the first record of this species from the Hortobágy-Berettyó.

New records

CALOPTERYGIDAE

Calopteryx splendens (Harris, 1782) — **Exuvial data:** Sebes-01: 2014.05.12., 2(0+2); 2014.05.24., 2(1+1); 2014.06.14., 10(7+3) — Sebes-02: 2014.06.14., 1(0+1) — Sebes-03: 2014.06.14., 1(0+1) — Sebes-05: 2014.05.12., 3(1+1+1); 2014.05.24., 6(3+2+1); 2014.06.14., 2(2+0) — Sebes-06: 2014.06.14., 2(0+2) — Sebes-09: 2014.06.14., 2(1+1) — Sebes-10: 2014.05.13., 1(1+0); 2014.05.24., 1(1+0) — Sebes-11: 2014.06.13., 2(0+2) — Sebes-13: 2014.05.25., 1(0+1); 2014.06.14., 1(0+0+1) — Sebes-14: 2014.05.14., 1(0+1); 2014.05.25., 1(0+1); 2014.06.15., 3(1+2) — Hármas-01: 2014.06.15., 1(1+0) — Hármas-06: 2014.06.15., 1(0+1) — Hármas-10: 2014.05.27., 1(0+1) — Hármas-13: 2014.06.17., 1(0+1) — Hármas-14: 2014.05.15., 1(0+1) — Hármas-22: 2014.05.26., 1(0+0+1) — HB-07: 2014.05.23., 1(1+0) — HB-08: 2014.06.13., 1(0+1) — HB-10: 2014.06.13., 1(0+1). — **Adult data:** Sebes-01: 2014.05.12., 5(2+3); 2014.05.24., 20(0+0+20); 2014.06.14., 35(0+0+35) — Sebes-02: 2014.05.12., 3(1+2); 2014.05.24., 100(0+0+100); 2014.06.14., 7(0+0+7) — Sebes-03: 2014.05.24., 100(0+0+100); 2014.06.14., 8(0+0+8) — Sebes-04: 2014.05.12., 60(0+0+60); 2014.05.24., 30(0+0+30); 2014.06.14., 18(0+0+18) — Sebes-05: 2014.05.12., 40(0+0+40); 2014.05.24., 60(0+0+60); 2014.06.14., 20(0+0+20) — Sebes-06: 2014.05.12., 40(0+0+40); 2014.05.24., 20(0+0+20) — Sebes-07: 2014.05.12., 10(0+0+10); 2014.05.24., 20(0+0+20); 2014.06.14., 1(0+0+1) — Sebes-08: 2014.05.24., 6(0+0+6); 2014.06.14., 3(2+1) — Sebes-09: 2014.05.24., 4(0+0+4) — Sebes-10: 2014.06.14., 2(0+0+2) — Sebes-11: 2014.05.14., 20(0+0+20); 2014.05.25., 12(0+0+12); 2014.06.13., 6(4+2) — Sebes-12: 2014.05.14., 2(0+0+2); 2014.06.13., 1(0+1) — Sebes-13: 2014.05.14., 4(0+0+4); 2014.05.25., 2(1+1); 2014.06.14., 15(0+0+15) — Sebes-14: 2014.05.14., 3(0+0+3); 2014.05.25., 9(0+0+9); 2014.06.15., 2(1+1) — Sebes-15: 2014.05.25., 16(0+0+16) — Hármas-01: 2014.05.14., 1(1+0); 2014.05.25., 20(0+0+20); 2014.06.15., 1(1+0) — Hármas-02: 2014.05.25., 3(0+0+3); 2014.06.15., 2(0+0+2) — Hármas-03: 2014.05.25., 3(0+0+3); 2014.06.15., 1(1+0) — Hármas-05: 2014.05.25., 1(0+0+1) — Hármas-07: 2014.05.15., 1(1+0); 2014.06.15., 1(1+0) — Hármas-11: 2014.05.17., 20(0+0+20); 2014.05.27., 1(0+1) — Hármas-12: 2014.05.27., 2(0+0+2); 2014.06.17., 1(1+0) — Hármas-13: 2014.05.26., 2(1+1) — Hármas-14: 2014.05.27., 1(1+0) — Hármas-17: 2014.05.16., 1(0+1) — Hármas-18: 2014.05.27., 9(8+1) — Hármas-19: 2014.05.16., 1(1+0); 2014.06.16., 1(0+1) — Hármas-21: 2014.05.26., 2(2+0); 2014.06.16., 2(2+0) — Hármas-22: 2014.06.16., 1(1+0) — Hármas-23: 2014.06.16., 4(0+0+4) — Hármas-24: 2014.05.27., 1(1+0) — Hármas-27: 2014.05.26., 2(2+0); 2014.06.16., 1(1+0) — HB-01: 2014.05.13., 1(1+0) — HB-02: 2014.05.13., 1(1+0); 2014.06.13., 1(1+0) — HB-05: 2014.05.23., 3(0+0+3); 2014.06.13., 1(1+0) — HB-06: 2014.05.23., 2(2+0); 2014.06.13., 2(1+1) — HB-07: 2014.05.13., 1(1+0) — HB-10: 2014.05.23., 1(1+0).

LESTIDAE

Lestes viridis/parvidens — **Exuvial data:** Hármás-08: 2014.06.15., 1(0+1).

Sympecma fusca (Vander Linden, 1820) — **Adult data:** HB-05: 2014.05.13., 5(0+0+5); 2014.05.23., 1(0+0+1) — HB-07: 2014.05.13., 1(0+0+1); 2014.05.23., 1(0+0+1) — HB-08: 2014.05.23., 3(0+0+3) — HB-10: 2014.05.23., 3(0+0+3).

