

Data on the Chironomidae (Diptera) fauna of streams originating from the Mecsek Mountains, SW Hungary

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Boóz, B. & Móra, A.: *Data on the Chironomidae (Diptera) fauna of streams originating from the Mecsek Mountains, SW Hungary.*

Abstract: Between 2017 and 2020, chironomid pupal exuviae were collected from streams originating from the Mecsek Mountains. Altogether, 7892 exuviae belonging to 112 taxa (10 Tanypodinae, 3 Diamesinae, 2 Prodiamesinae, 44 Orthoclaadiinae and 53 Chironominae) were identified from 11 sampling sites. The Hungarian occurrence of nine species (*Conchapelopia triannulata* (Goetghebuer, 1921), *Chaetocladius laminatus* Brundin, 1947, *Limnophyes punctipennis* (Goetghebuer, 1919), *Orthocladus lignicola* Kieffer, 1914, *Paraphaenocladus impensus* (Walker, 1856), *Paracladopelma mikianum* (Goetghebuer, 1937), *Polypedilum pullum* (Zetterstedt, 1838), *Polypedilum quadriguttatum* Kieffer, 1921 and *Tanytarsus gibbosiceps* Kieffer, 1922) were proved at first time.

Keywords: Chironomidae, non-biting midges, exuviae, new records

Introduction

The chironomid fauna of Hungary, despite the many new records from various studies, is far from fully known. It is especially true for the South-Western part of the country, where only sporadic faunistical surveys provided information regarding the occurrence of chironomid species of this region. Previous studies mainly focused on streams in southern catchment area of Lake Balaton (Móra 2014, Móra et al. 2007), Drava River (Móra & Csabai 2019) and Mecsek Mountains (see below).

From the Mecsek Mountains sporadic data were published in Gidó & Lakatos (2003) and Gebhardt (1960, 1963), recording the occurrence of three species and mentioning many invalid species names. In a survey of Diptera in Mecsek Mountains 35 chironomid taxa were recorded based on collecting adults (Gebhardt 1962). The next extensive faunistical survey on chironomids was performed in 2009-2010, in which further 19 chironomid taxa were found from 16 sampling sites, although, this study focused on investigation of larvae exclusively (Méhész et al. 2012). Altogether 57 chironomid species have been recorded from the Mecsek Mountains. However, the chironomid fauna in the areas between the Mecsek Mountains and the Drava River and between the Mecsek Mountains and the Danube River is completely unknown.

Identification of larvae provides limited information for faunistical studies, due to multiple problems with identification, i.e. the possible morphological differences

between the different larval stages, closely related species are often indistinguishable in larval form and many species are not known as larvae. It is also noted that larvae sampling methods are not properly sensitive to rare species (e.g. MÓRA 2014).

In contrast, pupal exuviae is acknowledged as a suitable technique to provide reliable data about distribution of chironomid species. Recently, studies on chironomid pupal exuviae has become more common in Hungary, because it can be collected and identified easier than larvae. Therefore, this method is more appropriate for faunistical studies (e.g. WILSON 1996).

In this paper, new occurrence data for the chironomid fauna of main watercourses originating from the Mecsek Mountains are given, based on collection of pupal exuviae.

Material and methods

Four watercourses were included in this study: Pécsi-víz, Völgységi-patak, Karasica and Megyefai-árok. Floating pupal exuviae were collected at 11 sites along the selected streams between 2017 and 2020 (Table 1), according to the Chironomid Pupal Exuvial Technique (WILSON 1996). Exuviae were preserved in 70% ethanol until further laboratory processing. All specimens were mounted on microscope slides for detailed investigations. Species identification was based on morphological characteristics according to keys and descriptions by LANGTON & VISSER (2003), EKREM (2004), MICHIELS & SPIES (2002), STUR & EKREM (2006) and VALLENDUUK & MOROZOVA (2005). The nomenclature followed SPIES & SAETHER (2013) for species names and LANGTON & VISSER (2003) for pupal exuvial forms.

New records in the species list contain the following information: locality with administration unit in parentheses, the date of collection, the total number of individuals (identified as exuviae), and the abbreviations for names of collectors in alphabetic order (BB = Bernadett Boóz, MA = Arnold Móra).

Results

This survey gives occurrence data of chironomids for the areas between the Mecsek Mountains and the Drava River and between the Mecsek Mountains and Danube River for the first time, resulted in 438 new species-level records for chironomid fauna of South-West Hungary. Altogether, 7892 exuviae belonging to 112 taxa (10 Tanypodinae, 3 Diamesinae, 2 Prodiamesinae, 44 Orthocladiinae and 53 Chironominae) were collected. The Hungarian occurrence of nine species, *Conchapelopia triannulata* (Goetghebuer, 1921), *Chaetocladius laminatus* Brundin, 1947, *Limnophyes punctipennis* (Goetghebuer, 1919), *Orthocladius lignicola* Kieffer, 1914, *Paraphaenocladius impen-sus* (Walker, 1856), *Paracladopelma mikianum* (Goetghebuer, 1937), *Polypedilum pul-lum* (Zetterstedt, 1838), *Polypedilum quadriguttatum* Kieffer, 1921 and *Tanytarsus gib-bosiceps* Kieffer, 1922, were proved at first time. Additionally, many species are rare in Hungary with less than five records. Since no data were known from these streams previously, all species are new in their fauna. Furthermore, 36 species were found in the Mecsek Mountains (i.e. the uppermost sections of the streams) for the first time, which increased the number of species recorded from here to 93. Our results strongly suggest that the chironomid fauna not only of the South Transdanubian region, but that of Hungary is far from being fully discovered.

