ecologies

MDPI

Supplementary Materials for

Spatio-Temporal Distribution and Ecology of Recent Freshwater Ostracoda (Crustacea) from the Danube Floodplain in Banat and Podunavlje Regions of Serbia

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Below are the supplementary materials for this work, including complete raw collected environmental and species datasets (Table S1), as well as the complete CCA scores for species, samples, and environmental variables for each axis (Table S2).

Table S1 – Environmental parameters and number of specimens recorded for each collected sample.

Year	Month	Site	Sampling date (dd/mm/yyyy)	Time (hh:mm)	Temperature (°C)	pH	Dissolved oxygen (mg/l)	Electrical conductivity (µS/cm)	Turbidity (mg/l)	Total no. of specimens	*Cypridopsis vidua*	*Bradleycypris vittata*	*Paralimnocythere compressa*	*Limnocythere inopinata*	*Tanycypris centa*	*Darwinula stevensoni*	*Physocypria kraepelini*	*Candona* sp.	*Pseudocandona stagnalis*	*Pseudocandona sucki*	*Candona candida*	*Eucypris virens*	*Tonnacypris lutaria*	*Bradleystrandesia reticulata*	*Fabaeformiscandona breuili*	*Cypridopsis elongata*	*Fabaeformiscandona balatonica*	*Fabaeformiscandona breycornis*	*Candona* cf. *weltneri*
2023	July	**L1**	23/07/2023	8:00	27.1	8.1	3.5	43	15	0																			
		L2	23/07/2023	10:00	27.4	8	3.6	41	15	9	4	5																	
		L3	23/07/2023	8:30	28.4	8.5	5.9	69	10	2	1							1											
		L4	23/07/2023	9:00	27	8.4	6.6	58	45	0																			
		L5	23/07/2023	9:30	26.9	7.6	0.5	53	57	35							25		4	1						5			
		L6	23/07/2023	15:30	30.3	8.6	7.1	129	56	0																			
		L7	16/07/2023	12:00	28.4	7.6	3.2	37	57	0																			
		L8	16/07/2023	12:30	30.7	7.7	1.6	70	5	1								1											
		L9	16/07/2023	13:00	29.4	7.7	5.7	43	695	0																			
		L10	16/07/2023	14:00	29.2	7.5	3.5	59	30	0																			
	August	**L1**	27/08/2023	15:30	27.3	8.4	4.3	44	12	0																			
		L2	27/08/2023	17:00	26.6	7.6	2.98	44	97	7	4	3																	
		L3	27/08/2023	16:50	30	8.6	7.2	70	16	12	10					1	1												
		L4	27/08/2023	16:30	28	8	5.17	62	21	0																			
		L5	27/08/2023	16:10	30.1	7.4	0.42	49	55	2							2												
		L6	27/08/2023	18:00	28.9	8.5	4.81	117	24	0																			
		L7	27/08/2023	18:45	27.8	7.8	2.78	45	51	1							1												
		L8	27/08/2023	19:10	26.8	7.4	1.15	46	286	0																			
		L9	27/08/2023	19:30	26	7.8	4.9	43	140	0																			
		L10	27/08/2023	20:00	25.6	7.4	0.38	139	27	0																			

2023	September	L1	30/09/2023	14:00	21.1	7.7	5.5	52	10	0																				
		L2	30/09/2023	15:45	21.1	7.5	4.1	51	355	65		10			55															
		L3	30/09/2023	15:30	22.4	8.3	7.4	70	4	3	1							2												
		L4	30/09/2023	14:30	19.8	7.5	6.4	58	51	0																				
		L5	30/09/2023	15:00	21.1	7	1.1	43	11	5	1						1		2	1										
		L6	30/09/2023	16:20	20.5	8.1	6.8	128	25	2		1					1													
		L7	30/09/2023	17:05	21.4	8	4.1	57	32	2				1															1	
		L8	30/09/2023	17:30	19	7	1	45	68	2								2												
		L9	30/09/2023	17:50	20.7	7.8	6.2	49	214	0																				
		L10	30/09/2023	18:20	20.6	7.8	3.4	110	91	0																				
	October	L1	22/10/2023	13:15	17.4	7.8	6.9	37	13	0																				
		L2	22/10/2023	14:40	17.9	8	5.9	55	509	340		200			140															
		L3	22/10/2023	14:25	18.5	8.3	8.1	72	12	4	3						1													
		L4	22/10/2023	13:45	16.1	8	7.5	71	149	0																				
		L5	22/10/2023	14:05	20.7	7.4	2.3	47	42	6									2	2	2									
		L6	22/10/2023	15:20	17.9	8.1	7.1	139	65	40	5	19			10		6													
		L7	22/10/2023	16:10	16.2	8.1	6.7	56	21	3		2																	1	
		L8	22/10/2023	16:30	-	-	-	-	-	-																				
		L9	22/10/2023	16:45	16.9	8	7.6	54	130	0																				
		L10	22/10/2023	17:15	17.7	7.9	3.9	116	137	1							1													
	November	L1	18/11/2023	13:15	9.9	7.8	9.8	45	56	0																				
		L2	18/11/2023	13:00	9.4	7.6	7.6	44	21	1		1																		
		L3	18/11/2023	12:45	11.7	7.5	8.9	71	4	3	3																			
		L4	18/11/2023	11:50	9.9	7.8	8.7	63	48	0																				
		L5	18/11/2023	12:15	8	7.7	4.1	46	4	1									1											
		L6	18/11/2023	11:00	9.2	7.9	7.2	125	7	0																				
		L7	18/11/2023	10:00	9	7.5	8.7	34	13	0																				
		L8	18/11/2023	9:30	8.5	7.6	7.7	45	10	3															3					
		L9	18/11/2023	9:15	9.1	7.6	9.1	45	43	0																				
		L10	18/11/2023	8:50	9.1	7	4.6	102	212	0																				

