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**CONTRIBUTION TO THE ODONATA FAUNA OF RUNNING AND STANDING WATERS ON THE FLOOD-PLAIN OF THE DANUBE BETWEEN ÁCS (1778 RKM) AND DUNAFÖLDVÁR (1560 RKM)**

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**ADATOK ÁRTÉRI KISVÍZFOLYÁSOK ÉS ÁLLÓVIZEK SZITAKÖTŐ-FAUNÁJÁHOZ (ODONATA) A DUNA ÁCS (1778 FKM) ÉS DUNAFÖLDVÁR (1560 FKM) KÖZÖTTI SZAKASZA MENTÉN**

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**ABSTRACT:** In 2013 faunistical studies on odonates were carried out in the Natura 2000 area of the flood-plain of the Danube located in the Danube-Ipoly National Park, with the main subject to detect species of community interest according to the Habitats Directive of the European Union. During our work a total of 26 small watercourses and 13 standing waters were visited usually at one occasion in spring. The study was mainly based on the collections of larvae; in addition, exuviae were also searched for and adults were occasionally recorded. Dragonflies were found at 16 small watercourses and 11 standing waters. A total of 353 larvae and 26 exuviae were collected and 23 specimens were observed as adults, representing altogether 22 species. Our study resulted in many new localities for the majority of the species, since these water bodies received little attention up to date. Five protected species were found (*Aeshna isosceles*, *Coenagrion ornatum*, *Gomphus vulgatissimus*, *Libellula fulva*, *Orthetrum brunneum*), out of them *C. ornatum* is also a species of community interest. This species was first recorded from two watercourses, among them from Szódrákosi-patak in high numbers. Since the populations of *C. ornatum* is decreasing in Hungary and Europe, those habitats where it occurs in high density, such as the Szódrákosi-patak, are of great conservation value.

**Key words:** faunistics, larvae, exuviae, adults, Natura 2000, small watercourses, standing waters, *Coenagrion ornatum*

**KIVONAT:** 2013-ban szitakötő-faunisztikai vizsgálatokat végeztünk a Duna árterének a Duna–Ipoly Nemzeti Parkhoz tartozó Natura 2000 területén. Fő célunk a Natura 2000 közösségi jelentőségű fajok előfordulásának felmérése volt. Munkánk során 26 kisvízfolyást és 13 állóvizet kerestünk fel, általában egy tavaszi alkalommal. Vizsgálatunk elsősorban lárvák gyűjtésén alapult, emellett esetenként exuviumokat is gyűjtöttünk, illetve feljegyeztük az imágó alakban megfigyelt fajokat is. A vizsgált vízterek közül 16 kisvízfolyásból és 11 állóvízből került elő szitakötő. Összesen 353 lárvát, 26 exuviumot és 23 imágót azonosítottunk, amelyek 22 fajt képviseltek. A vizsgált vízterek mindaddig kevés figyelmet kaptak, így munkánk a legtöbb faj esetében számos új élőhelyet eredményezett. A megtalált fajok közül öt védett (*Aeshna isosceles*, *Coenagrion ornatum*, *Gomphus vulgatissimus*, *Libellula fulva*, *Orthetrum brunneum*). A *C. ornatum* emellett közösségi jelentőségű faj, amelyet két kisvízfolyásban első alkalommal találtunk meg (a Sződrákosi-pataokban jelentős egyedszámban). Mivel a *C. ornatum* populációi Európa szerte és Magyarországon is visszaszorulóban vannak, újonnan megtalált, nagy egyedszámú populációinak élőhelyei természetvédelmi szempontból kiemelkedő jelentőségűek.

**Kulcsszavak:** faunisztika, lárvá, exuvium, imágó, Natura 2000, kisvízfolyások, állóvizek, *Coenagrion ornatum*

## Introduction

The flood-plain of the Danube located in the operational area of the Danube-Ipoly National Park Directorate extends along an approximately 220 rkm long section of the Danube river. This area includes surface waters of various types (e.g. small watercourses, channels, marshes, ponds, backwaters and oxbows). Most of them, at least partly (e.g. only the mouth area of many watercourses), are covered by Natura 2000 network of protected areas. However, the Odonata fauna of this flood-plain area received little attention up to date. In the case of watercourses earlier faunistical studies focused mainly on the larger ones and have found strikingly few dragonfly species, while others were totally neglected (AMBRUS et al. 1993, 1996, 1998; KOVÁCS K. 2008, 2010; KOVÁCS T. and AMBRUS 2010; KOVÁCS T. et al. 2006; MÜLLER et al. 2006). The Odonata fauna of standing waters located here is even more scarcely known, for which only some sporadic data are available in the literature (MÓRA et al. 2010; MÜLLER et al. 2006). There are also early papers concerning with this area, which present some old data mostly based on adults (e.g. BENEDEK 1962, 1966; BENEDEK et al. 1972-73; ÚJHELYI 1993). However, no exact localities (i.e. water bodies) of collections are given in these works, and therefore we could not take them into account. To fill the gaps in our knowledge, further faunistical studies are required and any new data on the Odonata fauna of these running and standing waters are of great importance.