Table 1: Sampling sites with the date of samplings and exact geographical coordinates as decimal degrees

Sampling sites	Date	Latitude (N)	Longitude (E)
Karasica (Erdősmecske)	29.09.2018.	46.150614	18.5171945
	07.08.2019.		
Karasica (Szederkény)	29.09.2018.	45.9969325	18.4519200
	07.08.2019.		
Karasica (Villány)	29.09.2018.	45.8686430	18.4713895
	07.08.2019.		
Pécsi-víz (Tüskésrét)	30.04.2017.	46.073488	18.255422
	04.08.2017.		
	21.10.2017.		
	29.09.2018.		
	07.08.2019.		
Pécsi-víz (Zók)	30.04.2017.	46.005649	18.098163
	04.08.2017.		
	21.10.2017.		
	29.09.2018.		
	07.08.2019.		
Pécsi-víz (Kémes)	30.04.2017.	45.826025	18.094345
	04.08.2017.		
	21.10.2017.		
	29.09.2018.		
	07.08.2019.		
Völgységi-patak (Magyaregregy)	29.09.2018.	46.2431646	18.3067454
	07.08.2019.		
Völgységi-patak (Hidas)	29.09.2018.	46.2699229	18.5176441
	07.08.2019.		
Völgységi-patak (Bonyhád)	29.09.2018.	46.3116051	18.5379408
	07.08.2019.		
Megyefai-árok, Megyefa (Bükkösd)	01.02.2020.	46.1006241	18.0014996
Megyefai-árok, Szentdomján (Bükkösd)	01.02.2020.	46.1063628	18.0291618

New species in the Hungarian fauna

Conchapelopia triannulata (Goetghebuer, 1921) The species has been recorded from Near East, North Africa and some countries of Europe (SPIES & SÆTHER 2013). Although it is known to occur in Austria and Slovakia, it was not listed among the species expected to occur in Hungary (MÓRA & DÉVAI 2004). The identification of the species of the genus is difficult, but the morphological characters of the collected exuvium clearly fit in with the description by LANGTON & VISSER (2003). The species lives in different types of running waters (MICHIELS & SPIES 2002).

Chaetocladius laminatus Brundin, 1947 The species occurs in the East Palaearctic region and many countries of Europe including Austria and Romania (SPIES & SÆTHER

2013). Accordingly, the occurrence of the species in Hungary has been expected (MÓRA & DÉVAI 2004). The species typically inhabits the hygropetric zone of springs and small watercourses (FITTKAU & REISS 1978, MOLLER PILLOT 2013).

Limnophyes punctipennis (Goetghebuer, 1919) The species has been known from Western Europe (SPIES & SÆTHER 2013) therefore was not listed among the species expected to occur in Hungary (MÓRA & DÉVAI 2004). The species inhabits temporary and stagnant streams and lakes (MOLLER PILLOT 2013). Parthenogenetic species with more generations a year (LANGTON & VISSER 2003, SÆTHER 1990).

Orthocladius lignicola Kieffer, 1914 Holarctic species, widespread in Europe, thus its Hungarian occurrence is not surprising (MÓRA & DÉVAI 2004). The species inhabits springs, small watercourses and rivers, the larvae live on wood material (FITTKAU & REISS 1978, MOLLER PILLOT 2013).

Paraphaenocladius impensus (Walker, 1856) Widespread species all over the world, known from many countries of Europe (SPIES & SÆTHER 2013). Accordingly, its occurrence in Hungary is not surprising (MÓRA & DÉVAI 2004). Moreover, this species is the first Hungarian representative of its genus. The species can be found in a wide range of aquatic habitats (FITTKAU & REISS 1978, MOLLER PILLOT 2013).

Paracladopelma mikianum (Goetghebuer, 1937) Widespread species all over the world, but was recorded only from few countries of Europe (SPIES & SÆTHER 2013). However, it was listed among the species expected to occur in Hungary (MÓRA & DÉVAI 2004). The species inhabits fast-flowing streams and rivers (FITTKAU & REISS 1978, MOLLER PILLOT 2009).

Polypedilum pullum (Zetterstedt, 1838) Widespread species in the Palaearctic region (SPIES & SÆTHER 2013), inhabiting streams, rivers and lakes (FITTKAU & REISS 1978, MOLLER PILLOT 2009). In Hungary the species name was mentioned by KOSKENNIEMI (1989) from the Kisköre reservoir, but only for larvae that were not identified certainly (as „*Polypedilum brevantennatum*-t. (?*pullum*)”). Accordingly, our records are the first ones that prove the Hungarian occurrence of this species.

Polypedilum quadriguttatum Kieffer, 1921 Widespread species in the Palaearctic region occurring in many countries in Europe (SPIES & SÆTHER 2013). However, it was not listed among the species expected to occur in Hungary (MÓRA & DÉVAI 2004). The species inhabits streams and rivers (MOLLER PILLOT 2009). Although Hungary is among the countries where the species occurs in the Fauna Europaea database (SPIES & SÆTHER 2013), no data have been found on its Hungarian occurrence. Accordingly, our records are regarded as the first ones that prove the occurrence of this species in Hungary.

