

Supplementary material

Table S1. Geographic location and main characteristics of each sampling site.

Site number	Coordinates	Distance from the source (km)	Altitude (m a.s.l.)	Catchment size (km ²)
1	15°59'27,369"E 46°17'17,53"N	0.4	290	0.4
2	15°57'34,893"E 46°16'27,089"N	3.7	250	8.3
3	15°57'30,751"E 46°16'15,801"N	4.1	248	8.6
4	15°57'24,309"E 46°15'18,471"N	6.5	245	23.2
5	15°58'48,436"E 46°13'34,163"N	10.6	236	31.5
6	16°1'10,551"E 46°12'41,024"N	15.5	228	80.3
7	16°2'26,113"E 46°12'36,308"N	18.0	225	108.9
8	16°3'57,28"E 46°13'30,18"N	20.9	215	114.9
9	16°9'0,739"E 46°14'41,654"N	29.5	203	201.0
10	16°14'51,219"E 46°12'52,091"N	40.8	197	335.0
11	16°15'53,294"E 46°12'41,158"N	41.6	195	341.9
12	16°17'11,691"E 46°12'55,076"N	43.8	193	348.7
13	16°21'5,914"E 46°11'2,651"N	51.8	189	376.5
14	16°22'31,942"E 46°10'20,286"N	59.7	178	416.7
15	16°33'14,585"E 46°13'40,193"N	83.5	160	529.3
16	16°33'25,264"E 46°13'58,835"N	84.1	159	536.7
17	16°37'37,856"E 46°15'5,913"N	91.5	152	563.1
18	16°38'9,794"E 46°15'25,41"N	92.6	150	565.5
19	16°44'34,203"E 46°17'26,424"N	102.2	139	597.2
20	16°45'34,707"E 46°18'2,524"N	104.2	136	598.5

Table S2. Selected environmental characteristics as indicators of hydromorphological habitat degradation at the Bednja River sampling sites (score 5- severely modified habitat, score 1- near-natural habitat).

Sampling site	Riparian vegetation type and structure	Modification of channel	Riverbed structure and modification	Connection to floodplains	Mean value of hydromorphological degradation score
1	3	1.25	2	2	1.44
2	5	2.25	3	2.33	2.75
3	2	1.88	1.5	2	1.81
4	1	1.38	1	1.33	1.38
5	5	2.25	3	5	2.88
6	5	2.75	5	5	3.5
7	5	2.5	4.5	4.33	3.19
8	4	2	2.5	2.67	2.13
9	4	2	2.5	2.67	2.13
10	5	2.75	3	3	2.75
11	5	3.38	4	4	3.5
12	4	1.75	3	3.33	2.06
13	4	2	2.5	3	2.19
14	2	1.63	2	2	1.63
15	5	1.88	3	3	2.19
16	2	1.35	5	2	1.38
17	5	3.25	5	5	4
18	3	1.75	2.5	2.33	1.81
19	5	1.88	4	4.67	2.63
20	2	1	1.5	1.33	1.13

Table S3. Representation of the respective substrate (microhabitat) at the sampling sites along the course of the Bednja River.

Site number	Macrolithal	Mesolithal	Microlithal	Akal	Psammal	Argyllal	Phythal-macrophytes	Xylal	Detritus	Technolithal
1	10%	35%	15%	5%	25%	10%				
2				20%	40%		40%			
3		20%	30%	10%	5%	30%			5%	
4			5%		50%			45%		
5					45%	40%		15%		
6	10%	75%	10%	5%						
7			55%	10%			5%			30%
8				80%	5%			15%		
9				80%	10%			10%		
10				95%				5%		
11			20%				25%			55%
12			15%	55%	20%			10%		
13			10%	50%	20%			20%		
14				55%	40%			5%		
15				85%	10%			5%		
16		50%	10%	15%	5%			20%		
17							5%			95%
18		30%	30%	20%				20%		
19			50%							50%
20			70%	5%	15%			10%		

Table S4. Physico- chemical water properties at the selected sampling sites of the Bednja River. (COD = chemical oxygen demand, BOD= biochemical oxygen demand, NH_4^+ = ammonium ion concentration, NO_2^- = nitrite concentration, NO_3^- = nitrate concentration, ORG. N= organic nitrogen, ΣN = total nitrogen, PO_4^{3-} = ortophosphate concentration, ΣP = total phosphorous).