In this paper new records on the Odonata fauna of several small watercourses and standing waters located in the Natura 2000 area of the flood-plain of the Danube belonging to the Danube-Ipoly National Park Directorate are presented. The main aim of our study was to reveal the distribution of the dragonfly species that are of community interest according to the Habitats Directive of the European Union (COUNCIL OF THE EUROPEAN UNION 2006) in this Natura 2000 area. Among them only *Coenagrion ornatum* (Sélys, 1850) has so far been recorded from few localities. Therefore, we focused mainly on this species, since the studied flood-

plain area includes several other small watercourses in which *C. ornatum* may occur. Besides this, faunistical data of all other Odonata species were also recorded and presented here.

## Materials and methods

During this study a total of 26 small watercourses (35 sampling sites) and 13 standing waters (14 sampling sites) were visited (Tables 1 and 2) along the flood-plain of the Danube between Ács (1778 rkm) and Dunaföldvár (1560 rkm). The study was mainly based on the collections of larvae; in addition, exuviae were also searched for and adults were occasionally recorded. The collections were made in 2013 usually at one occasion at each sampling site in spring (between 20 April and 5 May) timed near the emergence period of the studied species. In the case of some sampling sites in autumn a second visit (7–8 October) was also made (Tables 1 and 2).

Larvae were sampled with a standard pond net (mesh size 0.5 mm) from the vegetation and the sediment. Exuviae were searched among the emergent vegetation or on the ground and were collected by hand. In the case of adults only observational data were recorded. Larvae, exuviae and adults were identified using the keys and descriptions by ASKEW (2004), CHAM (2007, 2009), DIJKSTRA (2006), GERKEN and STERNBERG (1999).

In the species list new records contain the following information: locality (according to Tables 1 and 2), date of collection, total number of individuals and names of collectors in alphabetic order. In the case of data based on larvae and exuviae the numbers of males and females are also given after the total number of individuals in brackets (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 names of collectors are given by abbreviations: FA = Anna Farkas, MTO = Thomas Oliver MÉRŐ, MA = Arnold MÓRA. New occurrences (i.e. a species was first recorded from a given running/standing water) are marked with an asterisk (\*) prior to the name of the locality.

## Results

In the case of 10 watercourses and two standing waters neither larvae/exuviae nor adults could have been collected or observed (see Tables 1 and 2). At the other studied 16 running and 11 standing waters a total of 353 larvae and 26 exuviae were collected representing 22 species. Further 23 specimens were observed as adults belonging to seven species. Since no species were found that were only observed as adults, altogether 22 species were detected in the studied area, which is about one third of the Hungarian Odonata fauna (65 species, see DÉVAI 1978). The number of species ranged from one to 13 at the various water bodies, with the highest species numbers for Sződrákosi-patak (13), Gombás-patak (9), Hartyán-patak (9), and Nagyvenyim-Baracsi-ér (8).

In the small watercourses 21 species were recorded, among them five species (*A. isosceles*, *C. ornatum*, *G. vulgatissimus*, *L. fulva*, *O. brunneum*) are protected. Only one Natura 2000 species, *C. ornatum* was found. The larvae of this species were collected in two watercourses (Hartyán-patak, Sződrákosi-patak) at altogether five sampling sites. Out of them at three sites along the Sződrákosi-patak it was found in high numbers. In standing waters 12 species were recorded. Among them only *A. isosceles* is protected, and no Natura 2000 species were found.

**Table 1.** Sampling sites at small watercourses along the flood-plain of the Danube (listed downstream) with their administrative units, the exact geographical co-ordinates, the 10×10 km UTM-grid codes and the dates of collection. Those sites, where odonates were either collected or observed are marked with bold. (In the case of many geographical terms the original Hungarian form was left: árok, csatorna = channel, ér = brooklet, patak = stream, víz = stream.)