Tanytarsus gibbosiceps Kieffer, 1922 The species is known from some countries in Western, Northern and Eastern Europe (SPIES & SÆTHER 2013). Although it occurs in Austria and Slovakia, it was not listed among the species expected to occur in Hungary (MÓRA & DÉVAI 2004). The species lives in springs and lakes (FITTKAU & REISS 1978, LANGTON & VISSER 2003).

Annotated list of species with new records

Tanypodinae

Ablabesmyia longistyla Fittkau, 1962: Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 7, BB-MA; Pécsi-víz (Zók): 30.09.2018, 5, BB-MA.

Conchapelopia melanops (Meigen, 1818): Karasica (Szederkény): 30.09.2018, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 18, BB-MA; 04.08.2017, 8, BB-MA; Pécsi-víz (Zók): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 04.08.2017, 1, BB-MA; 30.09.2018, 4, BB-MA.

Conchapelopia triannulata (Goetghebuer, 1921): Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA. New species in the fauna of Hungary.

Macropelopia nebulosa (Meigen, 1804): Pécsi-víz, Tüskésrét (Pécs): 04.08.2017, 1, BB-MA.

Procladius cf. *choreus* (Meigen, 1804): Karasica (Erdősmecske): 07.08.2019, 23, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA. The species of the genus *Procladius* are hardly distinguishable as pupal exuviae, because the taxonomy of the genus is not clarified and the immature stages of many species are not known. The morphological characteristics of the collected specimens more or less fit in with the description for *Procladius choreus* by LANGTON & VISSER (2003), but, due to the taxonomical problems with the genus, it can not be excluded that they belong to other or more species. However, *P. choreus* is apparently one of the most widespread species in Hungary (MÓRA & DÉVAI 2004) occurring in Mecsek Mts. too (GEBHARDT 1962).

Procladius cf. *sagittalis* (Kieffer, 1909): Karasica (Villány): 07.08.2019, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA. See details of taxonomic problems with the genus *Procladius* in the previous note at *P. choreus*. According to the key by LANGTON & VISSER (2003), this pupal exuviae form represents different species. Due to the habitat characteristics, the collected specimens most probably belong to *Procladius sagittalis*.

Rheopelopia maculipennis (Zetterstedt, 1838): Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA.

Rheopelopia ornata (Meigen, 1838): Pécsi-víz (Kémes): 30.04.2017, 2, BB-MA.

Tanypus punctipennis Meigen, 1818: Karasica (Erdősmecske): 30.09.2018, 1, BB-MA.

Zavrelimyia barbatipes (Kieffer, 1911): Völgységi-patak (Magyaregregy): 30.09.2018, 1, BB-MA.

Diamesinae

Diamesa cinerella-Gr.: Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 3, BB-MA. The members of this species group are hardly distinguishable as pupal exuviae (LANGTON & VISSER 2003). The species group is known from the Mecsek Mts. as larvae too (MÉHES et al. 2012).

Potthastia gaedii (Meigen, 1838): Karasica (Szederkény): 07.08.2019, 2, BB-MA; Karasica (Villány): 30.09.2018, 11, BB-MA; 07.08.2019, 2, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 3, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 1, BB-MA.

Prodiamesinae

Odontomesa fulva (Kieffer, 1919): Karasica (Erdősmecske): 30.09.2018, 14, BB-MA.

Prodiamesa olivacea (Meigen, 1818): Karasica (Erdősmecske): 30.09.2018, 16, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 04.08.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 3, BB-MA.

Potthastia longimanus Kieffer, 1922: Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA.

Orthoclaadiinae

Brillia longifurca Kieffer, 1921: Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 1, BB-MA.

Chaetocladius laminatus Brundin, 1947: Megyefai-árok, Szentdomján (Bükkösd): 01.02.2020, 1, BB. New species in the Hungarian fauna.

Chaetocladius piger (Goetghebuer, 1913): Megyefai-árok, Megyefa (Bükkösd): 01.02.2020, 5, BB.

Corynoneura coronata Edwards, 1924: Karasica (Erdősmecke): 30.09.2018, 1, BB-MA; Karasica (Villány): 30.09.2018, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 07.08.2019, 3, BB-MA; Pécsi-víz (Zók): 30.09.2018, 2, BB-MA; 07.08.2019, 1, BB-MA.

Corynoneura lobata Edwards, 1924: Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Kémes): 30.09.2018, 4, BB-MA.

Cricotopus bicinctus (Meigen, 1818): Karasica (Szederkény): 30.09.2018, 4, BB-MA; Karasica (Villány): 30.09.2018, 45, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 401, BB-MA; 04.08.2017, 9, BB-MA; 21.10.2017, 3, BB-MA; 30.09.2018, 32, BB-MA; 07.08.2019, 2, BB-MA; Pécsi-víz (Zók): 30.04.2017, 130, BB-MA; 04.08.2017, 37, BB-MA; 21.10.2017, 4, BB-MA; 30.09.2018, 14, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.09.2018, 5, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 7, BB-MA; 07.08.2019, 21, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA; 07.08.2019, 3, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 5, BB-MA; 07.08.2019, 1, BB-MA.