COENAGRIONIDAE

Ischnura elegans (Vander Linden, 1820) — **Exuvial data:** Sebes-01: 2014.05.12., 1(1+0); 2014.05.24., 1(0+1); 2014.06.14., 6(3+2+1) — Sebes-10: 2014.05.24., 1(0+1) — Sebes-14: 2014.06.15., 1(0+1) — Hármás-01: 2014.05.25., 1(0+1); 2014.06.15., 1(1+0) — Hármás-03: 2014.05.25., 1(0+1); 2014.06.15., 3(1+2) — Hármás-05: 2014.05.25., 1(1+0) — Hármás-07: 2014.06.15., 2(0+0+2) — Hármás-09: 2014.06.15., 1(0+1) — Hármás-11: 2014.05.27., 2(1+1) — Hármás-13: 2014.06.17., 2(1+1) — Hármás-14: 2014.05.27., 1(1+0) — Hármás-16: 2014.05.26., 1(0+1) — Hármás-24: 2014.06.17., 1(1+0) — HB-02: 2014.06.13., 2(1+0+1) — HB-06: 2014.06.13., 2(1+1) — HB-07: 2014.05.23., 1(0+1) — HB-09: 2014.06.13., 1(0+1) — HB-10: 2014.06.13., 1(1+0). — **Adult data:** Sebes-01: 2014.05.24., 1(0+0+1); 2014.06.14., 3(0+0+3) — Sebes-02: 2014.05.24., 4(0+0+4); 2014.06.14., 1(0+0+1) — Sebes-06: 2014.05.12., 1(0+0+1) — Sebes-07: 2014.06.14., 1(0+0+1) — Sebes-08: 2014.05.24., 1(1+0) — Sebes-08: 2014.06.14., 1(1+0) — Sebes-09: 2014.05.24., 1(0+0+1) — Sebes-10: 2014.05.13., 1(0+0+1); 2014.05.24., 1(0+0+1); 2014.06.14., 1(0+0+1) — Sebes-11: 2014.05.14., 4(0+0+4); 2014.05.25., 2(2+0); 2014.06.13., 2(2+0) — Sebes-13: 2014.05.14., 2(0+0+2); 2014.05.25., 2(2+0) — Sebes-14: 2014.05.14., 1(0+0+1); 2014.05.25., 1(1+0) — Sebes-15: 2014.05.25., 1(1+0) — Hármás-01: 2014.05.14., 1(1+0); 2014.05.25., 2(0+0+2); 2014.06.15., 2(2+0) — Hármás-03: 2014.05.25., 1(0+0+1); 2014.06.15., 1(1+0) — Hármás-07: 2014.05.25., 6(0+0+6); 2014.06.15., 2(2+0) — Hármás-13: 2014.05.26., 1(1+0) — Hármás-17: 2014.05.27., 1(1+0) — Hármás-18: 2014.05.27., 1(1+0) — Hármás-19: 2014.06.16., 1(1+0) — Hármás-21: 2014.05.26., 1(1+0) — Hármás-22: 2014.06.16., 1(1+0) — Hármás-27: 2014.05.26., 1(1+0) — HB-03: 2014.06.13., 1(0+0+1) — HB-04: 2014.05.13., 1(0+0+1); 2014.06.13., 2(2+0) — HB-05: 2014.05.23., 1(1+0) — HB-07: 2014.05.13., 1(1+0); HB-07: 2014.05.23., 1(1+0) — HB-08: 2014.05.13., 2(0+0+2) — HB-09: 2014.05.13., 1(1+0); 2014.06.13., 2(2+0).

Coenagrion puella (Linnaeus, 1758) — **Exuvial data:** Hármás-07: 2014.05.25., 1(0+1). — **Adult data:** HB-01: 2014.06.13., 1(1+0).

Coenagrion pulchellum (Vander Linden, 1825) — **Exuvial data:** Hármás-01: 2014.06.15., 1(1+0). — **Adult data:** Sebes-15: 2014.05.25., 1(1+0) — HB-06: 2014.06.13., 1(1+0) — HB-07: 2014.06.13., 1(1+0).

Erythromma lindenii (Selys, 1840) — Sebes-01, Sebes-02, Sebes-03, Sebes-06. For details see MÓRA and FARKAS (2015).

Erythromma viridulum (Charpentier, 1840) — **Exuvial data:** Sebes-10: 2014.06.14., 1(0+1). — **Adult data:** HB-06: 2014.06.13., 1(0+0+1).

PLATYCNEMIDIDAE

Platycnemis pennipes (Pallas, 1771) — **Exuvial data:** Sebes-01: 2014.05.12., 8(6+2); 2014.05.24., 11(5+6); 2014.06.14., 58(23+31+4) — Sebes-02: 2014.06.14., 2(0+2) — Sebes-03: 2014.06.14., 1(1+0) — Sebes-04: 2014.05.24., 2(2+0); 2014.06.14., 3(1+0+2) — Sebes-05: 2014.05.24., 3(2+1); 2014.06.14., 6(4+2) — Sebes-06: 2014.06.14., 4(3+1) — Sebes-07: 2014.06.14., 2(1+0+1) — Sebes-08: 2014.06.14., 3(1+0+2) — Sebes-09: 2014.06.14., 6(1+4+1) — Sebes-10: 2014.05.24., 23(6+17); 2014.06.14., 10(5+5) — Sebes-11: 2014.05.14., 1(0+1); 2014.06.13., 5(5+0) — Sebes-12: 2014.05.25., 3(2+1); 2014.06.13., 9(6+3) — Sebes-13: 2014.05.25., 11(3+8); 2014.06.14., 18(7+7+4); 2014.05.14., 3(3+0) — Sebes-14: 2014.05.14., 3(2+1); 2014.05.25., 1(0+1); 2014.06.15., 19(6+12+1) — Sebes-15: 2014.05.25., 1(0+0+1); 2014.06.15., 7(4+3) — Hármás-01: 2014.05.14., 1(0+1); 2014.06.15., 4(1+2+1) — Hármás-02: 2014.06.15., 14(5+4+5) — Hármás-03: 2014.05.14., 1(0+1); 2014.05.25., 3(1+2); 2014.06.15., 14(5+8+1) — Hármás-04: 2014.06.15., 5(2+2+1) — Hármás-05: 2014.05.25., 4(1+3); 2014.06.15., 6(5+1) — Hármás-06: 2014.05.25., 4(0+4); 2014.06.15., 7(5+2) — Hármás-07: 2014.05.15., 1(0+1); 2014.06.15., 11(5+6) — Hármás-08: 2014.06.15., 17(8+9) — Hármás-09: 2014.05.25., 1(0+1); 2014.06.15., 7(4+2+1) — Hármás-