Sampling site	Co-ordinate		UTM code	Collection date
	North	East		
Draining ditch (Ács)	47°44'37.48"	17°59'18.42"	YN29	2013.05.03
<b>Concó (Ács)</b>	<b>47°44'13.10"</b>	<b>18° 0'20.60"</b>	<b>BT79</b>	<b>2013.04.20</b>
<b>Szőny-Füzitői-csatorna 1 (Dunaalmás)</b>	<b>47°43'18.77"</b>	<b>18°16'22.41"</b>	<b>BT98</b>	<b>2013.04.20</b>
<b>Szőny-Füzitői-csatorna 2 (Dunaalmás)</b>	<b>47°43'30.66"</b>	<b>18°17'18.97"</b>	<b>BT98</b>	<b>2013.05.03</b>
Által-ér, new branch (Dunaalmás)	47°43'46.38"	18°18'47.51"	BT98	2013.05.03
<b>Által-ér, old branch (Dunaalmás)</b>	<b>47°43'56.19"</b>	<b>18°19'25.12"</b>	<b>BT99</b>	<b>2013.04.20</b>
<b>Bikol (Süttő)</b>	<b>47°45'25.96"</b>	<b>18°26'30.86"</b>	<b>CT09</b>	<b>2013.05.03</b>
<b>Únyi-patak 1 (Tát)</b>	<b>47°44'23.37"</b>	<b>18°39'14.69"</b>	<b>CT29</b>	<b>2013.05.03</b>
<b>Únyi-patak 2 (Tát)</b>	<b>47°44'51.85"</b>	<b>18°39'28.28"</b>	<b>CT29</b>	<b>2013.04.21, 10.08</b>
Stream (Esztergom)	47°44'48.06"	18°41'9.48"	CT29	2013.05.03
<b>Kenyérmezői-patak (Esztergom)</b>	<b>47°45'1.78"</b>	<b>18°41'30.73"</b>	<b>CT29</b>	<b>2013.05.03, 10.07</b>
Szentléleki-patak A (Esztergom)	47°45'49.29"	18°44'12.36"	CT39	2013.04.21
Szentléleki-patak B (Esztergom)	47°45'53.38"	18°43'53.35"	CT39	2013.04.21
Csenke-patak (Esztergom)	47°48'58.61"	18°46'39.79"	CT39	2013.04.21
Medresz-patak (Zebegény)	47°48'31.24"	18°54'6.31"	CT49	2013.05.02
Pilismaróti-patak (Pilismarót)	47°47'16.52"	18°54'5.70"	CT49	2013.04.21, 10.07
Lepence-patak (Visegrád)	47°45'58.36"	18°57'7.70"	CT49	2013.04.21
<b>Mosoni-patak (Nagymaros)</b>	<b>47°49'16.32"</b>	<b>18°59'7.77"</b>	<b>CT49</b>	<b>2013.05.02</b>
<b>Felső-Gombás-patak (Vác)</b>	<b>47°47'55.51"</b>	<b>19° 6'19.90"</b>	<b>CT59</b>	<b>2013.05.02</b>
<b>Gombás-patak (Vác)</b>	<b>47°46'6.60"</b>	<b>19° 8'13.77"</b>	<b>CT69</b>	<b>2013.04.28</b>
<b>Hartyán-patak 1 (Csörög)</b>	<b>47°43'40.66"</b>	<b>19°11'41.77"</b>	<b>CT68</b>	<b>2013.04.27</b>
<b>Hartyán-patak 2 (Csörög)</b>	<b>47°43'46.84"</b>	<b>19°11'8.32"</b>	<b>CT68</b>	<b>2013.04.27</b>
<b>Sződrákosi-patak (Sződ)</b>	<b>47°43'30.04"</b>	<b>19° 9'48.15"</b>	<b>CT68</b>	<b>2013.04.27</b>
<b>Sződrákosi-patak 1 (Sződliget)</b>	<b>47°43'27.07"</b>	<b>19° 8'55.62"</b>	<b>CT68</b>	<b>2013.04.27</b>
<b>Sződrákosi-patak 2 (Sződliget)</b>	<b>47°43'17.01"</b>	<b>19° 8'42.16"</b>	<b>CT68</b>	<b>2013.04.27</b>
<b>Sződrákosi-patak 3 (Sződliget)</b>	<b>47°43'38.17"</b>	<b>19° 8'31.90"</b>	<b>CT68</b>	<b>2013.04.28</b>
<b>Sződrákosi-patak (Göd)</b>	<b>47°41'50.55"</b>	<b>19° 7'56.84"</b>	<b>CT68</b>	<b>2013.05.02</b>
<b>Dera-patak (Szentendre)</b>	<b>47°38'36.89"</b>	<b>19° 4'22.64"</b>	<b>CT57</b>	<b>2013.05.01, 10.07</b>
Barát-patak (Budakalász)	47°36'59.54"	19° 3'25.78"	CT57	2013.05.03