Cricotopus curtus Hirvenoja, 1973: Karasica (Szederkény): 30.09.2018, 2, BB-MA; Karasica (Villány): 30.09.2018, 41, BB-MA; 07.08.2019, 2, BB-MA; Pécsi-víz (Kémes): 30.09.2018, 33, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz (Zók): 30.09.2018, 19, BB-MA; 07.08.2019, 10, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 116, BB-MA; 07.08.2019, 38, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 2, BB-MA; 07.08.2019, 14, BB-MA.

Cricotopus intersectus (Stæger, 1839): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA.

Cricotopus sylvestris (Fabricius, 1794): Pécsi-víz (Kémes): 30.04.2017, 2, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 30.04.2017, 5, BB-MA.

Cricotopus triannulatus (Macquart, 1826): Pécsi-víz (Kémes): 30.04.2017, 79, BB-MA; 04.08.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 30.04.2017, 37, BB-MA; 04.08.2017, 8, BB-MA; 21.10.2017, 11, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 3, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA.

Cricotopus trifascia Edwards, 1929: Pécsi-víz (Kémes): 30.04.2017, 9, BB-MA; Pécsi-víz (Zók): 21.10.2017, 1, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Cricotopus tristis Hirvenoja, 1973: Karasica (Szederkény): 30.09.2018, 1, BB-MA.

Cricotopus vierriensis Goetghebuer, 1935: Karasica (Villány): 30.09.2018, 22, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 10, BB-MA; 30.09.2018, 3, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA.

Epicocladus ephemerae (Kieffer, 1924): Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Eukiefferiella brevicar (Kieffer, 1911): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA.

Eukiefferiella claripennis (Lundbeck, 1898): Karasica (Erdősmecke): 07.08.2019, 1, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 2, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 1, BB-MA.

Eukiefferiella devonica (Edwards, 1929): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA.

Eukiefferiella gracei (Edwards, 1929): Pécsi-víz (Kémes): 30.04.2017, 5, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 4, BB-MA; 21.10.2017, 3, BB-MA; 30.09.2018, 2, BB-MA.

Heleniella ornaticollis (Edwards, 1929): Karasica (Erdősmecke): 30.09.2018, 1, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.09.2018, 1, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 52, BB-MA; 07.08.2019, 1, BB-MA.

- Limnophyes ninae* Sæther, 1975: Karasica (Szederkény): 30.09.2018, 1, BB-MA.
- Limnophyes punctipennis* (Goetghebuer, 1919): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; Pécsi-víz (Zók): 21.10.2017, 1, BB-MA. New species in the fauna of Hungary.
- Nanocladius dichromus* (Kieffer, 1906): Karasica (Villány): 30.09.2018, 8, BB-MA.
- Nanocladius distinctus* (Malloch, 1915): Pécsi-víz (Kémes): 30.04.2017, 70, BB-MA; Pécsi-víz (Zók): 30.04.2017, 7, BB-MA; 04.08.2017, 1, BB-MA.
- Nanocladius rectinervis* (Kieffer, 1911): Karasica (Szederkény): 30.09.2018, 10, BB-MA; 07.08.2019, 2, BB-MA; Karasica (Villány): 30.09.2018, 9, BB-MA; 07.08.2019, 12, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 14, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 04.08.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 5, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 35, BB-MA; 07.08.2019, 9, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 4, BB-MA; 07.08.2019, 5, BB-MA.
- Orthocladius glabripennis* (Goetghebuer, 1921): Pécsi-víz (Kémes): 30.04.2017, 8, BB-MA; Pécsi-víz (Zók): 21.10.2017, 1, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 14, BB-MA.
- Orthocladius oblidens* (Walker, 1856): Pécsi-víz (Kémes): 30.04.2017, 6, BB-MA.
- Orthocladius rhyacobius* Kieffer, 1911: Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 56, BB-MA.
- Orthocladius rubicundus* (Meigen, 1818): Karasica (Erdősmecske): 30.09.2018, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 2, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 3, BB-MA.
- Orthocladius thienemanni* Kieffer, 1906: Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 7, BB-MA; 21.10.2017, 1, BB-MA.
- Orthocladius wetterensis* Brundin, 1956: Pécsi-víz (Kémes): 30.04.2017, 11, BB-MA.
- Paracladius conversus* (Walker, 1856): Karasica (Szederkény): 30.09.2018, 1, BB-MA.
- Paracricotopus niger* (Kieffer, 1913): Karasica (Erdősmecske): 30.09.2018, 2, BB-MA; Karasica (Szederkény): 30.09.2018, 1, BB-MA.
- Parakiefferiella* pe1 Langton, 1991: Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA. This pupal exuviae form represents a species different from those with known exuviae, but cannot be matched with any valid species names (i.e. not described species or described species whose exuviae is not known). This is the first record of this form from Hungary.
- Parametriocnemus stylatus* (Spärck, 1923): Karasica (Erdősmecske): 30.09.2018, 1, BB-MA; Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 04.08.2017, 1, BB-MA; 30.09.2018, 2, BB-MA; 07.08.2019, 20, BB-MA; Pécsi-víz (Zók): 21.10.2017, 1, BB-MA; 30.09.2018, 2, BB-MA; 07.08.2019, 41, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.09.2018, 3, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 2, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 4, BB-MA; 07.08.2019, 1, BB-MA.
- Paraphaenocladius impensus* (Walker, 1856): Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA. New species in the fauna of Hungary.
- Paratrichocladius rufiventris* (Meigen, 1830): Karasica (Erdősmecske): 30.09.2018, 34, BB-MA; 07.08.2019, 37, BB-MA; Karasica (Szederkény): 30.09.2018, 62, BB-MA; Karasica (Villány): 30.09.2018, 38, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 128, BB-MA; Pécsi-víz (Zók): 30.04.2017, 7, BB-MA; 04.08.2017, 1, BB-MA; 21.10.2017, 4, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 362, BB-MA; 04.08.2017, 24, BB-MA; 21.10.2017, 162, BB-MA; 30.09.2018, 146, BB-MA;