10: 2014.05.27., 4(2+2); 2014.06.15., 10(4+5+1) – Hármás-11: 2014.05.17., 1(1+0); 2014.05.27., 6(1+5); 2014.06.17., 4(3+1) – Hármás-12: 2014.05.15., 1(0+1); 2014.05.27., 4(4+0); 2014.06.17., 4(3+1) – Hármás-13: 2014.05.26., 6(4+2); 2014.06.17., 12(3+9) – Hármás-14: 2014.05.27., 3(1+2); 2014.06.17., 7(3+4) – Hármás-17: 2014.06.16., 1(1+0) – Hármás-18: 2014.05.27., 2(1+1); 2014.06.16., 3(2+1) – Hármás-20: 2014.06.16., 2(1+1) – Hármás-21: 2014.06.16., 2(1+1) – Hármás-22: 2014.06.16., 2(1+1) – Hármás-23: 2014.05.26., 1(1+0); 2014.06.16., 1(0+1) – Hármás-25: 2014.06.17., 1(1+0) – Hármás-26: 2014.05.26., 1(0+1) – HB-01: 2014.06.13., 2(1+0+1) – HB-02: 2014.05.13., 4(4+0); 2014.06.13., 2(2+0) – HB-03: 2014.05.23., 1(1+0); 2014.06.13., 6(1+4+1) – HB-04: 2014.05.13., 2(0+2); 2014.06.13., 3(3+0) – HB-05: 2014.05.13., 1(0+1); 2014.05.23., 3(1+2); 2014.06.13., 10(4+6) – HB-06: 2014.05.13., 3(2+1); 2014.05.23., 4(4+0); 2014.06.13., 15(8+7) – HB-07: 2014.05.23., 1(1+0); 2014.06.13., 1(0+1) – HB-08: 2014.06.13., 2(0+2) – HB-09: 2014.05.13., 1(0+1) – HB-10: 2014.05.23., 2(2+0); 2014.06.13., 5(2+3). — **Adult data:** Sebes-01: 2014.05.12., 2(0+0+2); 2014.05.24., 20(0+0+20); 2014.06.14., 60(0+0+60) – Sebes-02: 2014.05.24., 20(0+0+20); 2014.06.14., 3(0+0+3) – Sebes-04: 2014.05.24., 30(0+0+30); 2014.06.14., 18(0+0+18) – Sebes-05: 2014.05.24., 50(0+0+50); 2014.06.14., 7(0+0+7) – Sebes-06: 2014.05.24., 11(0+0+11); 2014.06.14., 1(0+0+1); Sebes-07: 2014.05.24., 10(0+0+10); 2014.06.14., 1(0+0+1) – Sebes-08: 2014.05.24., 4(0+0+4); 2014.06.14., 1(1+0) – Sebes-09: 2014.05.24., 3(0+0+3) – Sebes-10: 2014.05.24., 3(0+0+3); 2014.06.14., 1(0+0+1) – Sebes-11: 2014.05.14., 10(0+0+10); 2014.05.25., 1(0+0+1); 2014.06.13., 2(1+1) – Sebes-12: 2014.05.14., 3(0+0+3); 2014.05.25., 8(0+0+8) – Sebes-13: 2014.05.14., 6(0+0+6); 2014.05.25., 14(0+0+14); 2014.06.14., 2(0+0+2) – Sebes-14: 2014.05.14., 5(0+0+5); 2014.05.25., 25(0+0+25); 2014.06.15., 1(1+0) – Sebes-15: 2014.05.25., 30(0+0+30); 2014.06.15., 2(0+0+2) – Hármás-01: 2014.05.14., 4(0+0+4); 2014.05.25., 40(0+0+40); 2014.06.15., 2(1+1) – Hármás-02: 2014.05.25., 12(0+0+12) – 2014.06.15., 6(0+0+6) – Hármás-03: 2014.05.25., 7(0+0+7) – 2014.06.15., 4(0+0+4) – Hármás-04: 2014.05.25., 3(0+0+3); 2014.06.15., 16(0+0+16) – Hármás-05: 2014.05.25., 2(0+0+2); 2014.06.15., 3(0+0+3) – Hármás-06: 2014.06.15., 1(0+0+1) – Hármás-07: 2014.05.25., 10(0+0+10); 2014.06.15., 4(2+2) – Hármás-08: 2014.05.25., 2(0+0+2); 2014.06.15., 40(0+0+40) – Hármás-09: 2014.05.25., 7(0+0+7); 2014.06.15., 2(0+0+2) – Hármás-10: 2014.05.15., 1(0+0+1); 2014.05.27., 12(0+0+12) – Hármás-11: 2014.05.17., 20(0+0+20); 2014.05.27., 23(0+0+23); 2014.06.17., 60(0+0+60) – Hármás-12: 2014.05.15., 1(0+0+1); 2014.05.27., 14(0+0+14); 2014.06.17., 3(0+0+3) – Hármás-14: 2014.05.27., 3(0+0+3); 2014.06.17., 3(0+0+3) – Hármás-15: 2014.05.16., 1(0+0+1) – Hármás-16: 2014.05.26., 3(0+0+3) – Hármás-17: 2014.05.27., 6(0+0+6) – Hármás-18: 2014.05.27., 4(0+0+4) – Hármás-19: 2014.06.16., 3(0+0+3) – Hármás-20: 2014.06.16., 3(0+0+3) – Hármás-21: 2014.05.26., 8(4+4); 2014.06.16., 5(0+0+5) – Hármás-22: 2014.05.26., 3(0+0+3); 2014.06.16., 3(0+0+3) – Hármás-23: 2014.06.16., 1(0+0+1) – Hármás-24: 2014.06.17., 12(0+0+12) – Hármás-25: 2014.05.27., 2(0+0+2) – Hármás-26: 2014.06.16., 1(0+0+1) – Hármás-27: 2014.05.26., 1(0+0+1); 2014.06.16., 1(0+0+1) – HB-02: 2014.05.13., 2(0+0+2); 2014.06.13., 1(1+0) – HB-04: 2014.05.13., 1(0+0+1); 2014.05.23., 5(3+2); 2014.06.13., 4(0+0+4) – HB-05: 2014.05.13., 2(0+0+2); 2014.05.23., 6(0+0+6); 2014.06.13., 15(0+0+15) – HB-06: 2014.05.23., 3(0+0+3); 2014.06.13., 7(0+0+7) – HB-07: 2014.05.23., 2(0+0+2); 2014.06.13., 1(0+0+1) – HB-08: 2014.05.23., 1(0+0+1) – HB-10: 2014.05.13., 3(0+0+3); 2014.05.23., 1(0+0+1); 2014.06.13., 1(0+0+1).

