

Supplementary data to:

**Sampling larvae, exuviae or adults of Odonata
for ecological studies:
a test of methods in permanent rivers
in the Iberian Peninsula**

Genaro da Silva-Méndez, Sara Riso, M. Olalla Lorenzo-Carballea
& Adolfo Cordero-Rivera

Odonatologica 51(1/2) 2022: 63-81 – DOI:10.5281/odon.v51i1-2.a4

Contents:

- 1. Table S1.** Number of exuviae found by each of two observers
- 2. Table S2.** Results of Wilcoxon tests implemented to assess differences in exuviae found by two observers
- 3. Table S3.** Taxa found in each transect sampled at the river Lárez, Galicia, north-western Spain

Supplementary Table S1. Number of exuviae found by each of two observers (a and b) in each transect at the rivers Tuela, Beça, Tâmega, Torno and Avelames, north-eastern Portugal, sampled in July 2013 and July 2014. Values in brackets indicate the number of exuviae that were found by one observer but not by the other.

Date	River	Transect	Coordinates	Observer	<i>Calopteryx</i> sp.	Lestidae	<i>Platycnemis</i> sp.	Coenagrioni- dae	<i>Anax</i> <i>imperator</i>	<i>Boyeria</i> <i>irene</i>	<i>Cordulegaster</i> <i>boltonii</i>	<i>Onychogomphus</i> sp.	<i>Gomphus</i> sp.	<i>Macromia</i> <i>splendens</i>	<i>Oxygastra</i> <i>curtisii</i>
July 2013	Tuela	1	41 48 38.7 N, 06 59 38.7 W	a	0	0	3	4	0	7(1)	0	3(1)	3	0	1(1)
				b	0	0	4(1)	6(2)	0	8(2)	0	2	3	0	0
July 2013	Tuela	2	41 48 36.7 N, 06 59 50.5 W	a	0	0	2	4	0	9(2)	0	4(1)	3	1(1)	7(2)
				b	0	0	4(2)	6(2)	0	7	0	4(1)	3	0	5
July 2013	Tuela	3	41 48 37.1 N, 06 59 56.5 W	a	0	0	2	4	1	6(2)	0	2(1)	4(1)	1	5
				b	0	1(1)	2	6(2)	1	5(1)	0	1	3	1	6(1)
July 2013	Tuela	4	41 48 36.7 N, 07 00 09.1 W	a	0	0	4	1	0	4	0	2(1)	0	0	3
				b	0	0	4	1	0	4	1(1)	1	0	0	3
July 2013	Tuela	5	41 48 13.8 N, 06 59 59.9 W	a	0	0	0	2	0	6(2)	0	2	2	0	3(1)
				b	1(1)	0	0	3(1)	0	4	0	2	2	0	2
July 2013	Beça	6	41 35 12.0 N, 07 48 01.0 W	a	0	0	2(1)	1	0	4(1)	1	3(1)	6(2)	0	3(3)
				b	0	0	2(1)	2(1)	0	4(1)	1	2	6(2)	0	0
July 2013	Beça	7	41 35 10.6 N, 07 46 49.3 W	a	0	0	0	4(1)	3	3	0	0	0	0	0
				b	0	0	0	3	3	3	0	0	0	0	0
July 2013	Beça	8	41 38 13.0 N, 07 44 09.0 W	a	0	0	0	4(2)	0	6(1)	1	0	4(1)	0	0
				b	0	0	0	2	0	6(1)	1	0	3	0	0
July 2013	Tâmega	9	41 32 30.0 N, 07 47 12.6 W	a	0	0	0	4	0	3(1)	0	0	2	0	0
				b	0	0	0	4	0	3(1)	0	0	2	0	0
July 2013	Tâmega	10	41 32 14.0 N, 07 48 00.8 W	a	0	0	0	0	0	4	0	0	3	0	0
				b	0	0	0	0	0	4	0	0	3	0	0
July 2013	Tâmega	11	41 32 00.9 N, 07 48 23.9 W	a	0	0	0	0	0	3	0	0	2	0	0
				b	0	0	1(1)	0	0	3	0	0	2	0	0
July 2013	Tâmega	12	41 32 37.6 N, 07 46 56.9 W	a	0	0	0	0	0	3	1	0	2(1)	0	0
				b	0	0	0	0	0	4(1)	1	0	1	0	0
July 2013	Tâmega	13	41 32 04.9 N, 07 48 37.2 W	a	0	0	0	0	0	3	1	4	0	0	0
				b	0	0	0	0	0	3	1	5(1)	0	0	0
July 2013	Torno	14	41 28 59.3 N, 07 42 19.0 W	a	0	0	0	0	0	2	0	0	1	0	3
				b	0	0	0	0	0	2	0	0	1	0	3
July 2013	Torno	15	41 28 47.3 N, 07 41 56.8 W	a	0	0	0	1	0	5(2)	0	0	2	0	4(1)
				b	0	0	0	1	0	3	0	2(2)	2	0	3
July 2013	Torno	16	41 29 07.9 N, 07 42 41.7 W	a	0	1	0	1(1)	0	3(1)	0	0	1	1	0
				b	0	1	2(2)	0	0	3(1)	0	0	1	1	0