	December	**L1**	02/12/2023	11:15	7.5	7.5	8.1	41	160	0																					
		L2	02/12/2023	12:55	8.6	8	8.5	48	28	2	1							1													
		L3	02/12/2023	12:35	9.9	8.1	8.7	74	41	1	1																				
		L4	02/12/2023	11:50	8.1	8	8.7	44	124	0																					
		L5	02/12/2023	12:10	8.5	7.3	5.9	47	334	0																					
		L6	02/12/2023	13:40	8.3	8.1	7.2	135	1	0																					
		L7	02/12/2023	14:35	8.5	9	7.6	29	12	0																					
		L8	02/12/2023	15:20	9.7	8.2	5.3	40	11	0																					
		L9	02/12/2023	15:35	-	-	-	-	-	-																					
		L10	02/12/2023	16:05	9.6	7.7	1.9	141	32	1														1							
2024	**January**	**L1**	21/01/2024	14:15	3.7	8	10.7	50	13	0																					
		L2	21/01/2024	13:55	4	8.2	10.8	49	18	0																					
		L3	21/01/2024	13:40	4.8	8.4	14.4	71	4	0																					
		L4	21/01/2024	13:15	4.7	8	9	55	5	0																					
		L5	21/01/2024	13:00	4.7	8.2	11.6	53	6	1														1							
		L6	21/01/2024	11:45	4.5	8.1	9.4	131	2	0																					
		L7	21/01/2024	10:45	2.8	8.1	11.1	31	12	0																					
		L8	21/01/2024	10:25	2.8	7.7	6.5	60	13	43														42		1					
		L9	21/01/2024	10:15	-	-	-	-	-	-																					
		L10	21/01/2024	9:35	4.5	6.2	1	159	11	1														1							
	February	**L1**	10/02/2024	12:40	6.5	7.6	8.6	56	25	0																					
		L2	10/02/2024	12:20	7.1	8.5	12.8	51	20	0																					
		L3	10/02/2024	12:10	9.2	8.3	9.6	69	127	0																					
		L4	10/02/2024	11:10	8	8.4	7.6	63	13	0																					
		L5	10/02/2024	11:30	9.8	7.9	6.7	50	8	30														17	7	3			3		
		L6	10/02/2024	10:10	8.3	8.2	8.2	130	7	0																					
		L7	10/02/2024	9:10	7.2	8.3	8.3	24	345	6																6					
		L8	10/02/2024	8:20	8.2	7.9	10.2	92	8	21														12		1			4		4
		L9	10/02/2024	8:40	5.6	8.2	8.9	52	74	0																					
		L10	10/02/2024	7:40	9.8	6.6	1.9	156	48	0																					