(Table 1. continued)

Sampling site	Co-ordinate		UTM code	Collection date
	North	East		
<b>Benta-patak (Százhalombatta)</b>	<b>47°19'25.09"</b>	<b>18°54'50.68"</b>	<b>CT44</b>	<b>2013.05.04</b>
<b>Váli-víz (Ercsi)</b>	<b>47°10'38.81"</b>	<b>18°51'26.70"</b>	<b>CT32</b>	<b>2013.05.04</b>
Régi-Váli-víz (Iváncsa)	47° 8'28.51"	18°51'38.96"	CT32	2013.05.04
<b>Adonyi-főcsatorna (Adony)</b>	<b>47° 6'2.81"</b>	<b>18°51'16.98"</b>	<b>CT31</b>	<b>2013.05.04</b>
Dajapusztai-árok (Adony)	47° 4'38.05"	18°52'42.40"	CT31	2013.05.04
<b>Nagyvenyim-Baracsi-ér (Baracs)</b>	<b>46°51'56.57"</b>	<b>18°55'4.07"</b>	<b>CS49</b>	<b>2013.05.04</b>

**Table 2.** Sampling sites at standing waters along the food-plain of the Danube (listed downstream) with their administrative units, the exact geographical co-ordinates, the 10×10 km UTM-grid codes and the dates of collection. Those sites, where odonates were either collected or observed are marked with bold. (In the case of many geographical terms the original Hungarian form was left: Holt-Duna = dead arm or oxbow of the Danube, sziget = island.)

Sampling site	Co-ordinate		UTM code	Collection date
	North	East		
<b>Marsh near Concó (Ács)</b>	<b>47°44'4.41"</b>	<b>18° 0'16.98"</b>	<b>BT 79</b>	<b>2013.04.20</b>
Marsh (Tát)	47°44'45.48"	18°40'5.39"	CT29	2013.05.03
<b>Pond 1 (Esztergom)</b>	<b>47°45'47.12"</b>	<b>18°43'45.07"</b>	<b>CT29</b>	<b>2013.04.21, 05.05</b>
<b>Pond 2 (Esztergom)</b>	<b>47°45'58.50"</b>	<b>18°43'18.40"</b>	<b>CT29</b>	<b>2013.05.05</b>
<b>Fishing pond (Esztergom)</b>	<b>47°46'3.00"</b>	<b>18°43'35.00"</b>	<b>CT29</b>	<b>2013.05.05</b>
<b>Pond 3 (Esztergom)</b>	<b>47°46'0.45"</b>	<b>18°43'1.58"</b>	<b>CT29</b>	<b>2013.05.05</b>
<b>Kis-Duna 1 (Kismaros)</b>	<b>47°49'8.94"</b>	<b>18°59'43.06 "</b>	<b>CT59</b>	<b>2013.05.02</b>
<b>Kis-Duna 2 (Kismaros)</b>	<b>47°49'12.85"</b>	<b>18°59'58.67"</b>	<b>CT59</b>	<b>2013.05.02</b>
<b>Verőce-szigeti Holt-Duna (Kisoroszi)</b>	<b>47°48'53.53"</b>	<b>19° 1'35.30"</b>	<b>CT59</b>	<b>2013.05.01</b>
Dead arm, Kőgeszteri-sziget (Kisoroszi)	47°48'49.56"	19° 2'38.47"	CT59	2013.05.01
<b>Dead arm, Torda-sziget (Tahitótfalu)</b>	<b>47°47'11.33"</b>	<b>19° 6'17.30"</b>	<b>CT59</b>	<b>2013.05.01</b>
<b>Marsh, Paradicsom-sziget (Tahitótfalu)</b>	<b>47°46'31.84"</b>	<b>19° 6'58.71"</b>	<b>CT59</b>	<b>2013.05.01</b>
<b>Educational path, flood-plain of Danube (Vác)</b>	<b>47°45'48.06"</b>	<b>19° 8'6.34"</b>	<b>CT69</b>	<b>2013.05.02</b>
<b>Ercsi Holt-Duna (Ercsi)</b>	<b>47°14'23.93"</b>	<b>18°54'3.54"</b>	<b>CT43</b>	<b>2013.05.04</b>