Sampling site	Temperature (°C)	Dissolved oxygen concentration (mg/L)	Oxygen saturation (%)	Conductivity (µS/cm)	pH	COD (mgO ₂ /L)	BPK ₅ (mgO ₂ /L)	NH_4^+ (mgN/L)	NO_2^- (mgN/L)	NO_3^- (mgN/L)	ORG. N (mgN/L)	ΣN (mgN/L)	PO_4^{3-} (mgP/L)	ΣP (mgP/L)
1	14..70	8.90	88.10	620.00	8.10	3.60	2.40	0.07	0.00	0.80	0.53	1.40	0.02	0.13
2	24.80	8.70	106.00	608.00	8.03	3.70	2.70	0.13	0.07	0.87	0.03	1.10	0.02	0.13
3	22.50	6.70	78.10	609.00	8.03	3.70	2.70	0.13	0.07	0.87	0.03	1.10	0.02	0.13
4	22.50	6.00	69.90	419.00	7.90	6.60	4.60	0.09	0.02	0.44	0.76	1.32	0.01	0.08
5	21.50	6.30	72.00	448.00	8.03	9.60	7.70	0.05	0.02	0.51	1.15	1.73	0.02	0.30
6	22.50	7.90	92.10	513.00	8.24	5.00	3.50	0.08	0.03	0.63	0.77	1.47	0.03	0.17
7	23.10	8.20	96.70	516.00	8.21	3.90	2.70	0.04	0.02	0.79	0.33	1.18	0.02	0.14
8	22.30	7.20	83.50	529.00	8.01	3.70	2.40	0.06	0.04	0.88	0.24	1.22	0.03	0.10
9	23.50	7.70	91.40	528.00	8.02	3.80	2.80	0.26	0.08	1.09	0.36	1.79	0.04	0.16
10	25.70	7.60	92.60	512.00	8.39	3.60	2.20	0.06	0.06	1.22	0.10	1.45	0.04	0.14
11	24.80	7.60	92.60	510.00	8.31	3.60	2.20	0.06	0.06	1.22	0.10	1.45	0.04	0.14
12	23.60	7.60	92.60	511.00	8.28	3.60	2.20	0.06	0.06	1.22	0.10	1.45	0.04	0.14
13	23.20	7.60	89.80	520.00	8.31	3.40	2.00	0.00	0.04	1.28	0.07	1.40	0.04	0.15
14	20.40	7.40	82.70	531.00	8.08	3.40	1.90	0.06	0.04	1.32	0.14	1.57	0.04	0.15
15	23.50	7.60	90.30	566.00	8.21	4.20	3.00	0.00	0.04	1.49	0.13	1.67	0.04	0.14
16	23.50	7.60	90.30	566.00	8.21	4.20	3.00	0.00	0.04	1.49	0.13	1.67	0.04	0.14
17	25.70	7.40	91.70	570.00	8.48	5.80	4.60	0.01	0.05	1.84	0.93	2.88	0.05	0.14
18	25.50	7.70	95.10	574.00	8.41	5.90	4.40	0.12	0.05	1.89	0.47	2.48	0.06	0.19
19	24.50	7.00	84.80	580.00	8.27	5.40	3.60	0.04	0.06	1.79	0.18	2.07	0.05	0.20
20	22.50	8.00	93.20	580.00	8.24	5.30	4.20	0.10	0.07	1.81	0.36	2.43	0.05	0.16

Table S5. Water mite taxa abundance on all microhabitats (calculated number of individuals /m²) at 20 sampling sites along the Bednja River in 2015.