AESHNIDAE

Aeshna affinis Vander Linden, 1820 — **Adult data:** Hármás-03: 2014.06.15., 1(0+1).

Aeshna isosceles (Müller, 1767) — **Adult data:** Sebes-15: 2014.05.25., 1(0+0+1).

Anax imperator Leach, 1815 — **Exuvial data:** Sebes-01: 2014.06.14., 1(0+1) – Sebes-05: 2014.05.24., 1(1+0) – Sebes-09: 2014.05.24., 1(0+1); 2014.06.14., 1(1+0) – Hármás-03: 2014.06.15., 1(0+1).

Anax parthenope (Selys, 1839) — **Adult data:** HB-09: 2014.05.23., 1(0+0+1); 2014.06.13., 1(0+0+1) – HB-10: 2014.06.13., 1(0+0+1).

Brachytroton pratense (Müller, 1764) — **Exuvial data:** HB-09: 2014.05.23., 1(1+0).

GOMPHIDAE

Gomphus vulgatissimus (Linnaeus, 1758) — **Exuvial data:** Sebes-01: 2014.05.12., 52(26+25+1); 2014.05.24., 13(6+6+1); 2014.06.14., 7(4+3) — Sebes-02: 2014.05.12., 3(2+1) — Sebes-03: 2014.05.12., 8(4+4) — Sebes-04: 2014.05.12., 1(1+0) — Sebes-05: 2014.05.12., 2(2+0); 2014.05.24., 4(0+4) — Sebes-06: 2014.05.12., 3(1+2); 2014.05.24., 1(0+1) — Sebes-07: 2014.05.12., 5(1+4) — Sebes-08: 2014.05.12., 4(2+2); 2014.05.24., 2(1+1); 2014.06.14., 2(0+2) — Sebes-09: 2014.05.13., 18(9+9); 2014.05.24., 12(4+8); 2014.06.14., 2(2+0) — Sebes-10: 2014.05.13., 11(4+7); 2014.05.24., 3(2+1); 2014.06.14., 1(0+1) — Sebes-11: 2014.05.14., 1(0+1) — Sebes-12: 2014.05.14., 10(5+5); 2014.06.13., 1(1+0) — Sebes-13: 2014.05.25., 2(1+1); 2014.05.14., 3(2+1) — Sebes-14: 2014.05.14., 3(3+0); 2014.05.25., 2(2+0) — Sebes-15: 2014.05.14., 3(0+3); 2014.05.25., 3(2+1) — Hármás-01: 2014.05.14., 12(8+4); 2014.05.25., 4(2+2); 2014.06.15., 1(0+1) — Hármás-02: 2014.05.13., 9(4+5); 2014.05.25., 4(4+0); 2014.06.15., 1(1+0) — Hármás-03: 2014.05.14., 7(4+3); 2014.05.25., 5(3+2); 2014.06.15., 1(1+0) — Hármás-04: 2014.05.14., 3(1+2); 2014.05.25., 1(0+1) — Hármás-05: 2014.05.15., 3(2+1); 2014.05.25., 4(0+4) — Hármás-06: 2014.05.15., 3(1+2); 2014.05.25., 5(0+5) — Hármás-07: 2014.05.15., 6(3+3) — Hármás-08: 2014.05.17., 5(3+2); 2014.05.25., 1(0+1) — Hármás-09: 2014.05.17., 3(1+2) — Hármás-10: 2014.05.15., 6(2+4); 2014.05.27., 1(1+0) — Hármás-11: 2014.05.17., 20(6+14); 2014.05.27., 2(2+0); 2014.06.17., 1(0+1) — Hármás-12: 2014.05.15., 22(12+10); 2014.05.27., 1(1+0); 2014.06.17., 3(3+0) — Hármás-13: 2014.05.26., 28(16+12); 2014.06.17., 3(1+2) — Hármás-14: 2014.05.15., 5(3+2); 2014.05.27., 3(3+0); 2014.06.17., 2(0+2) — Hármás-15: 2014.05.16., 8(5+3); 2014.05.26., 1(0+1) — Hármás-16: 2014.05.26., 1(0+1) — Hármás-17: 2014.05.16., 2(0+2); 2014.05.27., 6(4+2) — Hármás-18: 2014.05.16., 27(13+14); 2014.05.27., 3(1+2) — Hármás-19: 2014.05.16., 33(18+15); 2014.05.26., 7(1+5+1) — Hármás-20: 2014.05.16., 23(11+12); 2014.05.26., 4(2+2); 2014.06.16., 1(0+1) — Hármás-21: 2014.05.16., 16(9+7); 2014.05.26., 1(1+0) — Hármás-22: 2014.05.16., 6(3+3) — Hármás-23: 2014.05.17., 14(6+8); 2014.05.26., 4(2+1+1) — Hármás-24: 2014.05.17., 2(1+1); 2014.05.27., 2(0+2) — Hármás-25: 2014.05.27., 7(1+6) — Hármás-26: 2014.05.17., 9(2+7) — Hármás-27: 2014.05.26., 8(6+2) — HB-10: 2014.05.13., 1(0+1). — **Adult data:** Sebes-01: 2014.05.12., 1(1+0) — Sebes-03: 2014.05.24., 1(1+0) — Sebes-04: 2014.05.12., 1(0+0+1) — Sebes-05: 2014.05.12., 1(0+0+1) — Sebes-11: 2014.05.25., 1(0+1) — Sebes-14: 2014.05.25., 1(0+1) — Sebes-15: 2014.05.25., 1(0+0+1) — Hármás-07: 2014.05.15., 1(0+1) — Hármás-14: 2014.05.15., 1(0+1) — Hármás-17: 2014.05.27., 1(1+0) — Hármás-19: 2014.06.16., 1(0+0+1) — Hármás-21: 2014.05.16., 1(0+0+1) — Hármás-22: 2014.05.26., 1(0+0+1) — Hármás-27: 2014.05.26., 1(1+0).