## New records

## CALOPTERYGIDAE

***Calopteryx splendens*** (Harris, 1782) — **Larval data:** \*Bikol (Süttő): 2013.05.03., 1(1+0), FA-MA – Concó (Ács): 2013.04.20., 2(0+2), FA-MA – Dera-patak (Szentendre): 2013.05.01., 2(1+1), FA-MA – \*Gombás-patak (Vác): 2013.04.28., 1(0+1), FA – \*Hartyán-patak 1 (Csörög): 2013.04.27., 11(4+7), FA – \*Hartyán-patak 2 (Csörög): 2013.04.27., 1(1+0), FA – \*Kenyérmezői-patak (Esztergom): 2013.10.08., 8(3+2+3), FA-MTO – \*Marsh near Concó (Ács): 2013.04.20., 2(0+2), FA-MA – \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 2(0+2), FA-MA – Szódrákosi-patak (Göd): 2013.05.02., 2(1+1), FA-MA – Szódrákosi-patak (Szöd): 2013.04.27., 4(3+1), FA – Szódrákosi-patak 1 (Szödliget): 2013.04.27., 2(1+1), FA – Szódrákosi-patak 2 (Szödliget): 2013.04.27., 3(1+2), FA – Szódrákosi-patak 3 (Szödliget): 2013.04.28., 2(2+0), FA – \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(1+0), FA-MA – \*Únyi-patak 1 (Tát): 2013.05.04., 1(1+0), FA-MA – \*Únyi-patak 2 (Tát): 2013.04.21., 1(0+1), FA-MA; 2013.10.08., 2(1+1), FA-MTO. — **Adult data:** \*Adonyi-főcsatorna (Adony): 2013.05.04., 1, FA-MA – \*Benta-patak (Százhalombatta): 2013.05.04., 1, FA-MA.

## LESTIDAE

***Sympecma fusca*** (Vander Linden, 1820) — **Adult data:** \*Ercsi Holt-Duna (Ercsi): 2013.05.04., 2, FA-MA – \*Marsh, Paradicsom-sziget (Tahitótfalu): 2013.05.01., 2, FA-MA – \*Pond 1 (Esztergom): 2013.04.21., 2, FA-MA; 2013.05.05., 1, FA-MA – \*Verőce-szigeti Holt-Duna (Kisoroszi): 2013.05.01., 2, FA-MA.

## COENAGRIONIDAE

***Ischnura elegans*** (Vander Linden, 1820) — **Larval data:** Concó (Ács): 2013.04.20., 14(5+9), FA-MA – \*Dead arm, Torda-sziget (Tahitótfalu): 2013.05.01., 3(2+1), FA-MA – \*Dera-patak (Szentendre): 2013.05.01., 2(1+1), FA-MA – \*Educational path, flood-plain of Danube (Vác): 2013.05.02., 2(1+1), FA-MA – \*Ercsi Holt-Duna (Ercsi): 2013.05.04., 1(1+0), FA-MA – \*Fishing pond (Esztergom): 2013.05.05., 4(3+1), FA-MA – \*Gombás-patak (Vác): 2013.04.28., 2(2+0), FA – \*Hartyán-patak 1 (Csörög): 2013.04.27., 2(1+1), FA – Kis-Duna 1 (Kismaros): 2013.05.02., 5(5+0), FA-MA – Kis-Duna 2 (Kismaros): 2013.05.02., 2(2+0), FA-MA – \*Marsh near Concó (Ács): 2013.04.20., 2(1+1), FA-MA – \*Pond 1 (Esztergom): 2013.04.21., 4(3+1), FA-MA – \*Pond 2 (Esztergom): 2013.05.05., 1(0+1), FA-MA – \*Szódrákosi-patak (Göd): 2013.05.02., 2(1+1), FA-MA – \*Szódrákosi-patak (Szöd): 2013.04.27., 7(6+1), FA – \*Szódrákosi-patak 1 (Szödliget): 2013.04.27., 4(1+3), FA – \*Szódrákosi-patak 3 (Szödliget): 2013.04.28., 6(5+1), FA – \*Szöny-Füzitői-csatorna 1 (Dunaalmás): 2013.04.20., 19(9+10), FA-MA – \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 2(1+1), FA-MA – \*Únyi-patak 2 (Tát): 2013.10.08., 10(2+8), FA-MTO – \*Váli-víz (Ercsi): 2013.05.04., 7(2+5), FA-MA. — **Exuvial data:** \*Pond 1 (Esztergom): 2013.05.05., 1(1+0), FA-MA – \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(1+0), FA-MA – \*Váli-víz (Ercsi): 2013.05.04., 1(0+1), FA-MA. — **Adult data:** \*Adonyi-főcsatorna (Adony): 2013.05.04., 5, FA-MA – \*Benta-patak (Százhalombatta): 2013.05.04., 1, FA-MA.