Station site	1	1	1	1	1	1	2	2	2	3	3	3	3	3	3	4	4	4
Substrate	Macrolith all	Mesolithal	Microlitha l/ Akal	Psammal / Xylal	Psammal / Akal	Argyllal / Xylal	Psammal / Detritus	Phytal-macrophytes	Akal	Argyllal	Microlitha l	Mesolithal	Akal	Detritus	Psammal	Psammal / Akal	Xylal / Detritus	Microlitha l
<i>Atractides loricatus</i> (Piersig, 1898)																		
<i>Atractides</i> sp. (Koch, 1837)											2.67						1.78	
<i>Aturus scaber</i> (Kramer, 1875)																		
Hydrachnidia non. det. (larvae)																	1.78	
<i>Hygrobates calliger</i> (Piersig, 1896)																		
<i>Hygrobates fluvialilis</i> (Ström, 1768)											2.67					3.20		
<i>Hygrobates longiporus</i> (Thor, 1898)																		
<i>Hygrobates</i> sp. (Koch, 1837)																		
<i>Hygrobates trigonicus</i> * (Koenike, 1895)																		
<i>Lebertia</i> sp. (Neuman, 1880)											2.67					1.60		
<i>Mideopsis orbicularis</i> (Muller, 1776)																		
<i>Mideopsis</i> sp. (Neuman, 1880)																		
<i>Neacarus hibernicus</i> * (Halbert, 1944)																		
<i>Nudomideopsis</i> cf. <i>motasi</i> ** (Petrova, 1966)																		
<i>Protzia</i> sp. (Piersig, 1896)																		
<i>Sperchon clupeifer</i> (Piersig, 1896)																		
<i>Sperchon compactilis</i> * (Koenike, 1911)																		
<i>Sperchon denticulates</i> group																		
<i>Sperchon hibernicus</i> (Halbert, 1944)																		
<i>Sperchon hispidus</i> (Koenike, 1895)																		
<i>Sperchon insignis</i> (Walter, 1906)																		
<i>Sperchon papillosus</i> * (Thor, 1901)																		
<i>Sperchon</i> sp. (Kramer, 1877)											2.67							
<i>Sperchonopsis verrucosa</i> (Protz, 1896)											2.67			32.00				
<i>Torrenticola amplexa</i> (Koenike, 1908)																		
<i>Torrenticola elliptica</i> (Maglio, 1909)																		
<i>Torrenticola hyporheica</i> * (Di Sabatino & Cicolani, 1993)																		
<i>Torrenticola ischnophallus</i> * (Lundblad, 1956)																		
<i>Torrenticola laskai</i> * (Di Sabatino, 2009)																		
<i>Torrenticola</i> sp. (Piersig, 1896)																		
<i>Torrenticola ungeri</i> * (Szalay, 1927)																		

* new record for the water mite fauna of Croatia

** due to sample damage, this finding cannot be confirmed

Table S5. (continued) Water mite taxa abundance on all microhabitats (calculated number of individuals /m²) at 20 sampling sites along the Bednja River in 2015.