2024	**March**	**L1**	16/03/2024	11:15	10.9	8.2	8.8	35	42	0																				
		L2	16/03/2024	11:00	11.1	8.3	11.1	51	13	0																				
		L3	16/03/2024	10:45	13.7	8.4	8.7	72	128	0																				
		L4	16/03/2024	10:00	11	8.5	7.4	52	7	0																				
		L5	16/03/2024	10:20	11.7	8.1	6.1	47	78	5							2					3								
		L6	16/03/2024	9:15	11.3	8.2	8.1	125	4	13			2				11													
		L7	16/03/2024	8:20	10.5	8.1	8.1	30	12	0																				
		L8	16/03/2024	7:40	10.6	8.3	9.1	107	17	0																				
		L9	16/03/2024	8:00	9.6	8.3	8.7	48	140	0																				
		L10	16/03/2024	7:10	11.7	7.6	2.16	73	72	0																				
	April	**L1**	14/04/2024	8:20	16	7.4	8.7	35	37	0																				
		L2	14/04/2024	10:00	18.1	8.5	11.7	46	39	0																				
		L3	14/04/2024	9:50	19.1	8.5	8.2	69	30	10						1	8	1												
		L4	14/04/2024	9:20	19.4	7.9	6.5	52	61	0																				
		L5	14/04/2024	9:00	17.5	7.9	5.8	43	24	33							1					4		28						
		L6	14/04/2024	10:40	21	8.2	6.3	134	24	20							20													
		L7	14/04/2024	11:40	20	8.7	8.7	29	94	3														3						
		L8	14/04/2024	13:50	27.6	7.9	7	87	84	3												2					1			
		L9	14/04/2024	13:30	17.7	8.3	9.2	33	57	0																				
		L10	14/04/2024	14:30	22.7	7.9	4.6	58	9	0																				
	May	**L1**	25/05/2024	12:40	20.4	8.2	9.2	31	120	0																				
		L2	25/05/2024	12:20	20.9	8.1	13.6	45	44	36	4	22			10															
		L3	25/05/2024	12:00	23	8.1	18.8	69	57	1							1													
		L4	25/05/2024	11:45	18.9	8.1	6.5	44	340	0																				
		L5	25/05/2024	11:20	21.4	8.2	11.2	35	31	0																				
		L6	25/05/2024	10:25	22.1	7.3	6.3	85	36	22		2					20													
		L7	25/05/2024	9:15	21.5	7.4	7.3	32	26	0																				
		L8	25/05/2024	8:30	20.3	7.3	3.7	112	32	0																				
		L9	25/05/2024	8:50	19.6	7.3	7.8	42	27	0																				
		L10	25/05/2024	7:50	20.9	7.6	1.8	96	70	0																				

2024	**June**	**L1**	08/06/2024	12:00	21.9	8.2	7.4	42	119	0																			
		L2	08/06/2024	11:50	25.6	8.3	11.8	40	63	50	33	10			7															
		L3	08/06/2024	11:40	26.6	8.1	15.1	71	117	33	20						11	2												
		L4	08/06/2024	11:20	25.6	8.1	6.5	59	52	0																			
		L5	08/06/2024	11:00	31.3	7.9	8.5	47	623	10	1						6								3				
		L6	08/06/2024	10:10	25.4	7.5	8.6	139	59	4							4												
		L7	08/06/2024	9:20	24.9	7.5	15.7	38	7	0																			
		L8	08/06/2024	8:50	23	7.4	8.6	66	27	0																			
		L9	08/06/2024	8:30	21.7	7.4	16.1	42	21	0																			
		L10	08/06/2024	8:00	23.1	7.4	0.5	96	206	2							1					1							

Table S2 – Canonical Correspondence Analysis (CCA) scores for species, samples, and environmental variables across each axis generated in PAST, with the highest score for each species, sample, or environmental factor highlighted in bold.

	Axis 1	**Axis 2**	**Axis 3**	**Axis 4**	**Axis 5**
Cypridopsis vidua	0.368864	-0.375998	-0.191484	1.481280	**-0.633126**
Bradleycypris vittata	0.282959	0.257234	**-0.304155**	0.194994	-0.284581
Paralimnocythere compressa	-1.024460	1.288650	3.408450	0.114652	**4.219230**
Limnocythere inopinata	-0.420172	-1.433140	-0.735181	-0.776685	**3.020460**
Tanycypris centa	1.138260	**1.786850**	-0.926223	-0.817203	0.099978
Darwinula stevensoni	0.481180	-1.139850	0.084112	1.431040	**4.803220**
Physocypria kraepelini	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
Candona sp.	0.458659	**-1.715540**	-0.163738	-0.330488	0.725496
Pseudocandona stagnalis	-1.369300	-1.291970	-1.200460	**-1.540060**	-1.095610
Pseudocandona sucki	-0.398870	-2.038520	-1.160530	-1.974320	**-2.473730**
Candona candida	-0.505763	-1.659910	-1.186900	-1.696000	**-1.723570**
Eucypris virens	**-1.405000**	0.862804	1.137110	-0.861750	-0.095050
Tonnacypris lutaria	**-2.246440**	0.314673	-0.911993	0.952827	-0.195913
Bradleystrandesia reticulata	-1.429380	1.022030	**-1.918890**	0.902665	0.808970
Fabaeformiscandona breuili	**4.798730**	4.268120	-3.358270	-3.336680	0.044703
Cypridopsis elongata	0.324760	-2.619480	-1.093910	**-3.029590**	2.234940
Fabaeformiscandona balatonica	-0.149748	0.283704	0.887211	1.076320	**-1.208300**
Fabaeformiscandona brevicornis	-0.709599	-0.955985	-0.693315	-0.031593	**2.358420**