***Ischnura pumilio*** (Charpentier, 1825) — **Larval data:** \*Adonyi-főcsatorna (Adony): 2013.05.04., 3(0+3), FA-MA – \*Dera-patak (Szentendre): 2013.05.01., 1(1+0), FA-MA – \*Gombás-patak (Vác): 2013.04.28., 4(2+2), FA – \*Hartyán-patak 1 (Csörög): 2013.04.27., 1(1+0), FA – \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(0+1), FA-MA – \*Únyi-patak 2 (Tát): 2013.04.21., 1(1+0), FA-MA; 2013.10.08., 5(2+3), FA-MTO.

***Coenagrion ornatum*** (Selys, 1850) — **Larval data:** \*Hartyán-patak 1 (Csörög): 2013.04.27., 2(1+1), FA – \*Szódrákosi-patak (Göd): 2013.05.02., 14(8+6), FA-MA – \*Szódrákosi-patak (Szöd): 2013.04.27., 14(7+7), FA – \*Szódrákosi-patak 1 (Szödliget): 2013.04.27., 7(0+7), FA – \*Szódrákosi-patak 2 (Szödliget): 2013.04.27., 1(0+1), FA – \*Szódrákosi-patak 3 (Szödliget): 2013.04.28., 2(2+0), FA.

***Coenagrion pulchellum*** (Vander Linden, 1825) — **Larval data:** \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 1(0+1), FA-MA – \*Szódrákosi-patak (Göd): 2013.05.02., 1(0+1), FA-MA – \*Szódrákosi-patak (Szöd): 2013.04.27., 1(0+1), FA. — **Exuvial data:** \*Pond 1 (Esztergom): 2013.05.05., 1(1+0), FA-MA.

**Coenagrion puella** (Linnaeus, 1758) — **Larval data:** \*Dead arm, Torda-sziget (Tahitótfalu): 2013.05.01., 1(0+1), FA-MA — \*Educational path, flood-plain of Danube (Vác): 2013.05.02., 3(0+3), FA-MA — \*Felső-Gombás-patak (Vác): 2013.05.02., 1(1+0), FA-MA — \*Gombás-patak (Vác): 2013.04.28., 1(1+0), FA — \*Hartyán-patak 2 (Csörög): 2013.04.27., 2(2+0), FA — \*Kis-Duna 1 (Kismaros): 2013.05.02., 1(0+1), FA-MA — \*Kis-Duna 2 (Kismaros): 2013.05.02., 2(1+1), FA-MA — \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 2(0+2), FA-MA — \*Pond 1 (Esztergom): 2013.04.21., 25(15+10), FA-MA; 2013.05.05., 1(1+0), FA-MA — Sződrákosi-patak 3 (Sződliget): 2013.04.28., 2(0+2), FA. — **Exuvial data:** \*Pond 1 (Esztergom): 2013.05.05., 5(5+0), FA-MA.

**Erythromma viridulum** (Charpentier, 1840) — **Larval data:** \*Fishing pond (Esztergom): 2013.05.05., 1(0+1), FA-MA — \*Kis-Duna 2 (Kismaros): 2013.05.02., 2(1+1), FA-MA — \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(0+1), FA-MA.

**Pyrrhosoma nymphula** (Sulzer, 1776) — **Larval data:** \*Gombás-patak (Vác): 2013.04.28., 1(0+1), FA. — **Adult data:** \*Mosoni-patak (Nagygyaros): 2013.05.02., 1, FA-MA.

#### PLATYCNEMIDIDAE

**Platycnemis pennipes** (Pallas, 1771) — **Larval data:** Concó (Ács): 2013.04.20., 5(1+4), FA-MA — Dera-patak (Szentendre): 2013.05.01., 2(0+2), FA-MA — \*Ercsi Holt-Duna (Ercsi): 2013.05.04., 1(0+1), FA-MA — \*Gombás-patak (Vác): 2013.04.28., 2(1+1), FA — \*Hartyán-patak 1 (Csörög): 2013.04.27., 4(1+3), FA — \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 1(0+1), FA-MA — Sződrákosi-patak (Göd): 2013.05.02., 1(1+0), FA-MA — Sződrákosi-patak (Szöd): 2013.04.27., 7(1+6), FA — Sződrákosi-patak 1 (Sződliget): 2013.04.27., 4(2+2), FA — Sződrákosi-patak 3 (Sződliget): 2013.04.28., 5(3+2), FA — \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 3(1+2), FA-MA — \*Únyi-patak 2 (Tát): 2013.04.21., 1(0+1), FA-MA; 2013.10.08., 2(1+1), FA-MTO — Váli-víz (Ercsi): 2013.05.04., 2(0+2), FA-MA. — **Exuvial data:** \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(1+0), FA-MA.