Date	River	Transect	Coordinates	Observer	<i>Calopteryx</i> sp.	Lestidae	<i>Platycnemis</i> sp.	Coenagrioni- dae	<i>Anax</i> <i>imperator</i>	<i>Boyeria</i> <i>irene</i>	<i>Cordulegaster</i> <i>boltonii</i>	<i>Onychogomphus</i> sp.	<i>Gomphus</i> sp.	<i>Macromia</i> <i>splendens</i>	<i>Oxygastra</i> <i>curtisii</i>
July 2013	Torno	17	41 29 18.6 N, 07 43 09.5 W	a	0	0	0	0	0	3	1	0	0	0	0
				b	0	0	0	1(1)	0	3	1	0	0	0	0
July 2013	Avelames	18	41 36 01.7 N, 07 38 52.7 W	a	0	0	0	0	0	11(2)	0	0	2	0	0
				b	0	0	0	0	0	12(3)	0	0	2	0	0
July 2013	Avelames	19	41 34 40.1 N, 07 38 13.0 W	a	0	0	0	0	0	5	0	2	4(1)	0	0
				b	0	0	0	0	0	5	0	2	4(1)	0	0
July 2013	Avelames	20	41 34 29.2 N, 07 37 52.9 W	a	0	0	0	0	0	4	0	3	6(1)	0	0
				b	0	0	0	0	0	4	0	3	7(2)	0	0
July 2013	Avelames	21	41 34 37.3 N, 07 38 24.3 W	a	0	0	0	0	0	7(2)	0	3(1)	2	0	0
				b	0	0	0	0	0	6(1)	0	3(1)	2	0	0
July 2014	Tuela	22	41 48 38.7 N, 06 59 38.7 W	a	0	0	0	0	0	8(1)	1	3	0	0	0
				b	0	0	0	0	0	8(1)	1	3	0	0	0
July 2014	Tuela	23	41 48 36.7 N, 06 59 50.5 W	a	0	0	0	0	0	4(1)	0	3	0	0	1
				b	0	0	0	0	0	3	0	3	0	0	1
July 2014	Tuela	24	41 48 37.1 N, 06 59 56.5 W	a	0	0	0	0	0	5	0	3(1)	1	0	1
				b	0	0	0	0	0	6(1)	0	2	1	0	1
July 2014	Tuela	25	41 48 36.7 N, 07 00 09.1 W	a	0	0	0	0	0	6(2)	1	2	3(1)	0	2(1)
				b	0	0	0	0	0	6(2)	1	2	3(1)	0	2(1)
July 2014	Tuela	26	41 48 13.8 N, 06 59 59.9 W	a	0	0	0	0	0	5(1)	0	3	2	0	0
				b	0	0	0	0	0	5(1)	0	3	2	0	0
July 2014	Tuela	27	41 48 14.6 N, 07 00 08.5 W	a	1	0	0	4	0	13(4)	0	0	4	0	3
				b	1	0	0	6(2)	0	11(2)	0	0	4	0	3
July 2014	Tuela	28	41 50 46.0 N, 06 56 09.6 W	a	0	0	0	0	1	6(1)	1	3(1)	2	0	3
				b	0	0	0	0	1	5	1	2	2	0	3
July 2014	Tuela	29	41 51 09.1 N, 06 55 54.6 W	a	0	0	0	0	0	4	0	0	0	0	0
				b	0	0	0	0	0	4	0	0	0	0	0
July 2014	Tuela	30	41 51 11.4 N, 06 55 05.9 W	a	0	0	0	0	0	5(1)	0	1	0	0	2
				b	0	0	0	0	0	6(2)	0	2(1)	0	0	2
July 2014	Tuela	31	41 51 44.9 N, 06 56 01.7 W	a	0	0	0	2	0	3	0	0	3(1)	0	0
				b	0	0	0	4(2)	0	3	0	0	2	0	0

