CONTRIBUTION TO THE KNOWLEDGE OF ODONATA (INSECTA) IN MOLDOVA: IAŞI COUNTY

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Abstract

From 21-vi to 29-vi-2024 I made an odonatological study trip to Iaşi County, northeastern Romania. During this trip I examined 39 sites of both standing and flowing water and noticed 23 species of Odonata. Many sites are threatened by littering and drying out. The results of the trip demonstrate the summer aspect of the Southeast European dragonfly and damselfly fauna; neither spring nor autumn species were observed. Interesting from a faunistic point of view are the very early observation of immature *Sympecma fusca* at two sites, the northernmost record of *Somatochlora meridionalis* east of the Carpathians, and the almost complete absence of species of the genera *Lestes*, *Aeshna*, *Gomphus* s.l., *Libellula* and *Sympetrum*. The mentions of some species in the literature are critically examined.

Keywords: Romania, Moldova, Odonata, check-list, faunistics

Introduction

Moldova (Fig. 1 B) as one of the three major historical regions of the modern Romanian state is located in the northeastern part of the country (Fig. 1 A) and borders (in general) by the Carpathians to the west, the Ukraine to the north, the Prut River to the east and the Milcov, Siret and Danube rivers to the south.

Iaşi County (Fig. 1 C) with an area of *ca.* 5,476 km² is located in eastern Moldova. Its climate is temperate-continental (*sensu* Beck et al 2023: Dfb, Prut valley: Dfa). The relief is hilly with heights between 22 m a.s.l. (Prut floodplain near Gorban in the south) and 593 m a.s.l. (in the Pădurea Tudora near Deleni in the northwest); it is characterized by valleys and floodplains of large and small rivers. The county is heavily influenced by agriculture (*ca.* 70 % of the area is agricultural land), forest covers *ca.* 18 % of the county, and water bodies only take up *ca.* 0.75 %. Rivers and streams of various sizes (Prut, Siret, Jijia, Bahlui, etc.) determine the hydrographic network, natural standing waters are almost completely absent (only a few oxbows of the rivers), whereas countless reservoirs of various sizes exist on many streams and rivers (all data: INS / DJS IS 2024).

The dragonfly fauna of Iaşi County is only moderately studied, with modern data almost completely lacking. The first mention dates from Cîrdei and Borcea (1949), who recorded a total of 22 species for nine locations in the county. Further investigations followed (Cîrdei 1956b, 1956c; Cîrdei and Bulimar 1961) and increased the total number of species mentioned for the county to 37. Cîrdei and Bulimar (1965) attempted to summarize all previous and numerous newer mentions. They listed a total of 32 species for Iaşi County, increasing the total number of species recorded here to 40. The summary by Lehrer and Bulimar (1979) showed mentions of 41 species and a total number of 43 species. Manci (2011) examined the dragonfly collection of the Iaşi Museum of Natural History and found 41 species collected in the county; this increased the total number of species reported for the county to 49. As part of his

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dissertation, Manci (2012) created distribution maps of Odonata occurring in Romania and shows the occurrence of 48 species in the county. The total number rose to 51 species. Some publications based on limnological studies, some of which contained "unexpected" species (Nicoară et al 2009; Ghețeu 2012), were apparently not included in Manci (2012). They increase the total number of records to 53 odonate species for Iaşi County.

Recently, several chance observations of Odonata by laypeople have been published in open natural history databases on the Internet (e.g. iNaturalist.org; observation.org). However, a modern overview of the county's odonate fauna is missing.

Figure 1. Situation of Romania (brown) within Europe (A) and Moldova (orange) with Iaşi County (green) within Romania (B), Iaşi County with the visited locations (C; red: standing waters, blue: flowing waters; see Tab. 1);

A: © Blank political map from Alexrk2, CC BY-SA 3.0; slightly edited;

B: © Romanian Moldavia location map from Andrein, CC BY-SA 4.0; slightly edited;

C: background map: © Harta judetului Iasi (Harta Romaniei 2007-2024), edited

Material and methods

In order to get a modern overview of the dragonfly fauna of the county, I undertook a study trip from 21-vi to 29-vi-2024. To prepare for the trip, I searched maps and aerial photographs available on the Internet (Mapy.cz 1996-2024; ANCPI 2019-2024) for water bodies that were relatively easy to reach and freely accessible. Based on the location information in the existing literature (e.g. Cîrdei and Bulimar 1965; Manci 2011; iNaturalist.org; observation.org), I included individual water bodies with evidence of dragonflies and damselflies in this pre-selection.

During my trip, I visited the preselected waters for varying lengths of time (between 15 minutes and 1 hour). The banks were walked for different lengths and all observed odonate species and their behaviour were recorded. I tried to document photographically each species that occurred, which was not always successful, especially with species of the Aeshnidae. Only once, I caught a specimen with an entomological net (diameter 40 cm) for reliable determination, but released it again afterwards. To search for larvae, I used a standard kitchen sieve (diameter 15 cm). I did not explicitly search for exuviae, but collected exuviae discovered by chance.

Imagines were identified using Lehmann and Nüß (2015) and Dijkstra et al (2020), for the identification of larvae and exuviae I used a digital microscope "DM-300" (Maginon, supra Foto-Elektronik-Vertriebs-GmbH, Kaiserslautern, Germany) and Brochard et al (2012), Gerken and Sternberg (1999), and Heidemann and Seidenbusch (2002). Coordinates of the locations were taken using the smartphone app "GPS Data" (examobile S.A, Bielsko-Biała, Poland) and verified by using the map services Mapy.cz (1996-2024) and ANCPI (2019-2024). The nomenclature follows Boudot and Kalkman (2015).

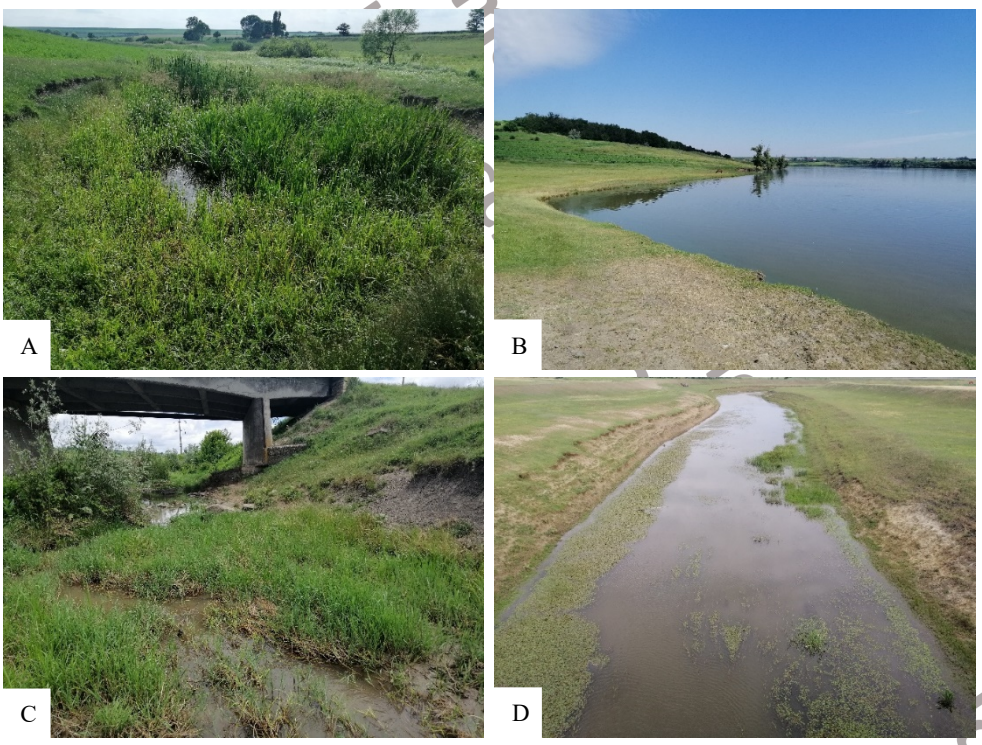

Figure 2. Examples of sites visited, top row: standing waters, bottom row: flowing waters. A) temporary pond (pond between Lacul Bogdănești and Lacul Hăbășești [loc. 31], 27-iv-2024), B) reservoire (Acumularea Podu Iloaiei [loc. 33], 28-iv-2024), C) stream (Bohotin [loc. 16], 25-iv-2024), D) channeled river (Jijia [loc. 09], 23-iv-2024).

Results

In total, I visited 39 water bodies (Tab. 1; Fig. 1 C) throughout the county within nine days, including 19 standing (lentic; Fig. 2 A, B) and 20 flowing water bodies (lotic; Fig. 2 C, D). I visited location 02 twice. I observed dragonflies and damselflies at 37 locations. Location 36 (a stream) was dried up, at location 29 (Moldova River) only a very exhausted female *Calopteryx splendens* (Harris, 1782) was floating past on the water.