#### AESHNIDAE

**Aeshna cyanea** (Müller, 1764) — **Larval data:** \*Sződrákosi-patak 2 (Sződliget): 2013.04.27., 1(0+1), FA.

**Aeshna isosceles** (Müller, 1767) — **Larval data:** \*Adonyi-főcsatorna (Adony): 2013.05.04., 1(0+1), FA-MA — \*Gombás-patak (Vác): 2013.04.28., 1(0+1), FA — \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 1(0+1), FA-MA — \*Pond 1 (Esztergom): 2013.04.21., 1(0+1), FA-MA. — **Exuvial data:** \*Pond 1 (Esztergom): 2013.05.05., 5(2+3), FA-MA. — **Adult data:** \*Pond 2 (Esztergom): 2013.05.05., 1, FA-MA.

**Anax imperator** Leach, 1815 — **Larval data:** \*Gombás-patak (Vác): 2013.04.28., 1(1+0), FA — \*Kis-Duna 2 (Kismaros): 2013.05.02., 2(1+1), FA-MA — \*Sződrákosi-patak 1 (Sződliget): 2013.04.27., 1(0+1), FA — \*Sződrákosi-patak 3 (Sződliget): 2013.04.28., 2(1+1), FA — \*Szöny-Füzitői-csatorna 1 (Dunaalmás): 2013.04.20., 1(0+1), FA-MA — \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(1+0), FA-MA — \*Váli-víz (Ercsi): 2013.05.04., 1(0+1), FA-MA.

**Brachytron pratense** (Müller, 1764) — **Larval data:** \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 1(0+1), FA-MA. — **Exuvial data:** \*Kis-Duna 1 (Kismaros): 2013.05.02., 2(1+1), FA-MA — \*Pond 1 (Esztergom): 2013.05.05., 1(0+1), FA-MA. — **Adult data:** \*Fishing pond (Esztergom): 2013.05.05., 1, FA-MA — Pond 3 (Esztergom): 2013.05.05., 2, FA-MA.

#### GOMPHIDAE

**Gomphus vulgatissimus** (Linnaeus, 1758) — **Larval data:** Sződrákosi-patak 3 (Sződliget): 2013.04.28., 3(0+0+3), FA.

#### CORDULIIDAE

**Cordulia aenea** (Linnaeus, 1758) — **Larval data:** \*Pond 1 (Esztergom): 2013.04.21., 1(0+1), FA-MA. — **Exuvial data:** \*Pond 1 (Esztergom): 2013.05.05., 1(1+0), FA-MA. — **Adult data:** \*Fishing pond (Esztergom): 2013.05.05., 1, FA-MA.

#### LIBELLULIDAE

**Libellula depressa** Linnaeus, 1758 — **Larval data:** \*Dera-patak (Szentendre): 2013.05.01., 1(1+0), FA-MA — \*Felső-Gombás-patak (Vác): 2013.05.02., 1(0+1), FA-MA — \*Gombás-

- patak (Vác): 2013.04.28., 1(1+0), FA. — **Exuvial data:** \*Váli-víz (Ercsi): 2013.05.04., 1(1+0), FA-MA.
- Libellula fulva*** Müller, 1764 — **Larval data:** \*Szódrákosi-patak 2 (Szödliget): 2013.04.27., 2(0+1+1), FA — \*Szódrákosi-patak 3 (Szödliget): 2013.04.28., 3(0+3), FA. — **Exuvial data:** \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 6(5+1), FA-MA.
- Orthetrum albistylum*** (Selys, 1848) — **Larval data:** \*Concó (Ács): 2013.04.20., 3(1+0+2), FA-MA — \*Dead arm, Torda-sziget (Tahitótfalu): 2013.05.01., 1(0+1), FA-MA — \*Szódrákosi-patak 3 (Szödliget): 2013.04.28., 1(1+0), FA — \*Szöny-Füzitői-csatorna 1 (Dunaalmás): 2013.04.20., 3(3+0), FA-MA — \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 2(0+2), FA-MA.
- Orthetrum brunneum*** (Fonscolombe, 1837) — **Larval data:** \*Bikol (Süttő): 2013.05.03., 2(0+2), FA-MA — \*Hartyán-patak 1 (Csörög): 2013.04.27., 5(0+0+5), FA — \*Szódrákosi-patak (Göd): 2013.05.02., 3(2+1), FA-MA.
- Orthetrum cancellatum*** (Linnaeus, 1758) — **Larval data:** \*Concó (Ács): 2013.04.20., 1(0+0+1), FA-MA — \*Dera-patak (Szentendre): 2013.05.01., 3(0+0+3), FA-MA — \*Hartyán-patak 2 (Csörög): 2013.04.27., 2(1+1), FA — \*Szódrákosi-patak 3 (Szödliget): 2013.04.28., 1(0+0+1), FA — \*Szöny-Füzitői-csatorna 2 (Dunaalmás): 2013.05.03., 1(0+1), FA-MA.
- Orthetrum coerulescens*** (Fabricius, 1798) — **Larval data:** \*Hartyán-patak 1 (Csörög): 2013.04.27., 1(0+0+1), FA — \*Nagyvenyim-Baracsi-ér (Baracs): 2013.05.04., 2(2+0), FA-MA.
- Sympetrum sanguineum*** (Müller, 1764) — **Larval data:** \*Által-ér, old branch (Dunaalmás): 2013.04.20., 1(0+0+1), FA-MA.

