



Title	Stable isotope ratios of emergent adult aquatic insects can be used as indicators of water pollution in the hyporheic food web
Author(s)	Alam, Md. Khorshed; Negishi, Junjiro N.; Rahman, Mirza A. T. M. Tanvir et al.
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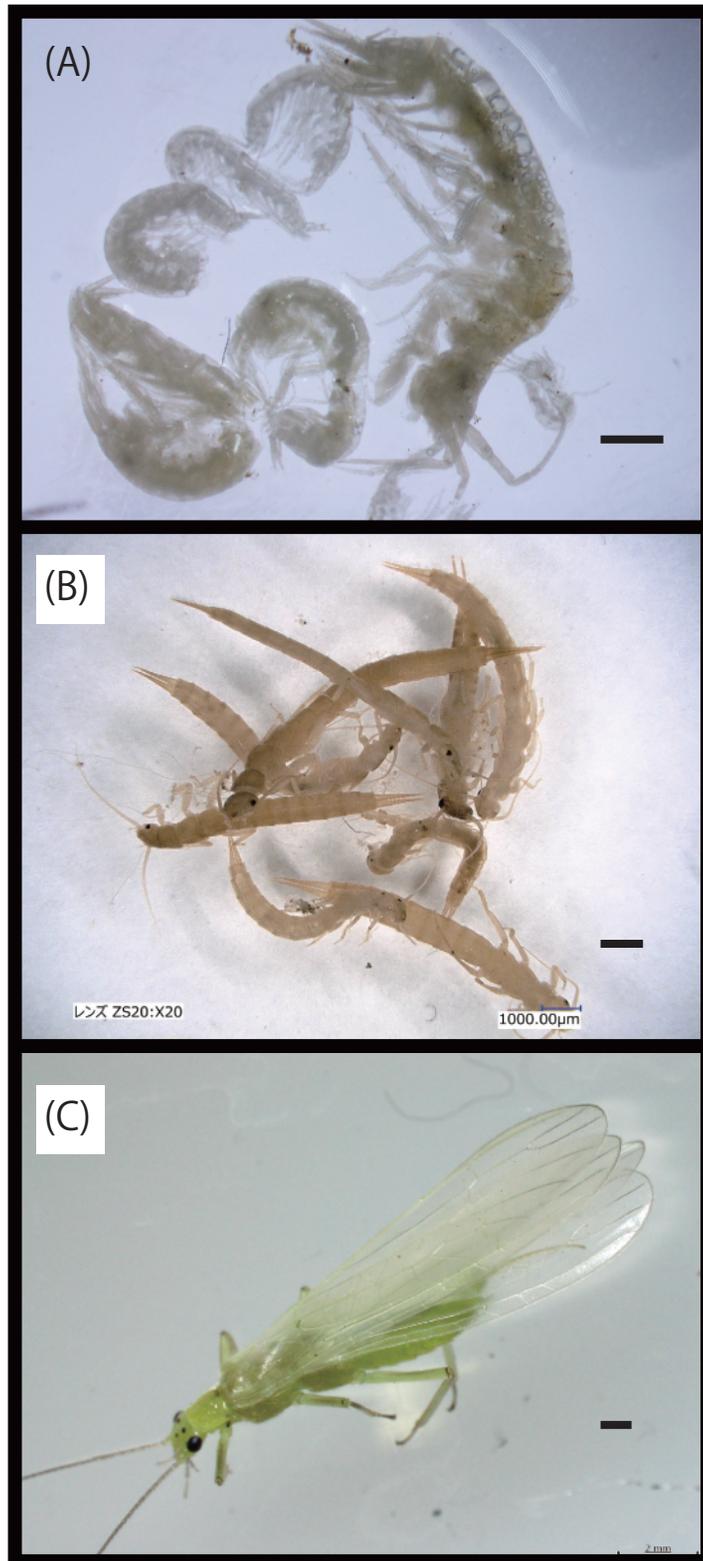
Typical landscape of the study channel with gravel bars and fringing riparian vegetation (A), braided channels (B), and riparian forest extending to the flood levees on the both sides (C).