Table 1. Locations visited during this study.

loc.	name [1)]				nearest settlement	
	type	north [2)]	east [2)]	height [3)]	date	species
01	**Bahlui**				Iași	
	channeled river	47.1536	27.6066	61	21-iv	5
02	concrete pond in **Parcul Copou**				Iași	
	garden pond	47.1781	27.5689	155	22-, 29-iv	2
03	reservoir in **Grădina Botanică "Anastasie Fătu"**				Iași	
	reservoir	47.1853	27.5494	65	22-iv	7
04	**Acumularea Chirița**				Dancu	
	reservoir	47.1678	27.6547	89	23-iv	9
05	**Jijia**				Bosia	
	channeled river	47.2094	27.7378	35	23-iv	6
06	oxbow of **Jijia**				Luceni	
	river (oxbow)	47.2822	27.6181	38	23-iv	3
07	small reservoir in **Soloneț River**				Soloneț	
	reservoir	47.4939	27.4503	56	23-iv	3
08	**Acumularea Traian III**				Traian	
	reservoir	47.5094	27.3986	74	23-iv	2
09	**Jijia**				Spineni	
	channeled river	47.4869	27.3053	48	23-iv	7
10	**Bahluieț**				Balțați	
	river	47.2108	27.1222	71	24-iv	4
11	**Siret**				Pașcani	
	river	47.2469	26.7511	204	24-iv	2
12	**Siret**				Cozmești	
	river	47.1842	26.7803	199	24-iv	2
13	**Acumularea Mihail**				Scheia	
	reservoir	47.1250	26.8994	214	24-iv	2
14	**Siret**				Scheia	
	river	47.0994	26.8922	189	24-iv	4
15	**Vasluieț**				Poieni	
	stream	47.0631	27.7036	230	25-iv	2
16	**Bohotin**				Bohotin	
	stream	46.9439	27.9936	63	25-iv	4
17	**Jijia Veche**				Gura Bohotin	
	river	46.9058	28.0814	26	25-iv	4
18	drainage ditch				Zberoaia	
	ditch	46.9258	28.0475	26	25-iv	3

Table 1. continued

19	**Jijia Veche** river	46.9269	28.0592	26	Zberoaia 25-iv	5
20	**Jijia** channeled river	47.1200	27.7664	32	Chiperești 25-iv	4
21	**Jijia** river	47.3214	27.4319	40	Țigănași 26-iv	7
22	**Delta Moldovei** reservoir	47.3536	27.3569	44	Movileni 26-iv	4
23a	**Lacul Hălceni**, southwest bay reservoir	47.4247	27.2678	52	Hălceni 26-iv	3
23b	**Lacul Hălceni**, middle north shore reservoir	47.4286	27.2831	52	Hălceni 26-iv	5
24	pond north of **Miletin River** temporary pond	47.4331	27.2555	54	Hălceni 26-iv	4
25	**Miletin** river	47.4839	27.1192	63	Plugari 26-iv	5
26	reservoir in **Durușca (Buhușoaia) River** reservoir	47.2792	27.2319	76	Erbiceni 26-iv	5
27	**Bahluieț** stream	47.4747	26.7950	198	Pârcovaci 27-iv	5
28	**Acumularea Pârcovaci** reservoir	47.4542	26.8194	169	Pârcovaci 27-iv	2
29	**Moldova** river	47.1800	26.6200	254	Soci 27-iv	0
30	**Lacul Copilași** reservoir	47.1167	26.9444	218	Miclăușeni 27-iv	5
31	pond between **Lacul Bogdănești** and **Lacul Hăbășești** temporary pond	47.1339	26.9478	229	Hăbășești 27-iv	5
32	**Bahluieț** river	47.2127	27.0708	77	Prigoreni 27-iv	2
33	**Acumularea Podu Iloaiei** reservoir	47.2008	27.2439	62	Podu Iloaiei 28-iv	4
34	reservoir in **Hărpășești River** reservoir	47.1900	27.2703	68	Scobâlțeni 28-iv	5
35	reservoir in **Gâmboasa River** reservoir	47.1440	27.2050	78	Obrijeni 28-iv	4
36	**Balta Neagră** stream	47.0597	27.2075	198	Mădârjac 28-iv	0
37a	**Acumularea Tungujel**, northeastern shore reservoir	46.9606	27.3428	157	Moara Ciornei 28-iv	5
37b	**Acumularea Tungujel**, southeastern shore reservoir	46.9422	27.3458	157	Moara Ciornei 28-iv	4
38	**Rebricea** river	46.8769	27.5689	131	Sasova 28-iv	2
39	dam between **Lacul Ciric I** and **Lacul Ciric II** reservoir	47.1825	27.6036	51	Iași 29-iv	5

Remarks: [1)] bold = name taken from the geoportal (ANCPI 2019-2024); [2)] in °, Datum: WGS84; [3)] in m above sea level

I observed 23 Odonata species (Tab. 2). All species except *Aeshna affinis* Vander Linden, 1820 and *Anax imperator* Leach, 1815 were documented photographically. Depending on the location, the number of species varied between one and nine (Tab. 1). The most common species were *Ischnura elegans* (Charpentier, 1825) (Fig. 3 A; observed at 25 locations), *Platycnemis pennipes* (Pallas, 1771) (23 locations), and *Orthetrum albistylum* (Selys, 1848) (Fig. 3 B; 21 locations). Only once I observed *Lestes barbarus* (Fabricius, 1798), *Calopteryx virgo* (Linnaeus, 1758), *Coenagrion ornatum* (Selys, 1850) (Fig. 5), *Aeshna affinis*, and *Onychogomphus forcipatus* (Linnaeus, 1758) (Fig. 6).

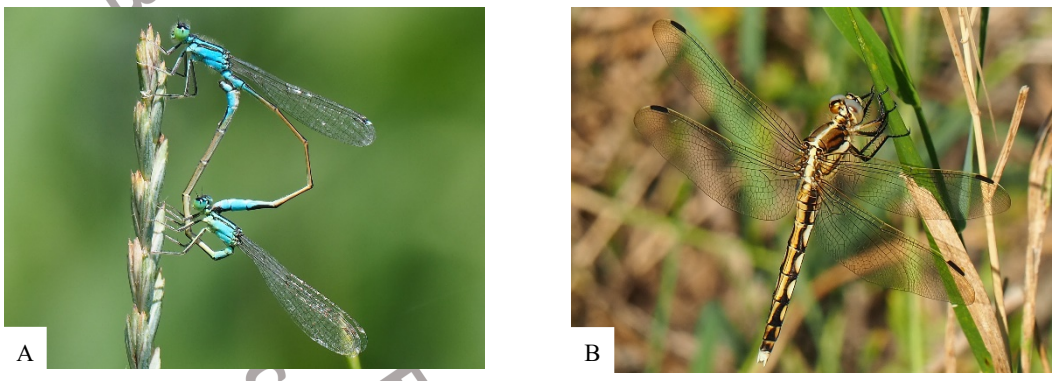

Figure 3. The most common species during this study: the most common damselfly was *Ischnura elegans* (A, pair *in copula*, Delta Moldovei [loc. 22], 26-iv-2024), the most common dragonfly was *Orthetrum albistylum* (B, female, Miletin river [loc. 25], 26-iv-2024)

At lentic habitats, I observed 16 species, only at lentic habitats four species: *Lestes barbarus*, *Coenagrion puella* (Linnaeus, 1758), *Enallagma cyathigerum* (Charpentier, 1840), and *Sympetrum fonscolombii* (Selys, 1840). At lotic habitats, I observed 19 species, only at lotic habitats seven species: *Calopteryx splendens*, *C. virgo*, *Coenagrion ornatum*, *Aeshna affinis*, *Onychogomphus forcipatus*, *Somatochlora meridionalis* Nielsen, 1935 (Fig. 7), and *Orthetrum coerulescens* (Fabricius, 1798).

I searched for larvae at three locations (loc. 12, 15, and 27), but was only able to catch one single, very small (very young) larva of *Somatochlora* cf. *meridionalis* at loc. 15. This larva is in my personal collection.

At three locations, I discovered exuviae, all *Orthetrum cancellatum* (Linnaeus, 1758): loc. 08 one female, loc. 22 one male, and loc. 37b eight males and 15 females. All exuviae are in my personal collection.

The 23 species I observed correspond to *ca.* 32 % of the 71 species mentioned for Romania (Manci 2012; Boudot and Kalkman 2015; Wildermuth and Martens 2019), *ca.* 43 % of the 53 species mentioned for Iaşi County (Cîrdei and Bulimar 1965; Lehrer and Bulimar 1979; Nicoară et al 2009; Ghețeu 2012; Manci 2012) or 50 % of the 46 species which I consider reliable to be part of the Iaşi County Odonata fauna (see Discussion and Appendix 1).