## Discussion

Although our faunistical study was far from exhaustive, since collections were usually made only at one occasion at few sampling sites of several running and standing waters, relatively many dragonfly species including rare and protected ones were recorded, and several new localities were revealed for most of the species. These results are more unexpected taking into account that most of our studied sites are situated in urban areas. Thus, our results well indicate that the Odonata fauna of these various surface waters is valuable and worth to be the subject of further studies. As far as we know, out of the studied running and standing waters there are many in which no dragonfly species at all were recorded up to date (Szöny-Füzitői-csatorna, Bikol, Únyi-patak, Kenyérmezői-patak, Mosoni-patak, Felső-Gombás-patak, Gombás-patak, Hartyán-patak, Benta-patak, Adonyi-főcsatorna, Nagyvenyim-Baracsi-ér, and all standing waters with the exception of Kis-Duna). In others that already have some literature data (Concó, Által-ér, Szódrákosi-patak, Dera-patak, Váli-víz, Kis-Duna) several new species were found during our work. Those running and standing waters that yielded no dragonflies in our study are mostly temporary waters that could have been dried up earlier.

Among the protected species *O. brunneum* (found in three watercourses) is less frequent, while the others (except *C. ornatum*, see below) can be commonly found in Hungary. Besides the protected species, it is worth to note *P. nymphula*, which has rather sporadic occurrence in Hungary, and was first recorded from two watercourses (as larva from Gombás-patak, as adult from Mosoni-patak). Further less frequent species that were recorded (all as larvae) are *A. cyanea* (Szódrákosi-patak), *I. pumilio* (Adonyi-főcsatorna, Dera-patak, Gombás-patak, Hartyán-patak, Szöny-Füzitői-csatorna, Únyi-patak) and *O. coerulescens* (Hartyán-patak, Nagyvenyim-Baracsi-ér). To our knowledge all of these data represent the first records of these species from these watercourses. The studied running waters has more dragonfly species with rare and protected ones, while in the case of standing waters much fewer and only common species could have been detected.



The Natura 2000 species *C. ornatum* was found in two watercourses, for the first time in both of them. Though earlier collections have already been made there, during these works this species was not detected (AMBRUS et al. 1993, 1998; MÜLLER et al. 2006). On the other hand, *C. ornatum* was previously recorded from two watercourses in the studied area (Csaja-patak, Dera-patak; see KOVÁCS et al. 2006; MÜLLER et al. 2006, 2009), in which during our collections it could not have been found. However, the Csaja-patak (at Dömös) was almost dried up, consequently the sampling was not possible. The Dera-patak (at Szentendre) also dries up at some times (own observations), furthermore it is running through urban area, and therefore could be easily polluted. Both may explain the absence of this species. Among the studied watercourses *C. ornatum* was previously found also in the Váli-víz, however at the upper reach (at Felcsút and Óbarok, see KOVÁCS and AMBRUS 2010; MÜLLER et al. 2006) far from our sampling site.

The populations of *C. ornatum* are decreasing in Europe, and therefore the species is presented in the 'Near Threatened' category in the IUCN Red List (KALKMAN et al. 2010). The major threats for the populations are habitat losses (DÉVAI 2014; KALKMAN et al. 2010): the running waters inhabited by *C. ornatum*, due to their small size, can be easily destroyed (by water pollution, modification of the river bed and river bank) or dried up (caused by either the longer dry periods or the increased water extractions). Accordingly, those habitats where *C. ornatum* occurs in high density, such as the Sződrákosi-patak, are of great conservation value.

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