07.08.2019, 19, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 101, BB-MA; 07.08.2019, 20, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 15, BB-MA; 07.08.2019, 12, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 33, BB-MA; 07.08.2019, 79, BB-MA.

Paratrissocladius excerptus (Walker, 1856): Völgységi-patak (Magyaregregy): 30.09.2018, 4, BB-MA.

Pseudosmittia sp.: Karasica (Szederkény): 07.08.2019, 1, BB-MA. Due to most of the species in this genus are not known as exuviae (LANGTON & VISSER 2003), the species level identification is not possible.

Rheocricotopus chalybeatus (Edwards, 1929): Karasica (Erdősmecske): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Karasica (Szederkény): 30.09.2018, 22, BB-MA; 07.08.2019, 8, BB-MA; Karasica (Villány): 30.09.2018, 102, BB-MA; 07.08.2019, 70, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 22, BB-MA; 04.08.2017, 12, BB-MA; 30.09.2018, 4, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz (Zók): 30.04.2017, 233, BB-MA; 04.08.2017, 26, BB-MA; 30.09.2018, 12, BB-MA; 07.08.2019, 57, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 11, BB-MA; 04.08.2017, 53, BB-MA; 21.10.2017, 3, BB-MA; 30.09.2018, 15, BB-MA; 07.08.2019, 13, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 17, BB-MA; 07.08.2019, 416, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 20, BB-MA; 07.08.2019, 59, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 6, BB-MA.

Rheocricotopus effusus (Walker, 1856): Karasica (Erdősmecske): 30.09.2018, 1, BB-MA.

Rheocricotopus fuscipes (Kieffer, 1909): Karasica (Erdősmecske): 30.09.2018, 2, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 2, BB-MA.

Thienemanniella p. Langton, 1991: Karasica (Villány): 30.09.2018, 3, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 223, BB-MA; 04.08.2017, 13, BB-MA; 21.10.2017, 2, BB-MA; 30.09.2018, 5, BB-MA; 07.08.2019, 148, BB-MA; Pécsi-víz (Zók): 04.08.2017, 40, BB-MA; 21.10.2017, 11, BB-MA; 30.09.2018, 39, BB-MA; 07.08.2019, 4, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 3, BB-MA; 07.08.2019, 1, BB-MA. This pupal form represents at least three species (LANGTON & VISSER 2003), among which *Thienemanniella clavicornis* (Kieffer, 1911) has been recorded from Hungary (MÓRA & DÉVAI 2004), but occurrence of other species cannot be excluded too.

Tvetenia calvescens (Edwards, 1929): Pécsi-víz (Kémes): 30.04.2017, 2, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 3, BB-MA.

Chironominae

Chironomus acutiventris Wülker, Ryser & Scholl, 1983: Pécsi-víz (Zók): 30.04.2017, 1, BB-MA.

Chironomus balatonicus Dévai, Wülker & Scholl, 1983 / *prasinus* Pinder, 1978 — Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA. — These two species cannot be distinguished as exuviae, and due to the limited knowledge on the biology of the species, occurrence of both species is possible.

Chironomus bernensis Klötzli, 1973: Karasica (Szederkény): 30.09.2018, 1, BB-MA; Karasica (Villány): 30.09.2018, 1, BB-MA.

Chironomus riparius Meigen, 1804: Völgységi-patak (Bonyhád): 30.09.2018, 160, BB-MA; 07.08.2019, 64, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA.

Chironomus tentans Fabricius, 1805: Völgységi-patak (Bonyhád): 30.09.2018, 1, BB-MA.

Cladotanytarsus mancus (Walker, 1856): Pécsi-víz (Kémes): 04.08.2017, 2, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA; 30.09.2018, 3, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Cladotanytarsus vanderwulpi (Edwards, 1929): Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Zók): 30.09.2018, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 4, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 9, BB-MA; 07.08.2019, 1, BB-MA.

Cryptochironomus defectus (Kieffer, 1913): Völgységi-patak (Hidas): 07.08.2019, 2, BB-MA.

Cryptochironomus *pel* Langton, 1984: Karasica (Erdősmecke): 07.08.2019, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 18, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA. This pupal exuviae form represents a species different from those with known exuviae, but cannot be matched with any valid species names (i.e. it is not a described species or described species whose exuvium is not known).

Cryptochironomus rostratus Kieffer, 1921: Karasica (Szederkény): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Karasica (Villány): 30.09.2018, 5, BB-MA; Pécsi-víz (Kémes): 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 10, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA.

Cryptochironomus supplicans (Meigen, 1830): Pécsi-víz (Kémes): 04.08.2017, 1, BB-MA.