Candona cf. *weltneri*	-1.396240	1.721020	1.805700	2.270050	**-2.534550**
L02-23-07	0.323518	-0.041737	-0.250959	**0.802296**	-0.449142
L03-23-07	0.413761	**-1.045770**	-0.177611	0.575396	0.046185
L05-23-07	0.131480	-1.073230	-0.175947	**-1.247700**	0.073278
L08-23-07	0.458659	**-1.715540**	-0.163738	-0.330488	0.725496
L02-23-08	0.328995	-0.082114	-0.243775	**0.884313**	-0.471366
L03-23-08	0.464728	-0.470730	0.061966	**1.148080**	0.558786
L05-23-08	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L07-23-08	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L02-23-09	0.882581	**1.329600**	-0.740265	-0.514622	-0.014980
L03-23-09	0.421464	**-1.160680**	-0.175230	0.419970	0.162736
L05-23-09	-0.275262	-0.983825	-0.500297	-0.647804	**-1.035920**
L06-23-09	**0.517192**	0.078027	0.268572	0.003228	-0.100535
L07-23-09	-0.564886	-1.194560	-0.714248	-0.404139	**2.689440**
L08-23-09	0.458659	**-1.715540**	-0.163738	-0.330488	0.725496
L02-23-10	0.672577	**0.954027**	-0.587528	-0.266095	-0.109402
L03-23-10	0.508891	-0.275407	0.186541	**0.870084**	-0.370819
L05-23-10	-0.757978	-1.663460	-1.182630	-1.736790	**-1.764300**
L06-23-10	**0.614275**	0.465579	-0.214814	0.091438	-0.174941
L07-23-10	-0.128172	-0.245297	-0.465350	0.101139	**0.810185**
L10-23-10	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L02-23-11	0.282959	0.257234	**-0.304155**	0.194994	-0.284581
L03-23-11	0.368864	-0.375998	-0.191484	**1.481280**	-0.633126
L05-23-11	-1.369300	-1.291970	-1.200460	**-1.540060**	-1.095610
L08-23-11	-1.429380	1.022030	**-1.918890**	0.902665	0.808970
L02-23-12	0.560144	-0.238589	0.324908	**0.646371**	-0.274808
L03-23-12	0.368864	-0.375998	-0.191484	**1.481280**	-0.633126
L10-23-12	**-1.405000**	0.862804	1.137110	-0.861750	-0.095050
L05-24-01	**-1.405000**	0.862804	1.137110	-0.861750	-0.095050
L08-24-01	**-1.408260**	0.884089	0.728591	-0.625888	0.025796
L10-24-01	**-1.405000**	0.862804	1.137110	-0.861750	-0.095050
L05-24-02	**-1.414220**	0.650015	0.047746	0.234102	-0.156543
L07-24-02	-1.429380	1.022030	**-1.918890**	0.902665	0.808970
L08-24-02	**-1.109210**	0.947570	0.874987	0.544678	-0.827729

L05-24-03	-0.435709	0.429503	**1.004140**	-0.559148	-0.014789
L06-24-03	0.220552	0.314290	**1.608710**	-0.097904	1.319820
L03-24-04	0.634821	-0.650641	0.476331	0.117489	**1.193950**
L05-24-04	**-1.160480**	0.848158	-0.848858	0.345464	0.503416
L06-24-04	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L07-24-04	-1.429380	1.022030	**-1.918890**	0.902665	0.808970
L08-24-04	-0.885058	0.622933	**1.033600**	-0.058977	-0.556173
L02-24-05	0.574910	**0.619634**	-0.480940	0.131227	-0.231906
L03-24-05	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L06-24-05	**0.638875**	-0.015070	0.566101	-0.096394	-0.004925
L02-24-06	0.521555	0.292668	-0.390594	**0.602793**	-0.369825
L03-24-06	0.520532	-0.482804	0.184981	**0.601088**	-0.166082
L05-24-06	**2.030500**	1.306320	-0.761826	-0.918616	-0.067768
L06-24-06	0.751425	-0.101180	**0.841300**	-0.188539	0.083510
L10-24-06	-0.326787	0.380812	**0.989203**	-0.525144	-0.005770
T	**0.628432**	-0.345409	-0.030670	0.019625	0.058873
pH	0.128579	0.075631	-0.133260	**0.445807**	0.267333
DO	0.123806	0.278691	0.000726	**0.409010**	0.005219
EC	0.074527	0.091583	**0.607488**	-0.141603	0.005855
Turbidity	0.309041	**0.416245**	-0.268696	-0.144030	0.017089