Station site	5	5	5	6	6	6	6	7	7	7	7	8	8	8	9	9	9	10
Substrate	Argyllal	Psammal	Xylal/ Detritus	Akal	Microolitha l	Macrolith al	Mesolithal	Akal	Submerge d macrophy te	Technolit hal	Microolitha l/ Akal	Xylal / Detritus	Akal	Psammal	Xylal	Akal	Psammal	Akal
<i>Atractides loricatus</i> (Piersig, 1898)											3.00							
<i>Atractides</i> sp. (Koch, 1837)																		
<i>Aturus scaber</i> (Kramer, 1875)										2.67								
Hydrachnidia non. det. (larvae)									16.00									0.84
<i>Hygrobates calliger</i> (Piersig, 1896)	2.00			16.00	16.00	8.00	3.20			13.33	1.18		1.00					
<i>Hygrobates fluviatilis</i> (Ström, 1768)	38.00		5.33		16.00	16.00	2.13	4.00					5.00			27.00		19.37
<i>Hygrobates longiporus</i> (Thor, 1898)		3.56																
<i>Hygrobates</i> sp. (Koch, 1837)											3.00					1.00		
<i>Hygrobates trigonicus</i> * (Koenike, 1895)																		2.53
<i>Lebertia</i> sp. (Neuman, 1880)	14.00	5.33			16.00	8.00	1.67	48.00		2.67	1.18		9.00			1.00		3.37
<i>Mideopsis orbicularis</i> (Muller, 1776)																1.00		3.32
<i>Mideopsis</i> sp. (Neuman, 1880)																		0.84
<i>Neocarus hibernicus</i> * (Halbert, 1944)																		
<i>Nudomideopsis</i> cf. <i>motasi</i> ** (Petrova, 1966)																		
<i>Protzia</i> sp. (Piersig, 1896)										2.67								
<i>Sperchon clupeifer</i> (Piersig, 1896)										2.67			1.00					
<i>Sperchon compactilis</i> * (Koenike, 1911)										2.67								
<i>Sperchon denticulates</i> group																		
<i>Sperchon hibernicus</i> (Halbert, 1944)											3.00							
<i>Sperchon hispidus</i> (Koenike, 1895)										16.00								
<i>Sperchon insignis</i> (Walter, 1906)																		
<i>Sperchon papillosus</i> * (Thor, 1901)																		
<i>Sperchon</i> sp. (Kramer, 1877)										5.33			1.00					
<i>Sperchonopsis verrucosa</i> (Protz, 1896)				16.00						8.00								
<i>Torrenticola amplexa</i> (Koenike, 1908)																		
<i>Torrenticola elliptica</i> (Maglio, 1909)																		0.84
<i>Torrenticola hyporheica</i> * (Di Sabatino & Cicolani, 1993)																		
<i>Torrenticola ischnophallus</i> * (Lundblad, 1956)																		
<i>Torrenticola laskai</i> * (Di Sabatino, 2009)																		
<i>Torrenticola</i> sp. (Piersig, 1896)																		
<i>Torrenticola ungeri</i> * (Szalay, 1927)																		

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Table S5. (continued) Water mite taxa abundance on all microhabitats (calculated number of individuals /m²) at 20 sampling sites along the Bednja River in 2015.

Station site	11	11	11	12	12	12	12	13	13	13	13	14	14	14	15	15	15
Substrate	Technolit hal	Phytal- macrophy te	Microlitha l	Akal	Psammal	Microlitha l	Xylal	Akal	Psammal	Microlitha ll	Xylal / Detritus	Xylal / Detritus	Akal	Psammal	Akal	Xylal	Psammal
<i>Atractides loricatus</i> (Piersig, 1898)																	
<i>Atractides</i> sp. (Koch, 1837)																	
<i>Aturus scaber</i> (Kramer, 1875)	1.45																
Hydrachnidia non. det. (larvae)	1.45												1.45				
<i>Hygrobates calliger</i> (Piersig, 1896)			4.00					4.80					1.45		3.76		
<i>Hygrobates fluviatilis</i> (Ström, 1768)	1.45		4.00	1.45				6.40					4.36		7.53	32.00	48.00
<i>Hygrobates longiporus</i> (Thor, 1898)																	
<i>Hygrobates</i> sp. (Koch, 1837)																	
<i>Hygrobates trigonicus</i> * (Koenike, 1895)															3.76		8.00
<i>Lebertia</i> sp. (Neuman, 1880)	7.27	3.20	28.00	1.45	12.00			4.80					1.45	6.00	1.35		24.00
<i>Mideopsis orbicularis</i> (Muller, 1776)									4.00					8.00	2.82		
<i>Mideopsis</i> sp. (Neuman, 1880)																	
<i>Neacarus hibernicus</i> * (Halbert, 1944)															1.88		
<i>Nudomideopsis</i> cf. <i>motasi</i> ** (Petrova, 1966)																	
<i>Protzia</i> sp. (Piersig, 1896)																	
<i>Sperchon clupeifer</i> (Piersig, 1896)		3.20															
<i>Sperchon compactilis</i> * (Koenike, 1911)	1.45																
<i>Sperchon denticulates</i> group	1.45										8.00						
<i>Sperchon hibernicus</i> (Halbert, 1944)																	
<i>Sperchon hispidus</i> (Koenike, 1895)																	
<i>Sperchon insignis</i> (Walter, 1906)			4.00														
<i>Sperchon papillosus</i> * (Thor, 1901)	4.36																
<i>Sperchon</i> sp. (Kramer, 1877)	3.00		4.00														
<i>Sperchonopsis verrucosa</i> (Protz, 1896)	1.45																
<i>Torrenticola amplexa</i> (Koenike, 1908)																	
<i>Torrenticola elliptica</i> (Maglio, 1909)																	
<i>Torrenticola hyporheica</i> * (Di Sabatino & Cicolani, 1993)	1.45																
<i>Torrenticola ischnophallus</i> * (Lundblad, 1956)																	
<i>Torrenticola laskai</i> * (Di Sabatino, 2009)													1.45		4.76		
<i>Torrenticola</i> sp. (Piersig, 1896)																	
<i>Torrenticola ungeri</i> * (Szalay, 1927)																	