Cryptotendipes pelc Langton, 1991: Karasica (Villány): 30.09.2018, 12, BB-MA. This pupal exuviae form represents a species different from those with known exuviae, but cannot be matched with any valid species names (i.e. it is not a described species or described species whose exuvium is not known).

Cryptotendipes pseudotener (Goetghebuer, 1922): Pécsi-víz (Kémes): 30.04.2017, 9, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 3, BB-MA.

Dicrotendipes nervosus (Stæger, 1839): Karasica (Villány): 30.09.2018, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 04.08.2017, 3, BB-MA; Pécsi-víz (Zók): 30.04.2017, 3, BB-MA; 04.08.2017, 14, BB-MA; 30.09.2018, 3, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 9, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 3, BB-MA.

Einfeldia pagana (Meigen, 1838): Karasica (Szederkény): 30.09.2018, 2, BB-MA; Karasica (Villány): 30.09.2018, 1, BB-MA.

Harnischia fuscimanus Kieffer, 1921: Karasica (Erdősmecke): 30.09.2018, 2, BB-MA; 07.08.2019, 1, BB-MA; Karasica (Szederkény): 30.09.2018, 18, BB-MA; 07.08.2019, 35, BB-MA; Karasica (Villány): 30.09.2018, 44, BB-MA; 07.08.2019, 60, BB-MA; Pécsi-víz (Kémes): 04.08.2017, 4, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA; 21.10.2017, 1, BB-MA; 30.09.2018, 6, BB-MA; 07.08.2019, 8, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 5, BB-MA.

Kiefferulus tendipediformis (Goetghebuer, 1921): Karasica (Villány): 30.09.2018, 2, BB-MA.

Micropsectra atrofasciata (Kieffer, 1911): Pécsi-víz (Zók): 30.04.2017, 30, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 1, BB-MA; 04.08.2017, 1, BB-MA; 30.09.2018, 2, BB-MA; 07.08.2019, 1, BB-MA.

Micropsectra notescens (Walker, 1856): Pécsi-víz (Kémes): 30.04.2017, 5, BB-MA; 04.08.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA.

Microtendipes britteni (Edwards, 1929): Karasica (Szederkény): 30.09.2018, 1, BB-MA; 07.08.2019, 2, BB-MA; Karasica (Villány): 30.09.2018, 5, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Microtendipes chloris (Meigen, 1818): Völgységi-patak (Bonyhád): 07.08.2019, 46, BB-MA.

Microtendipes pedellus (De Geer, 1776): Karasica (Szederkény): 30.09.2018, 9, BB-MA; 07.08.2019, 3, BB-MA; Karasica (Villány): 30.09.2018, 14, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 2, BB-MA; 07.08.2019, 16, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 10, BB-MA; 07.08.2019, 4, BB-MA.

Paracladopelma camptolabis (Kieffer, 1913): Völgységi-patak (Magyaregregy): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA.

Paracladopelma mikianum (Goetghebuer, 1937): Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA. New species in the Hungarian fauna.

Paralauterborniella nigrohalteralis (Malloch, 1915): Karasica (Villány): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 43, BB-MA; 04.08.2017, 48, BB-MA.

Paratanytarsus dissimilis (Johannsen, 1905): Pécsi-víz (Kémes): 30.04.2017, 7, BB-MA; 04.08.2017, 54, BB-MA; 21.10.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; 07.08.2019, 2, BB-MA; Pécsi-víz (Zók): 30.04.2017, 33, BB-MA; 04.08.2017, 51, BB-MA; 21.10.2017, 2, BB-MA; 30.09.2018, 11, BB-MA; 07.08.2019, 2, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA.

Paratanytarsus lauterborni (Kieffer, 1909): Karasica (Erdősmecke): 07.08.2019, 8, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Paratendipes albimanus (Meigen, 1818): Pécsi-víz (Kémes): 04.08.2017, 48, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Phaenopsectra flavipes (Meigen, 1818): Karasica (Szederkény): 30.09.2018, 3, BB-MA; 07.08.2019, 1, BB-MA; Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 3, BB-MA; Pécsi-víz (Zók): 30.09.2018, 5, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA; Völgységi-patak (Magyaregregy): 07.08.2019, 1, BB-MA.

Polypedilum acifer Townes, 1945: Pécsi-víz (Zók): 30.04.2017, 2, BB-MA.

Polypedilum convictum (Walker, 1856): Karasica (Erdősmecke): 30.09.2018, 3, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 30.09.2018, 2, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 2, BB-MA; 07.08.2019, 4, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 12, BB-MA; 07.08.2019, 1, BB-MA.

Polypedilum cultellatum Goetghebuer, 1931: Karasica (Villány): 30.09.2018, 3, BB-MA; Pécsi-víz (Zók): 30.09.2018, 9, BB-MA; 07.08.2019, 6, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 2, BB-MA.

Polypedilum laetum (Meigen, 1818): Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Zók): 30.09.2018, 3, BB-MA.

Polypedilum nubeculosum (Meigen, 1804): Pécsi-víz (Zók): 30.04.2017, 4, BB-MA; 04.08.2017, 1, BB-MA; 30.09.2018, 3, BB-MA; 07.08.2019, 3, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 1, BB-MA.

Polypedilum pedestre (Meigen, 1830): Karasica (Szederkény): 30.09.2018, 1, BB-MA; Karasica (Villány): 30.09.2018, 1, BB-MA.