Gomphus flavipes (Charpentier, 1825) — **Exuvial data:** Sebes-01: 2014.05.12., 1(1+0); 2014.05.24., 15(4+7+4); 2014.06.14., 51(17+29+5) — Sebes-02: 2014.05.24., 1(1+0) — Sebes-03: 2014.05.24., 5(4+1); 2014.06.14., 4(2+2) — Sebes-04: 2014.05.24., 2(0+2); 2014.06.14., 13(1+12) — Sebes-05: 2014.05.24., 7(3+4); 2014.06.14., 35(14+19+2) — Sebes-06: 2014.05.24., 6(3+3); 2014.06.14., 44(16+25+3) — Sebes-07: 2014.05.24., 2(0+2); 2014.06.14., 12(6+6) — Sebes-08: 2014.05.24., 1(0+1); 2014.06.14., 22(11+11) — Sebes-09: 2014.05.24., 2(0+2); 2014.06.14., 58(25+33) — Sebes-10: 2014.05.24., 4(3+1); 2014.06.14., 25(12+13) — Sebes-11: 2014.05.25., 1(0+1); 2014.06.13., 18(11+6+1) — Sebes-12: 2014.05.25., 2(1+1); 2014.06.13., 25(12+13) — Sebes-13: 2014.05.25., 2(1+1); 2014.06.14., 35(20+14+1) — Sebes-14: 2014.06.15., 20(8+11+1) — Sebes-15: 2014.05.25., 1(1+0); 2014.06.15., 24(15+9) — Hármás-01: 2014.05.25., 11(7+2+2); 2014.06.15., 21(10+11) — Hármás-02: 2014.05.25., 15(11+4); 2014.06.15., 31(14+13+4) — Hármás-03: 2014.05.25., 13(6+6+1); 2014.06.15., 38(17+17+4) — Hármás-04: 2014.05.25., 1(0+1); 2014.06.15., 11(4+4+3) — Hármás-05: 2014.05.25., 2(2+0); 2014.06.15., 11(3+7+1) — Hármás-06: 2014.06.15., 6(6+0) — Hármás-07: 2014.05.25., 13(4+8+1); 2014.06.15., 14(9+4+1) — Hármás-08: 2014.05.17., 2(1+1); 2014.06.15., 10(6+3+1) — Hármás-09: 2014.05.25., 1(1+0); 2014.06.15., 6(2+4) — Hármás-10: 2014.05.27., 2(2+0); 2014.06.15., 11(4+7) — Hármás-11: 2014.05.27., 11(7+4); 2014.06.17., 15(12+3) — Hármás-12: 2014.05.15., 1(0+1); 2014.05.27., 5(3+1+1); 2014.06.17., 9(2+7) — Hármás-13: 2014.05.26., 3(2+1); 2014.06.17., 12(7+5) — Hármás-14: 2014.06.17., 7(4+3) — Hármás-15: 2014.06.17., 7(4+3) — Hármás-16: 2014.05.26., 4(0+4); 2014.06.17., 23(7+16) — Hármás-17:

2014.05.27., 3(1+2); 2014.06.16., 23(14+9) – Hármás-18: 2014.05.27., 8(4+4); 2014.06.16., 100(44+54+2) – Hármás-19: 2014.05.16., 1(0+1); 2014.05.26., 4(1+3); 2014.06.16., 10(6+4) – Hármás-20: 2014.05.26., 10(5+4+1); 2014.06.16., 37(22+14+1) – Hármás-21: 2014.05.26., 20(15+5); 2014.06.16., 52(24+28) – Hármás-22: 2014.05.26., 3(2+1); 2014.06.16., 17(7+9+1) – Hármás-23: 2014.05.26., 8(6+2); 2014.06.16., 72(38+34) – Hármás-24: 2014.05.27., 9(3+6); 2014.06.17., 45(22+21+2) – Hármás-25: 2014.05.27., 9(4+ 5); 2014.06.17., 76(46+30) – Hármás-26: 2014.05.26., 3(2+1); 2014.06.16., 12(5+7) – Hármás-27: 2014.05.26., 3(2+1); 2014.06.16., 48(20+28) – HB-04: 2014.05.23., 1(0+1) – HB-05: 2014.05.23., 1(1+0) – HB-09: 2014.06.13., 1(1+0). — **Adult data:** Sebes-03: 2014.05.24., 5(0+0+5) – Sebes-04: 2014.06.14., 2(0+1+1) – Sebes-12: 2014.05.25., 1(0+1) – Sebes-15: 2014.05.25., 2(0+0+2) – Hármás-02: 2014.06.15., 4(0+0+4) – Hármás-03: 2014.05.25., 1(0+1) – Hármás-10: 2014.05.27., 1(0+0+1); 2014.06.15., 1(0+0+1) – Hármás-11: 2014.06.17., 2(0+0+2) – Hármás-12: 2014.05.27., 1(0+0+1); 2014.06.17., 1(0+0+1) – Hármás-18: 2014.06.16., 1(0+0+1) – Hármás-19: 2014.06.16., 1(0+0+1) – Hármás-20: 2014.06.16., 6(0+0+6) – Hármás-23: 2014.06.16., 3(0+0+3) – Hármás-25: 2014.06.17., 1(0+0+1) – HB-02: 2014.06.13., 1(0+0+1).

Ophiogomphus cecilia (Fourcroy, 1758) — **Exuvial data:** Sebes-09: 2014.05.24., 1(0+1).

Onychogomphus forcipatus (Linnaeus, 1758) — **Exuvial data:** Sebes-01: 2014.05.12., 2(0+2); 2014.05.24., 2(0+2); 2014.06.14., 29(12+17) – Sebes-02: 2014.05.24., 2(0+2); 2014.06.14., 16(5+11) – Sebes-03: 2014.05.24., 3(0+3); 2014.06.14., 5(2+3) – Sebes-04: 2014.06.14., 5(2+3) – Sebes-05: 2014.05.24., 2(2+0); 2014.06.14., 31(15+13+3) – Sebes-06: 2014.05.24., 1(1+0); 2014.06.14., 8(5+3) – Sebes-07: 2014.06.14., 26(12+14) – Sebes-08: 2014.06.14., 6(2+3+1) – Sebes-09: 2014.06.14., 10(6+4) – Sebes-10: 2014.06.14., 2(0+2) – Sebes-11: 2014.06.13., 5(1+4) – Sebes-12: 2014.06.13., 2(1+1) – Sebes-14: 2014.06.15., 1(1+0). — **Adult data:** Sebes-03: 2014.05.24., 1(0+0+1) – Sebes-04: 2014.06.14., 1(1+0).

CORDULIIDAE

Cordulia aenea (Linnaeus, 1758) — **Adult data:** Hármás-23: 2014.05.17., 1(0+0+1).