Discussion

Species spectrum. I deliberately chose the time of my trip, the end of June. My own experience (unpubl.) shows that summer species as well as the last spring species and also the first autumn species can be found. Unfortunately, I was not able to observe any spring species during my trip (too late?), and I also only observe very few autumn species (too early?). So, the results of my trip show only a picture of the summer species for Iaşi County and Moldova.

Table 2. Species, their behaviour and numbers at the respective locations.

no.	species	loc. [1] (behaviour [2]: abundance class [3])
1	*Lestes barbarus* (Fabricius, 1798)	**31** (F: II) [4]
2	*Sympecma fusca* (Vander Linden, 1820)	**09** (F: I) [4]; **31** (F: I) [4]
3	*Calopteryx splendens* (Harris, 1782)	**10** (F: IV); **11** (F: III); **12** (F: IV); **14** (F: I); **16** (F: V); **29** [5]; **32** (F, E: V)
4	*Calopteryx virgo* (Linnaeus, 1758)	**27** (F: II)
5	*Platycnemis pennipes* (Pallas, 1771)	**01** (F, M: III); **03** (F: II); **04** (F: II); **05** (F: II); **07** (F, E: II); **09** (F: II); **10** (F: II); **11** (F: III); **12** (F, C: V); **14** (F: IV); **15** (F: II); **16** (F, E: III); **18** (F: II); **19** (F: II); **21** (F: II); **22** (F: II); **25** (F, E: IV); **27** (F: IV); **30** (F: III); **31** (F: II); **32** (F: III); **38** (F, E: III); **39** (F: I)
6	*Coenagrion ornatum* (Selys, 1850)	**16** (F: II)
7	*Coenagrion puella* (Linnaeus, 1758)	**02** (F, C, E: II); **31** (F: II)
8	*Enallagma cyathigerum* (Charpentier, 1840)	**26** (F: III); **34** (F: I); **35** (F: II)
9	*Erythromma viridulum* (Charpentier, 1840)	**01** (F, M: II); **03** (F, C, E: IV); **04** (F: III); **05** (F, C: II); **06** (F, C, Em: V); **09** (F: III); **17** (F, C: V); **18** (F: 1); **19** (F: II); **20** (F, E: (III); **21** (F, C, E: III); **23b** [6]; **25** (F: III); **26** (F: III); **37a** (F: IV); **39** (F, E: III)
10	*Ischnura elegans* (Vander Linden, 1820)	**01** (F, C: IV); **03** (F: II); **04** (F, C: II); **07** (F, C: II); **08** (F, C: V); **09** (F, C: IV); **10** (F: II); **13** (F: II); **14** (F: III); **17** (F, C: III); **18** (F: III); **19** (F: III); **20** (F: III); **21** (F, C: V); **22** (F, C: V); **23a** (F, C: II); **23b** (F, C: V) [7]; **24** (F: III); **25** (F, C: V); **26** (F, C: V); **30** (F, C: III); **33** (F: II); **34** (F, C: V) [8]; **35** (F, C: III); **37a** (F, C: V) [9]; **37b** (F, C: V) [7]; **39** (F: II)
11	*Ischnura pumilio* (Charpentier, 1825)	**07** (F: II); **09** (M: II); **10** (F: II); **16** (F: I); **17** (F: I); **23b** (F, C: IV); **24** (F, C: V); **26** (F: II); **33** (F, C: II); **35** (F, C: IV); **37b** (F, M: V) [10]
12	*Aeshna affinis* Vander Linden, 1820	**05** (F: I)
13	*Anax imperator* Leach, 1815	**04** (F: I); **21** (F: I); **34** (F: I); **37a** (F: II)
14	*Anax parthenope* (Selys, 1839)	**01** (F: IV); **03** (F: II); **04** (F: III); **05** (F: I); **09** (F: I); **21** (F: I); **23a** (F: I); **25** (F: I); **33** (F: I); **39** (F: I)
15	*Onychogomphus forcipatus* (Linnaeus, 1758)	**27** (F: V)
16	*Somatochlora meridionalis* Nielsen, 1935	**15** (F, [L]: III [11]; **27** (F: II)
17	*Crocothemis erythraea* (Brullé, 1832)	**03** (F, C: II); **04** (F: III); **06** (F: II); **19** (F: II); **23b** (F: I)

Table 2. continued

18	*Orthetrum albistylum* (Selys, 1848)	**03** (F, C, E: IV); **04** (F: II); **05** (F: IV); **06** (F: II); **09** (F, E: II); **13** (F: I); **17** (F: II); **19** (F: I); **20** (F, E: III); **21** (F, C, E: V); **22** (F: III); **23b** (F, C: V); **24** (F: II); **25** (F: III); **28** (F: II); **30** (F: II); **33** (F: I); **34** (F: III); **35** (F: IV); **37a** (F: II); **39** (F, C, E: V)
19	*Orthetrum cancellatum* (Linnaeus, 1758)	**01** (F, M, C: V); **03** (F, C, E: III); **04** (F, M: V); **08** (Ex: I); **20** (F: II); **22** (F, Ex: IV); **30** (F: III); **34** (F: II); **37b** (Ex: IV); **39** (F: III)
20	*Orthetrum coerulescens* (Fabricius, 1798)	**05** (F: II); **27** (F: II)
21	*Sympetrum fonscolombii* (Selys, 1840)	**23a** (F: II); **24** (F: I); **26** (F, C: II); **37a** (F: IV); **37b** (F: II)
22	*Sympetrum meridionale* (Selys, 1841)	**04** (M: I); **14** (M: II); **21** (F: I); **23b** (F: I); **28** (F: I)
23	*Sympetrum sanguineum* (O.F. Müller, 1764)	**02** (F: I); **31** (F: III); **38** (F: II)

Remarks: [1] see Tab. 1. [2] C: copula, E: egg laying, Em: emergence, Ex: exuvia(e), F: flight, L: larva, M: maiden flight. [3] abundance class *sensu* Chovanec et al (2012) (see Tab. 3). [4] immature. [5] only one exhausted female floating on the water. [6] no observation despite lush submerged vegetation. [7] F: more than 1,000 specimens, C: more than 100 pairs. [8] F: V, C: IV. [9] F: V, C: V. [10] F, M: more than 1,000 specimens. [11] one single, very small (very young) larva *Somatochlora* cf. *meridionalis*.

Previous records. My original goal was to revisit as many previously mentioned dragonfly locations as possible. In preparation for my trip, I therefore evaluated the literature available to me on the occurrence of dragonflies and damselflies in Iaşi County (see Introduction). However, most publications only listed the nearest settlements. Manci (2011) lists highly accurate coordinates for the sites, but these refer to the center of the nearest settlement. It was therefore difficult to precisely locate many of the finds made so far. In order to stick to my schedule, previous sites could not be too far off my planned route. Therefore, I was finally only able to visit seven sites (four undoubted and three doubtful) from which observations had already been published (Tab. 4). Some species in these older publications appear very dubious from today's perspective. I discuss their records in the section "Remark to some families" below.

Threats. The waters in Iaşi County are exposed to various threats. One of the main problems is littering. Except for the streams (loc. 15, 27, and 36) and the pond in Parcul Copou (loc. 02),

Table 3. Abundance classes: imagines/100 m (Chovanec et al 2012)

	I (single)	**II (rare)**	**III (frequent)**	**IV (abundant)**	**V (extremely abundant)**
Zygoptera without Calopterygidae	1	2-10	11-25	26-50	> 50
Calopterygidae and Libellulidae	1	2-5	6-10	11-25	> 25
Anisoptera without Libellulidae	1	2	3-5	6-10	> 11

Table 4. Visited locations with previously published records of Odonata in Iasi County with mentioned / observed species.