Supplementary Table S2. Results of Wilcoxon tests implemented to assess differences in exuviae found by two observers. Columns 1-4 show the results of the tests comparing observers' concordance for each transect. Columns 5-8 show the results of tests comparing observers' detection concordance for each taxonomic group. For details on transects' locations and coordinates, see Supplementary Table S1.

Transect	Z	p-value	n exuviae	Taxonomic group	Z	p-value	n exuviae
1	-0.333	0.739	26	<i>Anax</i> sp.	0.000	1	4
2	-0.141	0.888	35	<i>Boyeria irene</i>	-1.281	0.200	185
3	-0.333	0.739	30	<i>Calopteryx</i> sp.	-1.000	0.317	2
4	0.000	1	15	<i>Cordulegaster boltonii</i>	-1.000	0.317	8
5	-0.378	0.705	17	<i>Gomphus</i> sp.	-1.633	0.102	70
6	-0.816	0.414	25	Lestidae	-1.000	0.317	2
7	-1.000	0.317	10	<i>Macromia splendens</i>	-1.000	0.317	2
8	-1.342	0.180	16	<i>Onychogomphus</i> sp.	-0.577	0.564	45
9	-1.000	0.317	10	<i>Oxygastra curtisii</i>	-1.725	0.087	43
10	0.000	1	7	<i>Platycnemis</i> sp.	-1.857	0.063	20
11	-1.000	0.317	6	Coenagrionidae	-1.691	0.091	44
12	-1.000	0.317	7				
13	-1.000	0.317	9				
14	0.000	1	7				
15	-0.272	0.785	14				
16	-0.447	0.655	10				
17	-1.000	0.317	5				
18	-1.000	0.317	16				
19	0.000	1	12				
20	-1.000	0.317	15				
21	-1.000	0.317	14				
22	0.000	1	13				
23	-1.000	0.317	13				
24	0.000	1	8				
25	0.000	1	18				
26	0.000	1	10				
27	0.000	1	26				
28	-1.414	0.157	15				
29	0.000	1	4				
30	-1.414	0.157	10				
31	-0.447	0.655	10				

Supplementary Table S3. Taxa found in each transect sampled at the river Lerez, Galicia, north-western Spain, as exuviae (E), adults (A) or larvae (L).