Polypedilum pullum (Zetterstedt, 1838): Karasica (Villány): 30.09.2018, 1, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 2, BB-MA. New species in the fauna of Hungary.

Polypedilum quadriguttatum Kieffer, 1921: Pécsi-víz (Kémes): 04.08.2017, 14, BB-MA; Pécsi-víz (Zók): 04.08.2017, 14, BB-MA. New species in the fauna of Hungary.

Polypedilum scalaenum (Schränk, 1803): Karasica (Szederkény): 07.08.2019, 14, BB-MA; Karasica (Villány): 30.09.2018, 1, BB-MA; 07.08.2019, 1, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 04.08.2017, 1, BB-MA; Pécsi-víz (Zók): 30.04.2017, 7, BB-MA; 30.09.2018, 3, BB-MA; 07.08.2019, 10, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 341, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA; 07.08.2019, 95, BB-MA.

Polypedilum tritum (Walker, 1856): Pécsi-víz (Kémes): 30.04.2017, 40, BB-MA; 04.08.2017, 17, BB-MA; Pécsi-víz (Zók): 30.04.2017, 1, BB-MA; 04.08.2017, 1, BB-MA.

Polypedilum uncinatum (Goetghebuer, 1921): Pécsi-víz (Kémes): 30.09.2018, 3, BB-MA; Pécsi-víz (Zók): 30.09.2018, 27, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA.

Rheotanytarsus curtistylus (Goetghebuer, 1921): Karasica (Erdősmecske): 07.08.2019, 2, BB-MA; Karasica (Villány): 30.09.2018, 24, BB-MA; 07.08.2019, 6, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 21, BB-MA; 04.08.2017, 21, BB-MA; 30.09.2018, 2, BB-MA; Pécsi-víz (Zók): 30.04.2017, 2, BB-MA; 04.08.2017, 488, BB-MA; 21.10.2017, 1, BB-MA; 30.09.2018, 3, BB-MA; 07.08.2019, 14, BB-MA; Pécsi-víz, Tüskésrét (Pécs): 04.08.2017, 1, BB-MA; Völgységi-patak (Bonyhád): 30.09.2018, 1, BB-MA; 07.08.2019, 348, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 80, BB-MA; 07.08.2019, 129, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 3, BB-MA.

Rheotanytarsus rhenanus Klink, 1983: Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 30.09.2018, 1, BB-MA; Pécsi-víz (Zók): 30.04.2017, 22, BB-MA; 30.09.2018, 1, BB-MA.

Stenochironomus gibbus (Fabricius, 1794): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA.

Tanytarsus brundini Lindeberg, 1973: Pécsi-víz (Kémes): 04.08.2017, 1, BB-MA.

Tanytarsus ejuncidus (Walker, 1856): Karasica (Szederkény): 30.09.2018, 1, BB-MA; Karasica (Villány): 30.09.2018, 6, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 2, BB-MA; 04.08.2017, 9, BB-MA; Pécsi-víz (Zók): 30.09.2018, 4, BB-MA; 07.08.2019, 21, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA; Völgységi-patak (Magyaregregy): 30.09.2018, 6, BB-MA; 07.08.2019, 1, BB-MA.

Tanytarsus eminulus (Walker, 1856): Karasica (Villány): 30.09.2018, 2, BB-MA; Pécsi-víz (Kémes): 30.04.2017, 6, BB-MA; 04.08.2017, 18, BB-MA; 30.09.2018, 2, BB-MA; Pécsi-víz (Zók): 04.08.2017, 1, BB-MA; 30.09.2018, 88, BB-MA; 07.08.2019, 7, BB-MA; Völgységi-patak (Hidas): 07.08.2019, 1, BB-MA.

Tanytarsus gibbosiceps Kieffer, 1922: Karasica (Villány): 30.09.2018, 1, BB-MA; Völgységi-patak (Bonyhád): 07.08.2019, 1, BB-MA. New species in the fauna of Hungary.

Tanytarsus gregarius Kieffer, 1909: Pécsi-víz (Kémes): 04.08.2017, 12, BB-MA.

Tanytarsus heusdensis Goetghebuer, 1923: Pécsi-víz (Kémes): 04.08.2017, 1, BB-MA.

Tanytarsus medius Reiss & Fittkau, 1971: Pécsi-víz (Kémes): 04.08.2017, 32, BB-MA; Pécsi-víz (Zók): 30.09.2018, 2, BB-MA; 07.08.2019, 1, BB-MA.

Tanytarsus volgensis Miseiko, 1967: Karasica (Villány): 07.08.2019, 1, BB-MA.

Virgatanytarsus arduennensis (Goetghebuer, 1922): Pécsi-víz, Tüskésrét (Pécs): 30.04.2017, 1, BB-MA; 30.09.2018, 8, BB-MA; 07.08.2019, 3, BB-MA; Völgységi-patak (Hidas): 30.09.2018, 1, BB-MA.

Xenochironomus xenolabis (Kieffer, 1916): Pécsi-víz (Kémes): 30.04.2017, 1, BB-MA; 04.08.2017, 6, BB-MA; Pécsi-víz (Zók): 04.08.2017, 2, BB-MA; 07.08.2019, 8, BB-MA.