loc.[1]	**name of the location** [2] [4] **species**	**source(s)** [3]
01	Bahlui (undoubted)	i121855351, i170489327, i170488438
	a) *E. viridulum, I. elegans, A. parthenope*	
	b) *P. pennipes, O. cancellatum*	
	c) –	
03	Grădina Botanică Iași (undoubted)	G, i18116208, i27717355
	a) *E. viridulum*, *C. erythraea*	
	b) *I. elegans*, *P. pennipes*, *A. parthenope*, *O. albistylum*, *O. cancellatum*	
	c) *L. barbarus*, *L. dryas*, *L. virens*, *S. fusca*, *I. pumilio*, *C. puella*, *C. pulchellum*, *A. imperator*, *I. isoceles*, *L. depressa*, *S. depressiusculum*, *S. meridionale*, *S. sanguineum*, *S. striolatum*, *S. vulgatum*	
15	Bîrnova, Pd. Bîrnova, Bârnova, Pd. Bârnova (doubtful)	A, C, D, E, F, G
	a) –	
	b) *P. pennipes*, *S. meridionalis*	
	c) *S. fusca*, *C. splendens*, *C. virgo*, *C. ornatum*, *C. puella*, *E. cyathigerum*, *I. elegans*, *A. affinis*, *A. cyanea*, *A. mixta*, *C. heros*, ~~*S. flavomaculata*~~, *L. depressa*, *O. coerulescens*, *S. flaveolum*, *S. sanguineum*, *S. striolatum*, *S. vulgatum*	
23	Halceni Dam Lake (undoubted)	H
	a) *I. elegans*, *I. pumilio*, *A. parthenope*, *C. erythraea*, *O. albistylum*, *S. fonscolombii*, *S. meridionale*	
	b) –	
	c) –	
33	Podu Iloaiei (doubtful)	G
	a) *I. pumilio*, *A. parthenope*	
	b) *I. elegans*, *O. albistylum*	
	c) –	
37	Acumularea Tungujel (undoubted) / Țibana (doubtful)	i168469464, i168469465 / G
	a) *E. viridulum*, *I. elegans*, *I. pumilio*, *A. imperator*, *O. albistylum*, *S. fonscolombii*	
	b) –	
	c) *O. cancellatum*, *S. flaveolum*, *S. meridionale*, *S. sanguineum*, *S. striolatum*, *S. vulgatum*	
39	Ciric (undoubted)	A, B, C, D, E, F, G
	a) *P. pennipes*, *E. viridulum*, *A. parthenope*, *O. albistylum*, *O. cancellatum*	
	b) *I. elegans*	
	c) *L. sponsa*, *L. dryas*, *S. fusca*, *C. splendens*, ~~*C. lunulatum*~~, *C. puella*, *C. pulchellum*, *E. cyathigerum*, *I. pumilio*, *A. imperator*, *B. pratense*, *L. depressa*, *L. fulva*, *L. quadrimaculata*, *O. coerulescens*, *S. depressiusculum*, *S. flaveolum*, *S. sanguineum*, *S. striolatum*, *S. vulgatum*	

Remarks: [1] (see Tab. 1). [2] name of the location in previous publications (same site as my location: undoubtedly resp. doubtfully). [3] A = Cîrdei and Borcea (1949), B = Cîrdei (1956a), C = Cîrdei (1956b), D = Cîrdei (1956c), E = Cîrdei and Bulimar (1961), F = Cîrdei and Bulimar (1965), G = Manci (2011), H = Ghețeu (2012), i12345678 = https://www.inaturalist.org/observations/12345678/ [4] species observed by me: a) only, b) also, c) not (crossed out: see corresponding family in Discussion)

I found garbage at all locations, mainly empty beverage containers, but also construction rubble, car tires, etc. It is hoped that the deposit system introduced in November 2023 (RetuRO 2024) will at least reduce the flood of empty beverage containers. However, the occasional discovery of containers with a deposit logo raises doubts about this.

Rivers and the reservoirs created along their course are in danger of drying up. Thus, Balta Neagră (a stream, loc. 36) was completely dried up, and Lacul Hălceni (loc. 23) was largely without water. Between 1961 and 2012, the average air temperature in Iaşi County was 10.3 °C, the average precipitation was 601 mm (Slave et al 2013). Compared to the period 1961-1990, the average air temperature in the period 2021-2050 will rise by up to 3.5 °C, and the average precipitation will fall by up to 60 mm (Romanian Ministry of Environment, Waters and Forests 2022). For the same period, heat waves are forecast to increase in number (up to 50 %) and duration (up to 40 %) (Antonescu et al 2023). So, the climate will change in Iaşi County. This will also affect the Odonata fauna.

Ott (2010) summarizes the effects of climate change on Odonata. These include, for example, more prominent tendency for expansion in Mediterranean species (e.g. *Crocothemis erythraea* (Brullé, 1832): since the 1990s in Germany and Poland (Bernard et al 2009; Ott et al 2015), 2014 in Lithuania (Račkauskaitė and Gliwa 2015), 2015 in Denmark (Billquist et al 2019)), more northerly breeding, also breeding in higher altitudes (e.g. *Chalcolestes viridis* (Vander Linden, 1825): Lemke 2021), or eclosion earlier in the season and overall alteration in the phenology (e.g. very early records of immature *Sympecma fusca* (Vander Linden, 1820) during my trip: see below).

Cerini et al (2020) were able to demonstrate that climate change causes more species to become locally extinct than to be replaced by new species. The replacement occurs more in lentic than lotic habitats. Specialized species are more likely to be threatened with local extinction, whereas generalist species are more common among the new colonists. So, the current dragonfly fauna of Iaşi County is only a snapshot that will (continue to) change in the coming years and decades. A reduction in species diversity is expected.

Parasites. In addition to the dragonfly biting midge *Forcipomyia* (*Pterobosca*) *paludis* (Macfie, 1936) (Insecta: Diptera: Ceratopogonidae) (Martens et al 2012; Wildermuth and Martens 2019: 869 ff.; Lemke and Hryniuk 2022), dragonflies and damselflies are mainly parasitized by larvae of water and terrestrial mites (Wildermuth and Martens 2019: 859 ff.). A very severe infestation of these parasites can weaken the dragonfly to such an extent that it dies (Petzold 2006).

The Rubber-dinghy Water-mite *Limnochares aquatica* (Linnaeus, 1758) (Arachnida:

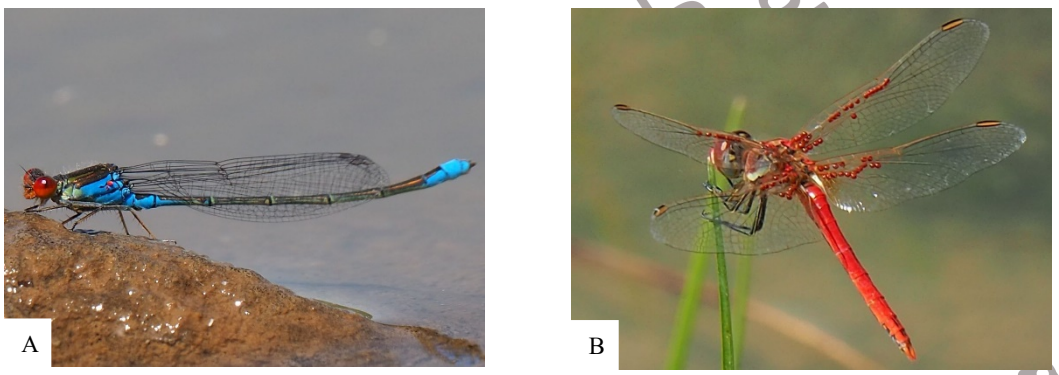

Figure 4. Examples of parasitic infestation in observed dragonflies and damselflies: A) male *Erythromma viridulum* infested with a larval *Limnochares aquatica* (red "dot" on the lateral thorax) (Acumularea Chiriţa [loc. 04], 23-iv-2024), B) male *Sympetrum fonscolombii* infested with more than 70 larval *Arrenurus papillator* ("pearls" on the wings) (Acumularea Tungujel [loc. 37b], 28-iv-2024)

Trombidiformes: Limnocharidae) is common and widespread in Europe. Its larva has a distinct red colouration and drop-shaped form. So far, only nine damselfly species and one dragonfly species have been identified as hosts (Wildermuth and Martens 2019: 864 ff.). I was able to observe an infestation of *L. aquatica* on two odonate species: one larva on a male *Erythromma viridulum* (Charpentier, 1840) (Fig. 4 A) and one larva on a female *Ischnura elegans*. Both records were on 23-iv at Acumularea Chiriţa near Dancu (loc. 04). Both *Erythromma viridulum* and *Ischnura elegans* are known as hosts of *L. aquatica* (Wildermuth and Martens 2019: 864 ff.).

Larvae of *Arrenurus papillator* (O.F. Müller, 1776) (Arachnida: Trombidiformes: Arrenuridae) are conspicuous as bright red balls, which are particularly recognizable as pearl-like structures on the wings of *Sympetrum* species (Wildermuth and Martens 2019: 862 ff.). On 28-iv at the southeast shore of Acumularea Tungujel near Moara Ciornei (loc. 37b) I observed a male *Sympetrum fonscolombii*, on whose four wings there were altogether more than 70 "pearls" (Fig. 4 B).

In addition to these two red larvae, other species of the genus *Arrenurus* parasitize Odonata (Zawal 2008). They appear as small grey-green pearls and adhere particularly to the thorax and the underside of the abdomen. Identification at species level is impossible based on photographic evidence (Wildermuth and Martens 2019: 859 ff.). The female *Ischnura elegans* at loc. 04, which was infested with at least one larva of *L. aquatica* (see above), was also parasitized by at least seven larvae of *Arrenurus* sp. They were positioned on the underside of the abdomen. At a temporary pond north of Miletin River near Hălceni (loc. 24) I photographed on 26-iv a female *Ischnura pumilio* in copula, the underside of the thorax heavily infested with larvae of *Arrenurus* sp.

Remarks to some families.