Transect	Coordinates	Sample type	<i>Calopteryx virgo</i>	<i>C. xanthostoma</i>	<i>Chalcolestes viridis</i>	<i>Platycnemis</i> sp.	<i>Erythromma lindenii</i>	<i>Pyrrosoma nymphula</i>	<i>Ischnura graellsii</i>	<i>Anax imperator</i>	<i>Boyeria irene</i>	<i>Gomphus pulchellus</i>	<i>G. similimus</i>	<i>Onycogomphus uncatus</i>	<i>Cordulegaster boltonii</i>	<i>Macromia splendens</i>	<i>Oxygastra curtisii</i>	<i>Othetrum coerulescens</i>		
1	42 27 06.4 N, 08 37 06.2 W	E	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	0		
		A	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	0	0	
		L	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	
2	42 27 06.7 N, 08 36 50.0 W	E	0	1	0	0	0	0	0	0	0	0	1	1	0	0	0	1	0	
		A	0	1	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	0
		L	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0
3	42 27 07.6 N, 08 36 32.9 W	E	1	0	0	0	0	1	0	0	0	0	1	1	1	0	0	1	0	
		A	1	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	
		L	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	
4	42 27 05.6 N, 08 36 20.2 W	E	1	0	0	0	0	0	0	0	1	1	0	1	1	0	0	1	1	
		A	0	1	0	1	0	0	1	1	1	0	0	0	1	1	1	1	1	
		L	0	1	0	1	0	1	0	0	0	1	0	0	1	1	0	1	0	
5	42 27 05.9 N, 08 36 15.0 W	E	0	0	0	0	0	1	0	0	1	1	1	1	1	0	0	1	0	
		A	1	0	0	1	0	1	0	0	1	0	0	0	1	1	0	0	0	
		L	1	0	0	0	0	0	0	0	0	1	0	0	1	1	0	0	0	
6	42 27 07.5 N, 08 36 00.5 W	E	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0		
		A	1	0	0	0	1	1	0	0	0	0	1	1	1	0	0	0		
		L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7	42 27 04.2 N, 08 35 39.5 W	E	0	0	0	0	0	0	0	0	1	0	1	1	1	0	0	0		
		A	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1		
		L	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0		
8	42 26 54.1 N, 08 35 27.3 W	E	1	0	0	0	0	0	0	0	1	1	0	1	1	0	1	0		
		A	1	1	0	1	0	1	1	0	1	0	0	0	1	1	0	1		
		L	0	0	0	1	0	1	0	1	1	0	0	0	1	1	0	1		
9	42 26 52.7 N, 08 35 13.8 W	E	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0		
		A	0	1	1	1	1	1	1	0	1	1	0	0	0	0	0	1		
		L	0	0	1	1	0	1	0	0	0	0	0	0	0	0	0	0		
10	42 26 48.8 N, 08 35 11.2 W	E	0	0	0	0	0	0	0	1	1	0	1	1	1	1	1	1		
		A	0	1	0	1	1	1	1	0	1	1	0	0	0	0	1	1		
		L	0	1	0	1	0	1	0	0	0	1	0	1	1	1	0	1		
11	42 27 36.4 N, 08 34 28.8 W	E	1	0	0	1	0	0	0	0	1	0	1	1	0	0	1	1		
		A	0	1	0	1	0	1	0	1	1	0	0	0	1	1	1	0		
		L	0	1	1	0	0	0	0	0	0	1	0	1	1	0	0	1		
12	42 27 27.9 N, 08 34 29.7 W	E	1	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0		
		A	0	1	0	0	1	1	0	1	1	0	0	0	1	0	0	0		
		L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Transect	Coordinates	Sample type	<i>Calopteryx virgo</i>	<i>C. xanthostoma</i>	<i>Chalcolestes viridis</i>	<i>Platycnemis</i> sp.	<i>Erythromma lindenii</i>	<i>Pyrrhosoma nymphula</i>	<i>Ischnura graellsii</i>	<i>Anax imperator</i>	<i>Boyeria irene</i>	<i>Gomphus pulchellus</i>	<i>G. similis</i>	<i>Onycogomphus uncatus</i>	<i>Cordulegaster boltonii</i>	<i>Macromia splendens</i>	<i>Oxygastra curtisii</i>	<i>Othetrum coerulescens</i>	
13	42 27 38.9 N, 08 34 04.7 W	E	1	0	0	0	0	0	0	0	1	0	1	1	1	0	1	0	
		A	1	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
		L	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	42 27 44.7 N, 08 34 02.9 W	E	0	0	1	1	0	0	1	0	1	1	1	1	1	1	1	1	0
		A	0	1	0	1	0	1	0	1	1	0	0	0	0	1	0	1	0
		L	0	1	1	1	0	1	0	0	0	1	1	1	1	1	0	1	0
15	42 27 55.4 N, 08 34 03.3 W	E	0	0	0	1	0	0	1	0	1	1	1	1	1	1	1	1	0
		A	0	0	0	1	0	1	0	1	1	0	0	0	0	0	0	1	0
		L	0	1	0	1	0	0	0	0	0	1	0	1	1	1	0	1	0
16	42 28 00.2 N, 08 34 01.5 W	E	0	1	0	0	0	0	0	0	1	1	1	1	0	1	1	1	0
		A	0	1	0	1	0	1	0	1	1	0	0	0	0	0	0	1	0
		L	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	1	0
Total	-	E	7	3	3	4	1	3	3	2	11	7	11	15	10	4	11	3	
		A	6	10	1	13	4	13	2	9	11	0	1	6	7	3	10	1	
		L	3	5	3	6	0	5	0	2	9	1	5	10	8	0	8	0	