References

- EKREM, T. 2004: Immature stages of European Tanytarsus species I. The eminulus-, gregarius-, lugens- and mendax species groups (Diptera, Chironomidae). - *Mitteilungen aus dem Museum für Naturkunde in Berlin Deutsche Entomologische Zeitschrift* 51: 97-146. <https://doi.org/10.1002/mmnd.20040510110>
- FITTKAU, E. J. & REISS, F. 1978: Chironomidae. - In: ILLIES J. (ed.): *Limnofauna Europaea*. - pp. 404-440. Gustav Fischer Verlag, Stuttgart – New York + Swets & Zeitlinger B.V., Amsterdam
- GEBHARDT, A. 1960: A Mecsek hegység forrásainak faunisztikai és biológiai vizsgálata. - *A Janus Pannonius Múzeum Évkönyve* 5: 7-38.
- GEBHARDT, A. 1962: A Mecsek-hegység és környékének Dipterafaunája. - *A Janus Pannonius Múzeum Évkönyve* 7: 5-38.
- GEBHARDT, A. 1963: A Mecsek hegység barlangjainak biológiai vizsgálata. - *A Janus Pannonius Múzeum Évkönyve* 8: 5-32.
- GIDÓ, ZS. & LAKATOS, GY. 2003: *Paraboreochlus minutissimus*: a Podonominae árvaszúnyog (Diptera) alcsalád első hazai képviselője. - *Folia entomologica hungarica* 64: 362-363.
- KOSKENNIEMI, E. 1989: On the chironomids in shallow Hungarian reservoirs. - *Acta Biologica Debrecina Supplementum Oecologica Hungarica* 3: 209-214.
- LANGTON, P. H. & VISSER, H. 2003: Chironomidae exuviae. Key to pupal exuviae of the West Palaearctic Region. - In: *World Biodiversity Database CD-ROM Series. Multimedia Interactive Software 1.0.*, Expert Center for Taxonomic Identification, University of Amsterdam, Amsterdam.
- MÉHES, N., SZIVÁK, I., CSABAI, Z. & MÓRA, A. 2012: Contribution to the Chironomidae (Diptera) fauna of the Mecsek Mountains. - *Acta Biologica Debrecina Supplementum Oecologica Hungarica* 28: 121-128.
- MICHELIS, S. & SPIES, M. 2002: Description of *Conchapelopia hittmairorum*, spec. nov., and redefinition of similar western Palaearctic species (Insecta, Diptera, Chironomidae, Tanytarsinae). - *Spixiana* 25: 251-272.
- MOLLER PILLOT, H. K. M. 2009: Chironomidae larvae II. Biology and ecology of the Chironomini. - KNNV Publishing, Zeist, The Netherlands, 270 pp.
- MOLLER PILLOT, H. K. M. 2013: Chironomidae larvae III. Biology and ecology of the aquatic Orthoclaadiinae. - KNNV Publishing, Zeist, The Netherlands, 312 pp.
- MÓRA, A. 2014: Contribution to the Chironomidae (Diptera) fauna of Lake Balaton and its catchment area, with first records of nine species from Hungary. - *Acta Biologica Debrecina Supplementum Oecologica Hungarica* 32: 107-127.
- MÓRA, A., BARNUCZ, E., BODA, P., CSABAI, Z., CSER, B., DEÁK, Cs. & PAPP, L. 2007: A Balaton környéki kisérvizfolyások makroszkópikus gerinctelen faunája. - *Acta Biologica Debrecina Supplementum Oecologica Hungarica* 16: 105-167.
- MÓRA, A. & CSABAI, Z. 2019: Chapter 16. Aquatic macroinvertebrates of the Drava River and its floodplain. - In: LÓCZY, D. (ed.): *The Drava River*. pp. 247-279. Springer Geography, Springer, Cham. https://doi.org/10.1007/978-3-319-92816-6_16
- MÓRA, A. & DÉVAI, GY. 2004: Magyarország árvaszúnyog-faunájának (Diptera: Chironomidae) jegyzéke az előfordulási adatok és sajátosságok feltüntetésével. - *Acta Biologica Debrecina Supplementum Oecologica Hungarica* 12: 39-207.
- SAETHER, O. A. 1990: A review of the genus *Limnophyes* Eaton from the Holarctic and Afrotropical regions (Diptera: Chironomidae, Orthoclaadiinae). - *Entomologica Scandinavica Supplement* 35: 1-139.
- SPIES, M. & SÆTHER, O. A. 2013: Fauna Europaea: Chironomidae. - In: BEUK, P. & PAPE, T. (eds): *Fauna Europaea: Diptera, Nematocera*. Fauna Europaea version 2.6. <http://www.faunaeur.org> (last visited 30 September 2020).
- STUR, E. & EKREM, T. 2006: A revision of West Palaearctic species of the *Micropsectra atrofasciata* species group (Diptera: Chironomidae). - *Zoological Journal of the Linnean Society* 146: 165-225. <https://doi.org/10.1111/j.1096-3642.2006.00198.x>
- VALLENDUUK, H. J. & MOROZOVA, E. 2005: *Cryptochironomus*. An identification key to the larvae and pupal exuviae in Europe. - *Lauterbornia* 55: 1-22.
- WILSON, R. S. 1996: A practical key to the genera of pupal exuviae of the British Chironomidae (Diptera: Insecta). - Privately published from Dr. Wilson, Mudgley Elms, Wedmore, Somerset.