Lestidae. *Chalcolestes parvidens* / *viridis*: There is only one old record of "*Lesies* [sic!] *viridis* Vanderl." from Iaşi County. Cîrdei and Borcea (1949) list it in their overview: "Lives around stagnant water, picked up from the branches of shrubs, Nicolina, August [1949]." ("Trăieşte în jurul apelor stătătoare, recoltat depe [sic!] ramurile arbuştilor, Nicolina, August [1949].") This record is repeated in Cîrdei and Bulimar (1965), Lehrer and Bulimar (1979) and Manci (2012). *Chalcolestes parvidens* was described by Artobolevskij in 1929 as a new subspecies of *Chalcolestes viridis*. However, there is a large genetic distance between the two taxa, differences in diurnal activity and phenology, so that *C. parvidens* is considered a *bona species* (Wildermuth and Martens 2019: 44). Romania is situated in the broad transition zone between both species (Boudot and Dyatlova 2015a; Boudot and Willigalla 2015; Wildermuth & Martens 2019: 47, 53). Both *C. parvidens* and *C. viridis* occur in the neighboring Republic of Moldova (Bușmachiu and Munjiu 2024). So it remains unclear whether Cîrdei and Borcea (1949) collected *C. viridis* or *C. parvidens*. Therefore, I only list the genus in the check-list (App. 1).

Lestes: The emerging of species of the genus *Lestes* observed so far in the Iaşi County (*L. barbarus*, *L. dryas* Kirby, 1890, *L. sponsa* (Hansemann, 1823), *L. virens* (Charpentier, 1825): Manci 2011, 2012) begins in Central Europe from mid-May, in the Mediterranean countries even earlier (Wildermuth and Martens 2019: 57 ff.). By the time I travelled (end of June) imagines should already have emerged. Nevertheless, I was able to observe only one single specimen of a *Lestes* species: On 27-vi I saw an immature male *Lestes barbarus* at a temporary pond (loc. 31). Precisely because I visited different types of water bodies (stream, river, oxbow, channel, pond, lake), I also expected to observe other *Lestes* species. I can't explain why I saw only this one specimen and no others.

Lestes macrostigma (Eversmann, 1836): Manci (2012) symbolizes with a blue dot a finding of this species after 1979 near Iaşi. The basis of this dot remains unclear. No specimen was found in the Iaşi Museum of Natural History (Manci 2011). The corresponding distribution map on

Manci's homepage (Manci *n.d.* [no date] e) also shows no record of this species in Moldova. So, the status of this species in Iaşi County remains unclear. However, an occurrence of *L. macrostigma* in the county seems possible. Bușmachiu and Munjiu (2024) observed it in 2022 and 2023 in the village Măcărești, Republic of Moldova, only *ca.* 30 km southeast of Iaşi.

Sympecma fusca: With the observation of one male each on 23-vi (loc. 09: channeled Jijia River) and 27-vi (loc. 31: temporary pond), I was able to make very early observations of the summer generation of *S. fusca*. Their shiny wings identified them as very young specimens that had obviously emerged in the respective water body.

Sympecma is the only odonate genus in Europe that hibernate as adults. They return to the waters from February onwards and mate there. Egg laying was recorded up to June. In Central and Western Europe, the larvae develop rapidly within two to three months, and the imagines emerge from the beginning of July to September. The immatures initially stay near the water and then slowly retreat to their winter quarters, which can be up to several kilometers away from their home waters (Schweighofer 2011; Wildermuth and Martens 2019: 89 ff.). In southern France, emerging of *S. fusca* begins in early June (Boudot et al 2017).

Of 145 evaluated data sets for Romania (Cîrdei and Bulimar 1965 with included references; Manci *n.d.* c with included references; iNaturalist.org; observation.org), 12 are from June and 26 from July (for Iaşi County there is only one data in these months: 1-vii-1990; Manci 2011). But only for one observation each from 29-vi (2023: iNaturalist.org/observations/170173201/) and 6-vii (2014: iNaturalist.org/observations/69051574/) it can be determined that these are specimens of the newly emerged summer generation. For all other data sets, it remains unclear whether these are specimens from the hibernating generation or the summer generation. When observing imagines of *Sympecma fusca* in June and/or July, special attention should be paid to indicating to which generation the observed specimens belong.

Platycnemididae. During my trip *Platycnemis pennipes* was the second most common species with observations at 23 locations (59 % of the locations visited). I observed this only species of the family in southeastern Europe in both lentic and lotic habitats. It was more common in lotic than in lentic habitats (observations in 84 % of lotic and 34 % of lentic habitats), and it was also more numerous in lotic (max. abundance class V; see Tab. 3) than in lentic habitats (max. abundance class III). Nevertheless, it also showed reproductive behaviour in lentic habitats (oviposition at loc. 07). I have not encountered *P. pennipes* in small ponds or in fish-rich or very murky waters. Remarkable because of the frequency I found: only 12 specimens of this species from five locations (all in Iaşi County) are deposited in the collection of the Iaşi Museum of Natural History (Manci 2011). It remains unclear whether the number of populations and/or the abundance of *P. pennipes* has increased or not. However, this museum has deposited 51 specimens from ten localities in Iaşi County of the most common species in my study, *Ischnura elegans*, and 54 specimens from seven localities in Iaşi County of my third most common species, *Orthetrum albistylum* (Manci 2011).

Coenagrionidae. The only representatives of the genus *Coenagrion* I observed were *C. ornatum* (loc. 16; Fig. 5) and *C. puella* (loc. 02, 31). I was also expecting observations of *C. pulchellum* (Vander Linden, 1825) and *C. scitulum* (Rambur, 1842), which has already been recorded in Iaşi County (Manci 2011, 2012). These expectations have not been fulfilled. As with the genus *Lestes* (see above), I cannot explain why I did not see any other species.

Coenagrion lunulatum (Charpentier, 1840): There are two (or four) older reports for this species from Iaşi County. Cîrdei and Borcea (1949) found this species in summer 1949 at "Grasses around the swamps" ("Ierburile din jurul bălților") at the locations Ciric and Zagavia in June and July respectively. Cîrdei (1956b) refers to Cîrdei and Borcea (1949), but mentions other sites: Cristeşti and Larga Jijiei, both with the date "VIII/49". In Cîrdei and Bulimar (1965) these (false) locations are again given with reference to Cîrdei and Borcea (1949). Lehrer and Bulimar

(1979) take the original and the incorrectly reproduced locations and show in their compilation four locations for *C. lunulatum*. Manci (2012) corrects the incorrect information from Cîrdei (1956b), Cîrdei and Bulimar (1965) and Lehrer and Bulimar (1979) and shows the two older mentions in his map: Ciric and Zagavia.

C. lunulatum is a Euro-Siberian taxon (Boudot et al 2017) with a distribution range from Western Europe across Asia to Kamchatka. It is missing south of the Alps. It flies very early in the year, its flight period is very short (Wildermuth and Martens 2019: 195 ff.). Outside its core range in northern Central Europe, it has been recorded in Polish and Ukrainian Galicia and the high altitudes of the Romanian and Ukrainian Carpathians. There it is rare and lives in small, scattered populations (Boudot and Nelson 2015).

Because of the confusion regarding the locations of the species in Cîrdei and Borcea (1949), Cîrdei (1956b), Cîrdei and Bulimar (1965) and Lehrer and Bulimar (1979), its (current) rarity, its preference for higher altitudes in the south-eastern European countries (Boudot and Nelson 2015), and its recent Romanian records only in the heights of the Carpathians and the Apuseni Mountains (Flenker 2011; Manci 2012), *C. lunulatum* should be removed from the check-list of Moldovan Odonata (Appendix 1). In any case, a (former) occurrence of this species in Iaşi County remains very doubtful.

Figure 5. *Coenagrion ornatum*, a species listed in Annex II of the EU Habitats Directive (European Community 1992), was observed only once. (male, Bohotin stream [loc. 16], 25-iv-2024)

Erythromma najas (Hansemann, 1823): Lehrer and Bulimar (1979) show in their compilation five quadrants in Iaşi County where this species was observed. The basis of their entries remains unknown. In any case, Cîrdei and Bulimar (1965) did not mention the species for Iaşi County and Manci (2011) does not find any specimens in the Iaşi Museum of Natural History. Manci (2012) shows an old record (before 1979) of the species near Iaşi, but Manci (*n.d.* d) does not

show any records for Iaşi County in its map. Except for a report by Kipping (1998), who observed *E. najas* on the same day at the same location (syntopic?) with *E. viridulum* as a similarly "common" species with similar reproductive behaviour, there are no modern records of *E. najas* in Moldova. I consider the mention in Kipping (1998) as a misidentification. *Erythromma najas* should be removed from the check-list of Moldovan Odonata (App. 1).

Ischnura elegans (Fig. 3 A) was by far the most common species in June 2024, both in terms of number of localities and number of specimens. I observed it at 25 locations (*ca*. 67 % of the locations with observations), at two locations it was abundant (class IV *sensu* Chovanec et al 2012, see Tab. 3), at nine locations even extremely abundant (class V).