LIBELLULIDAE

Libellula fulva Müller, 1764 — **Adult data:** Sebes-01: 2014.05.24., 1(0+0+1) – Hármás-07: 2014.06.15., 3(0+0+3).

Orthetrum cancellatum (Linnaeus, 1758) — **Exuvial data:** Hármás-13: 2014.05.26., 1(0+1) – Hármás-21: 2014.06.16., 1(1+0) – HB-10: 2014.06.13., 2(2+0). — **Adult data:** Hármás-03: 2014.05.25., 2(1+1) – Hármás-09: 2014.05.17., 1(0+0+1) – Hármás-13: 2014.05.26., 1(0+0+1).

Orthetrum albistylum (Selys, 1848) — **Exuvial data:** Sebes-01: 2014.06.14., 4(2+2) – Sebes-10: 2014.05.13., 1(0+1) – Hármás-06: 2014.06.15., 1(0+1) – Hármás-11: 2014.05.27., 2(0+2) – Hármás-12: 2014.05.27., 1(0+1) – Hármás-13: 2014.05.26., 1(0+1); 2014.06.17., 3(1+2) – Hármás-14: 2014.05.27., 1(1+0); 2014.06.17., 2(1+1) – Hármás-18: 2014.06.16., 1(1+0) – HB-01: 2014.06.13., 1(0+1) – HB-03: 2014.06.13., 1(0+1) – HB-10: 2014.05.23., 1(0+1); 2014.06.13., 8(2+5+1). — **Adult data:** Sebes-02: 2014.06.14., 1(0+0+1) – Sebes-15: 2014.05.25., 1(0+0+1) – Hármás-06: 2014.06.15., 1(0+0+1) – Hármás-08: 2014.06.15., 1(0+0+1) – Hármás-21: 2014.06.16., 3(2+1) – Hármás-22: 2014.06.16., 1(1+0) – HB-01: 2014.06.13., 3(0+0+3) – HB-02: 2014.06.13., 2(1+1) – HB-04: 2014.06.13., 1(0+0+1) – HB-05: 2014.06.13., 2(0+0+2) – HB-06: 2014.06.13., 1(0+0+1) – HB-07: 2014.06.13., 1(0+0+1).

Gomphidae assemblages

Gomphus flavipes and *G. vulgatissimus* were the most frequent gomphid species in the studied rivers: both of them occurred at all sampling sites along the Sebes-Körös and Hármás-Körös, and were also found along the Hortobágy-Berettyó, however, at few localities (Figs. 2–3). *Onychogomphus forcipatus* and *O. cecilia* were only recorded from the Sebes-Körös, but the former occurred all along the studied river section except the lowest part of it, while the latter was only collected at one locality (Figs. 4–5).

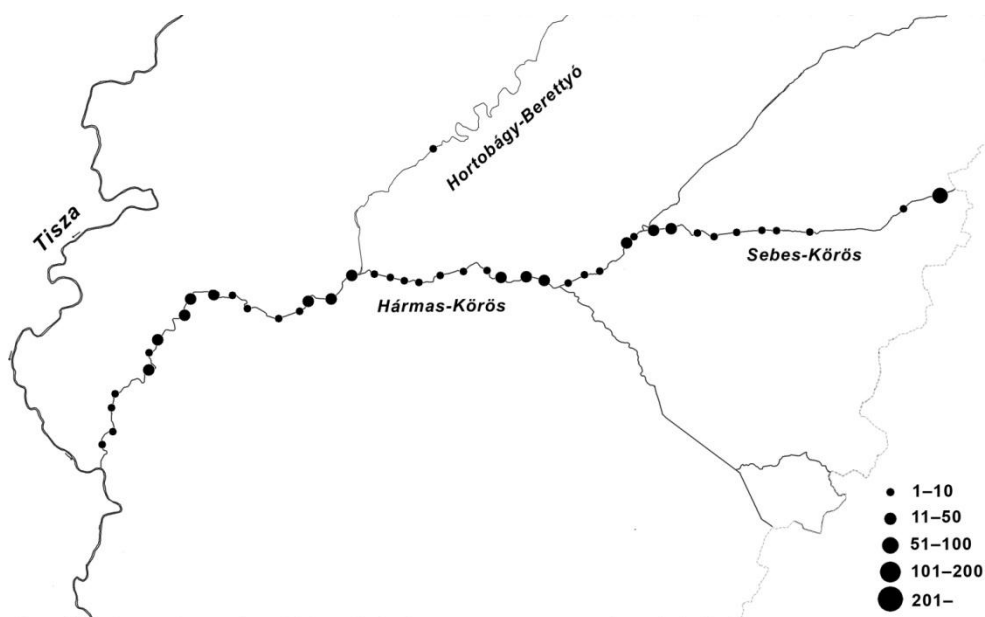


Figure 2. Occurrences of *G. vulgatissimus* along the studied rivers based on collection of exuviae carried out in 2014 (the size of the dots indicate the number of individuals on 20 meters).

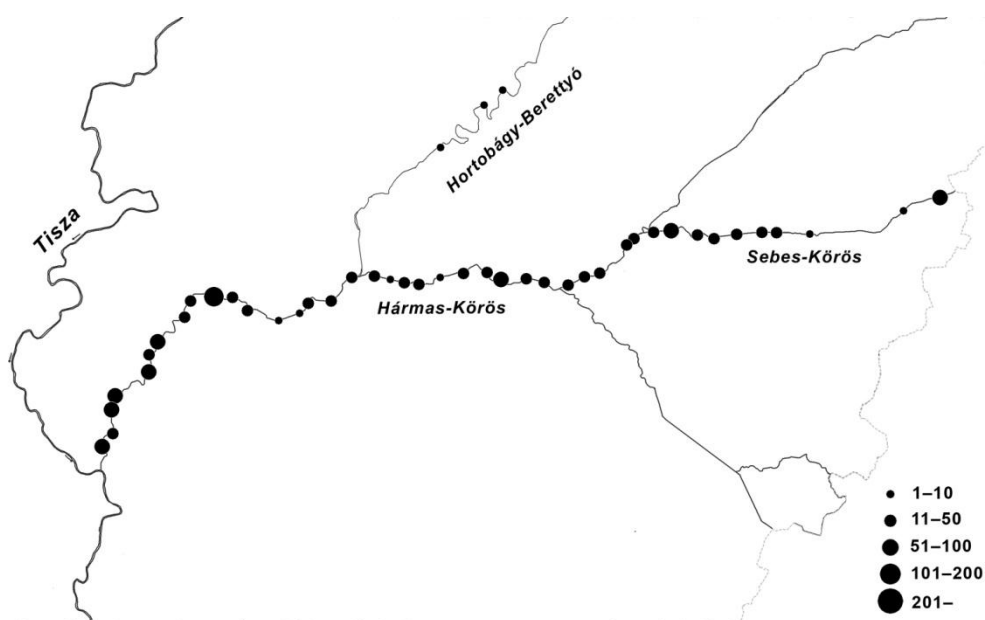


Figure 3. Occurrences of *G. flavipes* along the studied rivers based on collection of exuviae carried out in 2014 (the size of the dots indicate the number of individuals on 20 meters).