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Table S5. (continued) Water mite taxa abundance on all microhabitats (calculated number of individuals /m²) at 20 sampling sites along the Bednja River in 2015.

Station site	16	16	16	16	16	17	17	18	18	18	18	19	19	20	20	20	20
Substrate	Microlitha l	Mesolithal	Psammal	Xylal	Akal	Phytal- macrophy tes	Technolit hal	Microlitha l	Mesolithal	Xylal	Akal	Technolit hal	Microlitha l	Microlitha l	Psammal	Xylal	Akal
<i>Atractides loricatus</i> (Piersig, 1898)																	
<i>Atractides</i> sp. (Koch, 1837)			16.00														
<i>Aturus scaber</i> (Kramer, 1875)																	
Hydrachnidia non. det. (larvae)												1.60					
<i>Hygrobates calliger</i> (Piersig, 1896)							0.84	16.00	2.67		12.00		17.60	2.29		8.00	
<i>Hygrobates fluviatilis</i> (Ström, 1768)									5.33								
<i>Hygrobates longiporus</i> (Thor, 1898)															1.67		
<i>Hygrobates</i> sp. (Koch, 1837)													1.60	1.14			
<i>Hygrobates trigonicus</i> * (Koenike, 1895)																	
<i>Lebertia</i> sp. (Neuman, 1880)							0.84	2.67	2.67		12.00		8.00	2.29	1.67		
<i>Mideopsis orbicularis</i> (Muller, 1776)							5.89										
<i>Mideopsis</i> sp. (Neuman, 1880)																	
<i>Neocarus hibernicus</i> * (Halbert, 1944)														1.14			
<i>Nudomideopsis</i> cf. <i>motasi</i> ** (Petrova, 1966)																	
<i>Protzia</i> sp. (Piersig, 1896)							0.84										
<i>Sperchon clupeifer</i> (Piersig, 1896)																	
<i>Sperchon compactilis</i> * (Koenike, 1911)																	
<i>Sperchon denticulates</i> group									2.67				1.60			8.00	
<i>Sperchon hibernicus</i> (Halbert, 1944)								2.67		4.00	4.00			1.14			
<i>Sperchon hispidus</i> (Koenike, 1895)																8.00	
<i>Sperchon insignis</i> (Walter, 1906)																	
<i>Sperchon papillosus</i> * (Thor, 1901)																	
<i>Sperchon</i> sp. (Kramer, 1877)								16.00	53.33		4.00						
<i>Sperchonopsis verrucosa</i> (Protz, 1896)																	
<i>Torrenticola amplexa</i> (Koenike, 1908)							6.74										
<i>Torrenticola elliptica</i> (Maglio, 1909)																	
<i>Torrenticola hyporheica</i> * (Di Sabatino & Cicolani, 1993)																	
<i>Torrenticola ischnophallus</i> * (Lundblad, 1956)															5.33		
<i>Torrenticola laskai</i> * (Di Sabatino, 2009)																	
<i>Torrenticola</i> sp. (Piersig, 1896)									2.67								
<i>Torrenticola ungeri</i> * (Szalay, 1927)																	

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