Female *I. elegans* occur in a number of colour variation, resulting from the combination of three mature colour morphs with ontogenetic colour changes (Sternberg 1999; Svensson et al 2007; Wildermuth and Martens 2019: 257 f.; Dijkstra et al 2020; Cordero-Rivera and Sánchez-Guillén 2024): the male-like morph typica ("androchrome" in Svensson et al 2007 and Cordero-Rivera and Sánchez-Guillén 2024; "A-type" in Dijkstra et al 2020), the morph infuscans ("B-type" in Dijkstra et al 2020) and the morph infuscans-obsoleta ("aurantiaca" in Cordero-Rivera and Sánchez-Guillén 2024; "C-Type" in Dijkstra et al 2020). Gorb (1999) notes that morph infuscans-obsoleta is missing in central Ukraine. Likewise, Dyatlova (2004) and Gosden et al (2011) were unable to detect such females in southwestern Ukraine. Despite the frequency of the species and my special attention, I could not observe any females of this morph in Iaşi County. As in the studies of Gorb (1999), Dyatlova (2004) and Gosden et al (2011), the morph typica was in the majority in my study: of 65 photographed females, 46 (*ca*. 71 %) belonged to this morph, 19 (*ca*. 29 %) were infuscans.

Nehalennia speciosa (Charpentier, 1840): Even with this species, there are contradictions in the information on the locations in the older literature. The species is not mentioned in Cîrdei and Borcea (1949), which presents results of odonatological surveys carried out in the summer 1949 in the (former) counties of Iaşi and Cîmpulung Moldovenesc. *Nehalennia speciosa* is mentioned for the first time in Cîrdei (1956b) as "new species for the R.P.R." for six locations from two years (year 1949: three locations, two of them in Iaşi County; year 1953: three locations). An attached drawing shows the species-typical narrow transverse stripe on the rear edge of the head. Cîrdei and Bulimar (1965) only show the three locations from 1953 in their map, none of them in Iaşi County. Without further additions, Lehrer and Bulimar (1979) includes these three locations in their map. Manci (2012) shows on his map the original mentions of Cîrdei (1956b), but moves the location Cucuteni (Cucuteni, commune Cucuteni; representation in Cîrdei and Bulimar 1965: Cucuteni, commune Lețcani).

According to Bernard and Wildermuth (2005), the records of 1949 should be recognized as a misidentification. Therefore, this species should be canceled from the check-list for both Iaşi County and Moldova (Appendix 1).

Aeshnidae. Of the seven species of this family recorded so far in Iaşi County, I was able to observe only three species: *Aeshna affinis*, *Anax imperator* and *A. parthenope* (Selys, 1839).

Aeshna affinis: I have observed this species only once: one male flew at loc. 05. It seems to be a rather rare species in Moldova, its main distribution areas in Romania are the Banat and the Danube Delta (Manci 2012). Of 312 specimens deposited in the Iaşi Museum of Natural History, only 21 are from Iaşi County; they are also the only specimens from Moldova. In the literature (Cîrdei and Bulimar 1961, 1965; Lehrer and Bulimar 1979; Manci 2011) it is mentioned for up to seven locations.

Aeshna cyanea (Müller, 1764) is a typical species of late summer and early autumn. Regarding them too, my trip was too early. It is questionable whether *A. cyanea* currently occurs in Iaşi County (and Moldova). It is only mentioned in older publications. Cîrdei and Borcea (1949), Cîrdei (1956c) and Cîrdei and Bulimar (1965) report an occurrence for two localities in Iaşi

County. Lehrer and Bulimar (1979) show five quadrants with records of this species in the county. Manci (2012) discards these records and shows only two dots with older records (the locations of the other literature should appear as one dot), but no dot with younger records after 1979. There is no specimen deposited in the Iaşi Museum of Natural History (Manci 2011). There are also no entries for Iaşi County and Moldova in the online databases (iNaturalist.org; observation.org). In July 2024, Bușmachiu (in lit.) was able to observe two male *A. cyanea* for the first time for the Republic of Moldova in the Scientific Reserve "Plaiul Fagului". This location is only *ca.* 25 km east of the Romanian-Moldovan border.

Aeshna mixta (Latreille, 1805) is another typical species of late summer and early autumn. My trip was too early to observe them. The specimens from Moldova deposited in the Iaşi Museum of Natural History were collected mainly in August, only exceptionally in July (17, 18 and 29-vii; Manci 2011). Recent finds from Manci (*n.d.* a, https://observation.org/observation/288398697/) date from September.

Anax parthenope was a common species, with observations at ten water bodies. It flew on both lentic and lotic water. The occurrence of this holo-Mediterranean (Boudot et al 2017) and northward expanding species (Kalkman and Proess 2015) also seems to have increased in Moldova and Iaşi County. Cîrdei and Bulimar (1961) reported the find of "several specimens" ("cîteva exemplare") as larvae from a location near Iasi, but did not mention this find in their compilation four years later (Cîrdei and Bulimar 1965). Lehrer and Bulimar (1979) show an additional find, which Manci (2012) rejects. He shows only the old record of Cîrdei and Bulimar (1961) and the two newer locations of the specimens deposited in the Iaşi Museum of Natural History (Manci 2011).

I could not observe either *Brachytron pratense* (Müller, 1764) or *Isoaeschna isoceles* (O.F. Müller, 1767); both already fly in late spring. The specimens from *B. pratense* deposited in the Iaşi Museum of Natural History were collected in May and early June, those from *I. isoceles* mainly in June, only two of them in the third decade (Manci 2011). So my trip was too late to observe these species.

Gomphidae. Before my trip, I hoped to observe at least three species from this family: *Gomphus vulgatissimus* (Linnaeus, 1758), *Onychogomphus forcipatus* and *Stylurus flavipes* (Charpentier, 1825).

Gomphus vulgatissimus: There is only one mention of this species in Iaşi County: in the map in Lehrer and Bulimar (1979) is a dot near Iaşi. It remains unknown what this dot is based on. Neither Cîrdei (1956c) nor Cîrdei and Bulimar (1965) report a corresponding find. The map in Manci (2012) lacks a corresponding dot.

Because this species has been mentioned only once in the literature, without any precise information on location, habitat and year, *G. vulgatissimus* should be excluded from the check-list of dragonflies and damselflies of Iaşi County (Appendix 1).

But it seems possible that this species occurs in wide and calmly flowing parts of the Jijia and Miletin rivers, possibly also in large reservoirs along their course (e.g. Acumularea Hălceni, Lacul Vlădeni, Lacul Câmpeni). I also consider populations in the Prut River to be possible. During my visit, the current of the Moldova and Siret rivers proved to be too strong for the occurrence of *G. vulgatissimus*. This species, which is widespread in Central and Eastern Europe, inhabits mainly quiet streams and rivers in lowland areas, occasionally also the sandy banks of well-oxygenated lentic waters (Boudot et al 2015a; Dijkstra et al 2020: 190; Wildermuth and Martens 2019: 460). In the Republic of Moldova this species has been found several times in the Prut River (Bușmachiu and Munjiu 2024). During my trip, the Romanian border police prohibited me from entering the Prut River, which marks the Romanian-Moldovan border. So I was not able to observe the species at the locations I visited. Thus, reliable evidence of this species is still lacking in Moldova.

Onychogomphus forcipatus (Fig. 6): There is only one report of this species in Iaşi County: Ghețeu (2012) reported the collection of one larva each in October 2010 and October 2011 in Jijia River. On aerial photographs (Mapy.cz 1996-2024; ANCPI 2019-2024) the location shows strong similarities with the locations 05, 09 and 20 I visited. At these locations, the river was straightened as a channel, had a width of several meters and was accompanied by dikes. The water flowed leisurely. At Ghețeu's location, there are partly loose groups of bushes on the west bank, while the east bank has only a low herb layer.
However, the location where I found this species (loc. 27, Bahluieț stream) is completely different. I was able to observe 13 males over a length of about 80 m. Individual males sat on boulders lying in the stream and waited there for females, other males sunned themselves somewhat away from the stream on sunlit leaves of low vegetation. Only occasionally did small fights occur between the males over the stream, males outside the stream showed no aggression among each other. The Bahluieț stream was not a slowly flowing lowland river like the location at Ghețeu (2012), but a narrow, barely 1 m wide, clearly flowing stream in the middle of a large forest area. This probably corresponds to the vast majority of locations where this species has been found in Romania so far (Manci 2012; Manci *n.d.* b). So, I consider the mention in Ghețeu (2012) as a misidentification.

Figure 6. *Onychogomphus forcipatus* was observed only once. The habitat differs greatly from the habitat in Ghețeu (2012, see discussion; male, Bahluieț stream [loc. 27], 27-iv-2024).