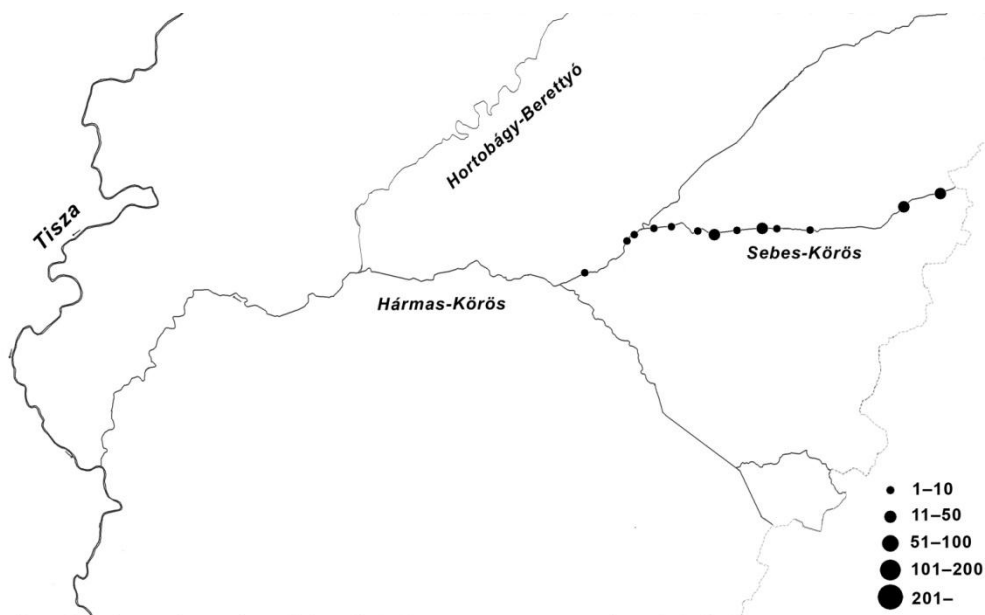


Figure 4. Occurrences of *O. forcipatus* along the studied rivers based on collection of exuviae carried out in 2014 (the size of the dots indicate the number of individuals on 20 meters).

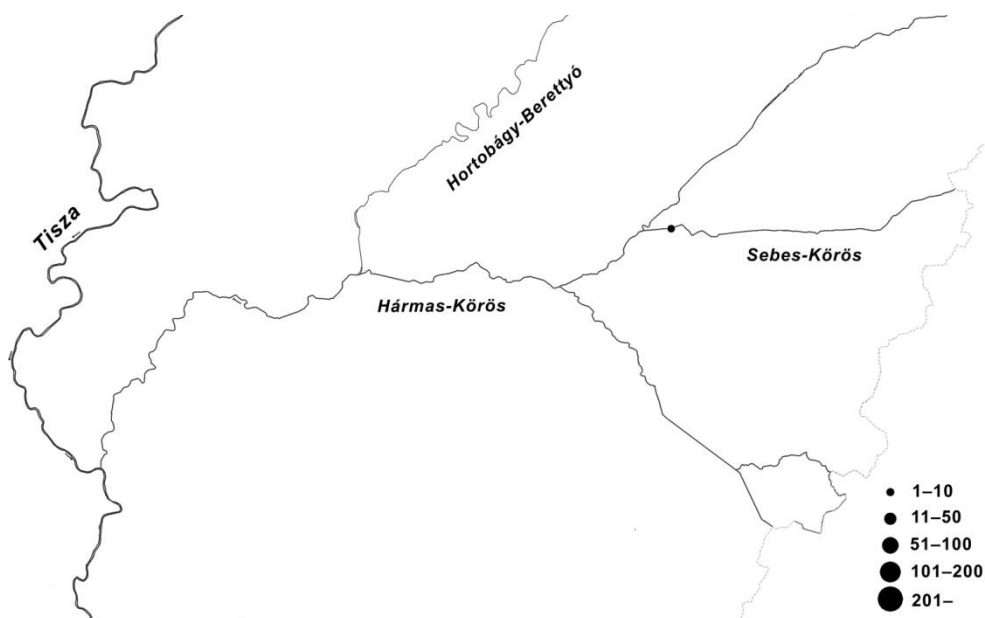


Figure 5. Occurrences of *O. cecilia* along the studied rivers based on collection of exuviae carried out in 2014 (the size of the dots indicate the number of individuals on 20 meters).

Comparing the studied rivers, the Sebes-Körös seemed to be the most favourable for gomphids in respect of abundances: mean number of exuviae on a 20 metre long stretch was the highest there. This value was similar, but somewhat lower for the much larger river Hármas-Körös. Compared to them, the Hortobágy-Berettyó had negligibly low mean number, less than 'half' individual on 20 metre (Fig. 6).

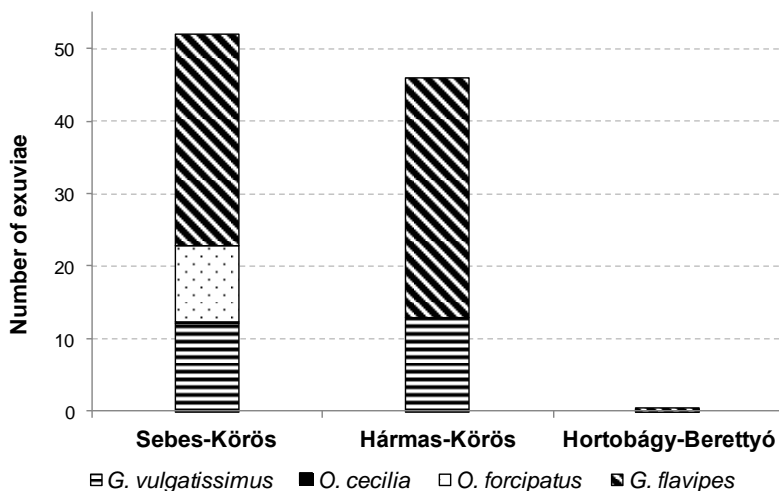


Figure 6. Mean numbers of individuals of Gomphidae on a 20 metre long stretch along the studied rivers.