Stylurus flavipes: This species has not yet been recorded in Iaşi County. Along with *Gomphus vulgatissimus*, *S. flavipes* is a species that inhabits quiet flowing streams and rivers in lowlands. However, the waters it inhabits are wider and flow more calmly than those inhabited by *G. vulgatissimus* (Boudot and Dyatlova 2015b; Wildermuth and Martens 2019: 500). I expected to observe imagines or to catch larvae on the right side of the Prut River. The species has been recorded in the Republic of Moldova on the left side of the Prut River (Munjiu et al 2014;

Bușmachiu and Munjiu 2024). Visits to pre-selected locations on the Prut River were thwarted by the Romanian border police, who forbade me from staying near the river. Therefore, I could not find *S. flavipes*. So there are still no records of this species in Iaşi County.

Cordulegastridae. At two streams that seemed suitable to me (loc. 15: Vasluieț stream, and loc. 27 Bahluieț stream) I used a sieve to search for buried larvae of *Cordulegaster* sp. I held the sieve under water and shoveled by hand fine soil (sand, fine gravel, detritus) into it. I repeated this process several times at several points, each over a stream length of 150 to 200 m. Unfortunately, I was not able to catch any larvae of *Cordulegaster* sp.

Manci (2011) lists several specimens of *Cordulegaster heros* Theischinger, 1979 deposited in the Iaşi Museum of Natural History, which were collected between 1974 and 1990 in the "Pd. Bârnova". My loc. 15 is situated within the Bârnova forest, but slightly further northeast than the coordinates given by Manci (2011; but see my notes on the coordinates in Manci (2011) in the section "Previous records"). Unfortunately, I was unable to visit other streams in this forest and search for *Cordulegaster* larvae.

The drying up of smaller streams described in the section "Threats" has a particularly strong impact on *Cordulegaster heros*. Its larvae require between three and five years for their full development (Boda et al 2015). Although *Cordulegaster* larvae can survive short dry periods hidden between rubble and in rock crevices (for *C. bidentata* Selys, 1843: Tamm 2018), they are unlikely to survive weeks or even months of streams drying up. Especially because their food is no longer available.

Corduliidae. *Epitheca bimaculata* (Charpentier, 1825): In a large study conducted between March and December 2006, Nicoară et al (2009) investigated the macroinvertebrate fauna from the river Ciric and the connected five dam lakes Lake Dorobanț, Lake Aroneanu, lakes Ciric I, Ciric II and Ciric III (Veneția). There they found, among others, a single larva, which they identified as "*Epitheca* sp." They provide no information about the month of collection, the exact location, or the literature used for its determination.

The only European representative of the genus *Epitheca* is *Epitheca bimaculata*. It inhabits larger lentic waters with broad belts of reed, bulrush and sedges (Boudot et al 2015b; Wildermuth and Martens 2019: 558 f.). In Romania, this species has been recorded twice so far: in the Carpathians and in the Crișana (Manci 2012). The larva of *E. bimaculata* is unmistakable. The abdomen is heavily spined dorsally and laterally, and there are two "humps" between the eyes (Gerken and Sternberg 1999; Brochard and van der Ploeg 2014). Due to the distinctive nature of the larvae and the mere mention of the genus instead of the name of the only European species in Nicoară et al (2009), I consider the mention here to be a misidentification. So, *Epitheca bimaculata* should be removed from the check-list for Iaşi County (Appendix 1).

Somatochlora flavomaculata (Vander Linden, 1825): This species is first mentioned in Cîrdei and Borcea (1949) with two locations in Iaşi County. Later, these records are neither mentioned in Cîrdei (1956c) nor in Cîrdei and Bulimar (1961) or Cîrdei and Bulimar (1965). Only Lehrer and Bulimar (1979) again shows an occurrence of the species at the two locations in Iaşi County mentioned in Cîrdei and Borcea (1949). After that, this species was never mentioned again. Manci (2012) therefore does not show any locations of this species in Iaşi County or in Moldova. I consider the mention in Cîrdei and Borcea (1949) as a misidentification. So, *S. flavomaculata* should be removed from the check-list for both Iaşi County and Moldova (Appendix 1).

Somatochlora meridionalis / *metallica*: The taxon *Somatochlora meridionalis* was first described in 1935 by Nielsen as a subspecies of *Somatochlora metallica* (Vander Linden, 1825) (Wildermuth and Martens 2019: 589). Schmidt (1957) elevated the taxon to species rank without further justification. The species rank was controversial for a long time (Holuša 2009).

Recently it has been generally accepted that *S. meridionalis* is a *bona species* (Wildermuth 2008).
As with other species (see above), the data on the taxon *S. metallica* in Cîrdei and Bulimar (1965) are confusing. They show two locations for this species in Iaşi County and refer to Cîrdei and Borcea (1949) and Cîrdei (1956a). However, these two sources do not mention any finds in Iaşi County. Lehrer and Bulimar (1979) includes the two wrong locations in their map for *S. metallica*. Manci (2011) found four male specimens of *S. meridionalis* from three different locations in Iaşi County in the collection of the Iaşi Museum of Natural History. Manci (2012) shows these three locations in his map for *S. meridionalis*. His map for *S. metallica* shows no dots either in Iaşi County or in Moldova. For Iaşi County, there are so far only records of *S. meridionalis* and no records of *S. metallica*.
Manci (2016) recognizes a clear separation of the occurrence of both species: "In Romania, it appears to be a clear separation between the two also on ecological demands: *Somatochlora meridionalis* being found only near small and shaded running waters (mostly at low altitude); and *Somatochlora metallica* being found only at an altitude in habitats with standing waters." So, *S. metallica* should be removed from the check-list for both Iaşi County and Moldova.

Figure 7. Yellow spot on the mesepimeron (red arrow) as identification feature of *Somatochlora meridionalis* (Wildermuth 2008; Dijkstra et al 2020). (male, Vasluieț stream [loc. 15], 25-iv-2024).

I observed *Somatochlora meridionalis* twice: on 25-iv-2024 at loc. 15 (Fig. 7) and on 27-iv-2024 at loc. 27. My loc. 15 corresponds to the locations "Pd. Bârnova" and "Pd. Bârnova - Pr. Nastea" in Manci (2011). One male *S. meridionalis* was collected at each of these locations in 1985 and 1990, respectively. My loc. 27 is located *ca.* 80 km northwest of Bârnova forest. It represents the northernmost location of *S. meridionalis* in Romania and is also the northernmost location of this species east of the Carpathians (Manci 2012; Bernard and Daraż 2015;

Wildermuth and Martens 2019: 590). Although Bernard and Daraż (2015) could not find any specimens of this species in the streams they investigated in the Ukrainian Khotyn and Chernivtsi Uplands, "an eastern 'passage' [for the northward spread of this species] must have also existed, i.e., the northward colonisation route proceeding along the eastern Subcarpathians and to the east of them." (Bernard and Daraż 2015: 271). My loc. 27 also points to this. Further targeted searches for the species at streams in forests of the Moldovan Plateau in Romania, Republic of Moldova (where the species has not yet been recorded: Bușmachiu and Munjiu 2024) and Ukraine are expected to yield new finds of *S. meridionalis* east of the Carpathians.

***Libellulidae*.** *Libellula*: All three species of the genus *Libellula* (*L. depressa* (Linnaeus, 1758), *L. fulva* (O.F. Müller, 1764) and *L. quadrimaculata* (Linnaeus, 1758)) have so far been recorded in Iaşi County (Cîrdei 1956c; Cîrdei and Bulimar 1961, 1965; Lehrer and Bulimar 1979; Manci 2011, 2012). Surprisingly, however, I was unable to observe any of these species. All three are late spring/early summer species and are on the wings in Central and Southern Europe from mid-May to late June (Kalkman and Chelmick 2015a, b; Kalkman et al 2015a; Wildermuth and Martens 2019: 663, 670, 678). It is possible that the 2024 flight period in Iaşi County had already ended when I travelled.

Sympetrum: For most species of the genus *Sympetrum* my travel time was probably too early. Of the nine species recorded in Iaşi County (and Moldova) (Manci 2011, 2012), I was only able to observe *S. fonscolombii*, *S. meridionale* (Selys, 1841) and *S. sanguineum* (O.F. Müller, 1764). The emergence period of *S. danae* (Sulzer, 1776), *S. depressiusculum* (Selys, 1841), *S. flaveolum* (Linnaeus, 1758), *S. pedemontanum* (O.F. Müller in Allioni, 1766), *S. striolatum* (Charpentier, 1840) and *S. vulgatum* (Linnaeus, 1758) starts in Central Europe from the end of May, the main flight period begins from the end of June (Wildermuth and Martens 2019: 740, 746, 752, 773, 790, 799). Similar times have also been observed in southern Europe (Kalkman et al 2015b; Kalkman and Conze 2015; Kalkman and Kulijer 2015; Kalkman 2015), but there the main flight period of *S. striolatum* begins already in early May (Kalkman et al 2015c) and of *S. vulgatum* already in mid-June (Kalkman et al 2015d). So the species I observed show the typical summer aspect of my travel time. For most species of the genus *Sympetrum* my trip was too early.

Preliminary check-list of the Odonata in Iaşi County. The discussion resulted in the following preliminary check-list of the Odonata in Iaşi County (Appendix 1). Of the 53 odonate species ever mentioned for Iaşi County, seven are to be deleted.

Conclusions

During an odonatological study trip in Iaşi County from 21-vi to 29-vi-2024, I observed 23 species (11 Zygoptera, 12 Anisoptera). These species present the normal summer aspect of the dragonfly fauna of southeastern European countries. The dragonfly fauna in Iasi County is exposed to various threats. As a result of climate change with rising temperatures and decreasing rainfall, more streams and small reservoirs will dry up. The banks of almost all of the bodies of water visited were littered, mainly with empty beverage and food packaging, but also with old tires and construction rubble. The literature consulted in preparation for the trip reveals many contradictions and obvious misidentifications. Through critical evaluation of the existing literature, the illustrated publications in open natural history online databases and my observations, a preliminary check-list of dragonfly species in Iaşi county is prepared. It contains 46 species; seven previously mentioned species are to be deleted. Intensive surveys in spring and autumn could reveal the presence of additional species.

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Appendix 1. Preliminary check-list of the Odonata in Iaşi County.

no.	species [1)] previous mention(s) [2)]
LESTIDAE	
01	*Chalcolestes* sp. [3)] CBo49, CBu65, LBu79, Man12
02	***Lestes barbarus* (Fabricius, 1798)** CBo49, Cir56b, CBu61, CBu65, LBu79, Man11, Man12
03	*Lestes dryas* (Kirby, 1890) LBu79, Man11, Man12
04	*Lestes macrostigma* (Eversmann, 1836) [3)] Man12
05	*Lestes sponsa* (Hansemann, 1823) CBo49, LBu79, Man11, Man12
06	*Lestes virens* (Charpentier, 1825) CBo49, Cir56b, CBu65, LBu79, Man11, Man12
07	***Sympecma fusca* (Vander Linden, 1820)** CBo49, Cir56b, CBu65, LBu79, Man11, Man12, i208489913
CALOPTERYGIDAE	
08	***Calopteryx splendens* (Harris, 1782)** CBo49, CBu65, LBu79, Man11, Ghe12, Man12, i126699249, i236711638
09	***Calopteryx virgo* (Linnaeus, 1758)** CBu65, LBu79, Man11, Man12, i69685096, i69685228, i69685833, i69685954, i69686104
PLATYCNEMIDIDAE	
10	***Platycnemis pennipes* (Pallas, 1771)** Cir56b, CBu61, CBu65, LBu79, Nea09, Man11, Ghe12, Man12, i170488438, i170489327
COENAGRIONIDAE	
	~~*Coenagrion lunulatum* (Charpentier, 1840)~~ [3)] CBo49, Cir56b, CBu65, LBu79, Man12
11	***Coenagrion ornatum* (Selys, 1850)** Man11, Man12
12	***Coenagrion puella* (Linnaeus, 1758)** CBo49, Cir56b, CBu61, CBu65, LBu79, Nea09, Man11, Man12, i234572610
13	*Coenagrion pulchellum* (Vander Linden, 1825) LBu79, Man11, Man12
14	*Coenagrion scitulum* (Rambur, 1842) Man11, Man12
15	***Enallagma cyathigerum* (Charpentier, 1840)** CBo49, CBu65, LBu79, Nea09, Man11, Ghe12, Man12
	~~*Erythromma najas* (Hansemann, 1823)~~ CBu61, LBu79, Man12
16	***Erythromma viridulum* (Charpentier, 1840)** CBo49, Cir56bm CBu65, LBu79, Man12
17	***Ischnura elegans* (Vander Linden, 1820)** CBo49, CBu65, LBu79, Nea09, Man11, Ghe12, Man12, i27717355, i131475620, i171815334

Appendix 1. continued

18	***Ischnura pumilio* (Charpentier, 1825)** CBo49, Cir56b, CBu65, LBu79, Man11, Man12
	~~*Nehalennia speciosa* (Charpentier, 1840)~~ [3)] Cir56b, Man12
AESHNIDAE	
19	***Aeshna affinis* Vander Linden, 1820** CBo49, Cir56c, CBu61, CBu65, LBu79, Man11, Man12
20	*Aeshna cyanea* (O.F. Müller, 1764) CBo49, Cir56c, CBu65, LBu79, Man11, Man12
21	*Aeshna mixta* Latreille, 1805 Cir56c, CBu65, LBu79, Man11, Man12
22	***Anax imperator* Leach, 1815** Cir56c, CBu61, CBu65, LBu79, Man11, Ghe12, Man12
23	***Anax parthenope* (Selys, 1839)** CBu61, LBu79, Man11, Man12
24	*Brachytron pratense* (O.F. Müller, 1764) Cir56c, CBu65, LBu79, Man11, Man12
25	*Isoaeschna isoceles* (O.F. Müller, 1767) [4)] CBu61, LBu79, Man11, Man12, i166298019
GOMPHIDAE	
	~~*Gomphus vulgatissimus* (Linnaeus, 1758)~~ [3)] LBu79
26	***Onychogomphus forcipatus* (Linnaeus, 1758)** Ghe12
CORDULEGASTRIDAE	
27	*Cordulegaster heros* Theischinger, 1979 Man11, Man12
CORDULIIDAE	
28	*Cordulia aenea* (Linnaeus, 1758) Nea09, Man12
	~~*Epitheca bimaculata* (Charpentier, 1825)~~ [3)] Nea09
	~~*Somatochlora flavomaculata* (Vander Linden, 1825)~~ [3)] CBo49, LBu79
29	***Somatochlora meridionalis* Nielsen, 1935** Man11, Man12
	~~*Somatochlora metallica* (Vander Linden, 1825)~~ [3)] CBu65, LBu79
LIBELLULIDAE	
30	***Crocothemis erythraea* (Brullé, 1832)** CBu61, Man11, Man12
31	*Libellula depressa* (Linnaeus, 1758) Cir56c, CBu61, CBu65, LBu79, Man11, Man12, i126699820, i167396138
32	*Libellula fulva* (O.F. Müller, 1764) Cir56c, CBu61, CBu65, LBu79, Man11, Man12
33	*Libellula quadrimaculata* (Linnaeus, 1758) CBo49, Cir56c, CBu61, CBu65, LBu79, Man11, Man12

Appendix 1. continued

35	*Orthetrum brunneum* (Fonscolombe, 1837) LBu79, Man11, Man12
36	***Orthetrum cancellatum* (Linnaeus, 1758)** CBo49, CBu65, LBu79, Nea09, Man11, Ghe12, Man12, i121855351, i167395349, i168469469, i203361582
37	***Orthetrum coerulescens* (Fabricius, 1798)** Cir56c, CBu65, LBu79, Man11, Man12
38	*Sympetrum danae* (Sulzer, 1776) Cir56c, CBu65, LBu79, Man11, Man12
39	*Sympetrum depressiusculum* (Selys, 1841) CBo49, Cir56c, CBu65, LBu79, Man11, Man12
40	*Sympetrum flaveolum* (Linnaeus, 1758) CBo49, Cir56c, CBu65, LBu79, Man11, Man12
41	***Sympetrum fonscolombii* (Selys, 1840)** Man11, Man12, i226180407
42	***Sympetrum meridionale* (Selys, 1841)** CBo49, Cir56c, CBu61, CBu65, LBu79, Man11, Man12, i18116208, i192045593
43	*Sympetrum pedemontanum* (O.F. Müller in Allioni, 1766) Man11, Man12
44	***Sympetrum sanguineum* (O.F. Müller, 1764)** Cir56c, LBu79, Man11, Man12, i94918325, i168469464, i189514528, i232968316, o286056972
45	*Sympetrum striolatum* (Charpentier, 1840) CBo49, CBu65, LBu79, Man11, Man12
46	*Sympetrum vulgatum* (Linnaeus, 1758) CBo49, CBu65, LBu79, Man11, Man12

Remarks: [1)] bold = species observed during this study, crossed out = species mentioned in previous publications but their occurrence is unlikely (see corresponding family in section "Remarks to some families" of chapter "Discussion"). [2)] CBo49 = Cîrdei and Borcea (1949), CBu61 = Cîrdei and Bulimar (1961), CBu65 = Cîrdei and Bulimar (1965), Cir56b = Cîrdei (1956b), Cir56c = Cîrdei (1956c), Ghe12 = Ghețeu (2012), LBu79 = Lehrer and Bulimar (1979), Man11 = Manci (2011), Man12 = Manci (2012), Nea09 = Nicoară et al (2009), i12345678 = https://www.inaturalist.org/observations/12345678/, o98765432 = https://observation.org/observation/12345678/. [3)] see corresponding family in section "Remarks to some families" of chapter "Discussion". [4)] formerly known as *Aeshna* (*Anaciaeschna*) *isoceles*, but with some unique combinations of morphological and colour characters that justify a separate genus (Schneider et al 2023).