Both in the Sebes-Körös and the Hármas-Körös *G. flavipes* was the dominant gomphid species (Fig. 6). However, relative abundances varied from site to site within a given river (Fig. 7). There were some sampling sites along the Sebes-Körös where either *G. vulgatissimus* or *O. forcipatus* was the dominant. In the case of the Hármas-Körös the higher relative abundance of *G. vulgatissimus* was apparent at the middle river section. The numbers of individuals also varied widely among sites within a given river (Sebes-Körös: ranged from 21 to 172; Hármas-Körös: ranged from 10 to 138 exuviae), indicating local differences in habitat conditions (Fig. 7). Along the Sebes-Körös by far the highest number of individuals was obtained at the uppermost site, which may be due to the damming effect of the submerged weir at Körösnagyharsány. Additionally, it is evident that along the Sebes-Körös the number of individuals of *O. forcipatus* decreased downstream, while along the Hármas-Körös the number of *G. flavipes* increased remarkably downstream from Hármas-18 site (Fig. 7).

In conclusion, in terms of nature conservation it is the Sebes-Körös, especially its heterogeneous upper section, which is of the greatest importance with the co-occurrence of the four Hungarian gomphid species, three of them having stable populations along the entire studied river section. In the Hármas-Körös only the two *Gomphus* species occur, their stable populations exist all along the river. The Hortobágy-Berettyó has the lowest conservation value, since only the two *Gomphus* species and only sporadically can be found along the studied section.

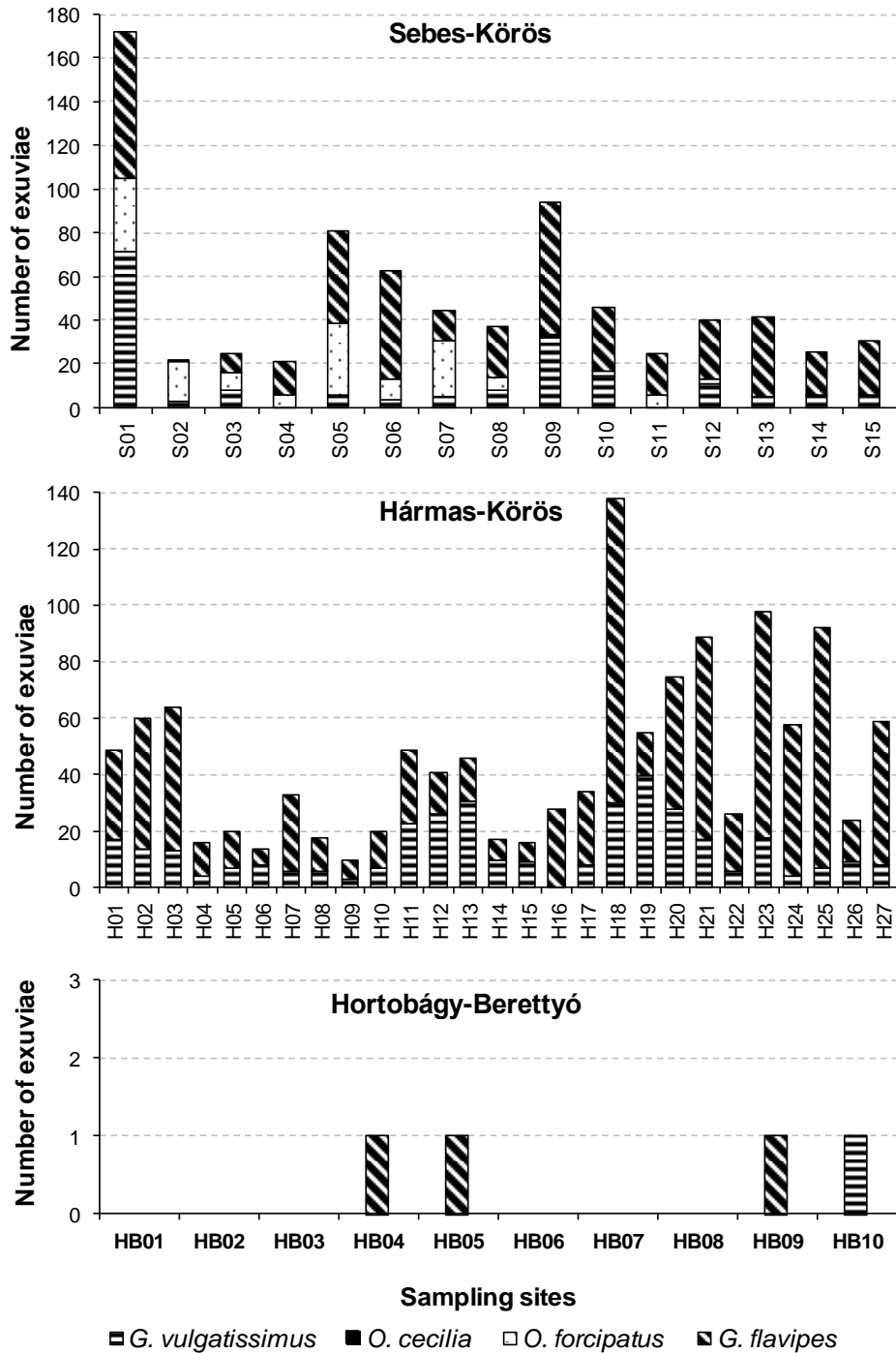


Figure 7. Numbers of individuals of Gomphidae at each sampling site along the Sebes-Körös, Hármaskörös and Hortobágy-Berettyó. Sampling sites are given according to Table 1: S01–S15 = Sebes-01–Sebes-15, H01–H27 = Hármaskörös-01–Hármaskörös-27, HB01–HB10 = HB-01–HB-10.

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