Open arrows in (C) indicate approximate locations of flood levees.

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Photographs of colonization traps before the installation (A), the process of installation of traps using a backhoe (B), and a colonization trap immediately after the retrieval (C)



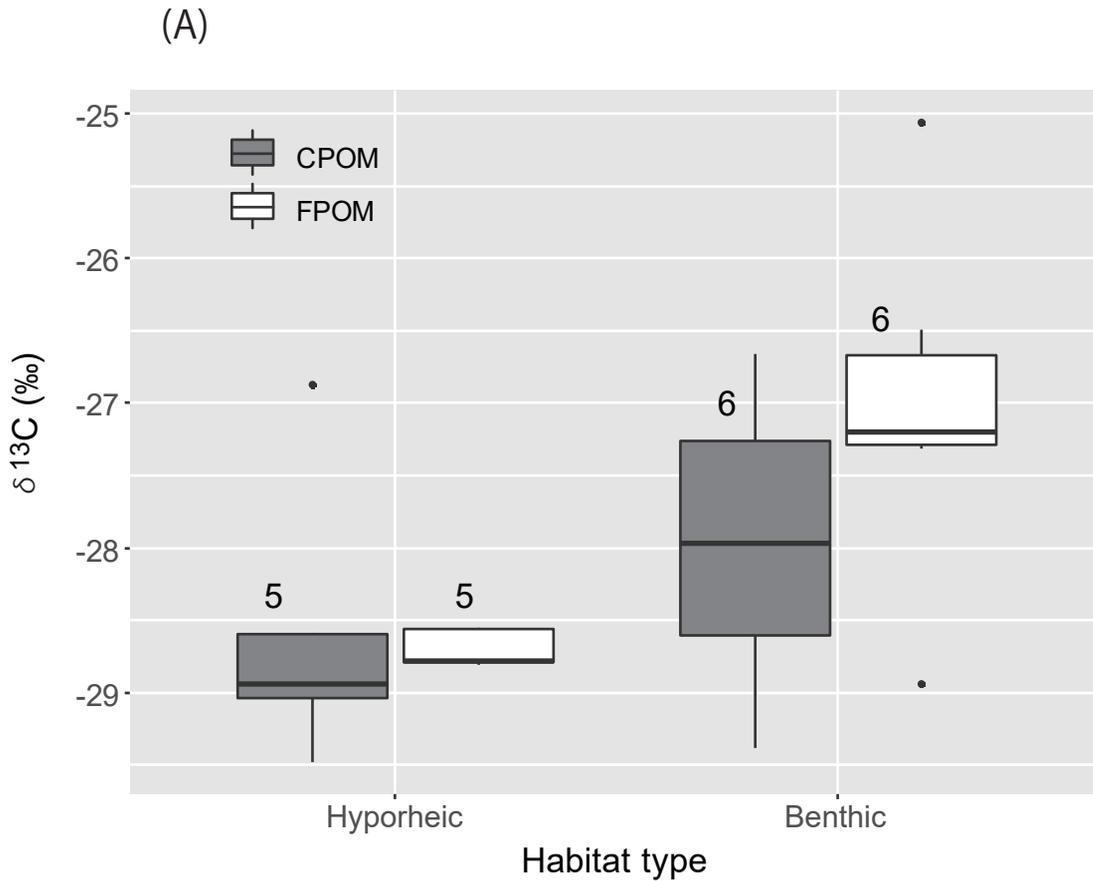
Photographs of Amphipoda (*Pseudocrangonyx yezonis* Akatsuka and Komai, 1922) (A) and larvae of *Alloperla ishkariana* (B) collected in hyporheic colonization traps, and adults of *A. ishkariana* caught in riparian zones (C). Horizontal scale bar denotes 1.0 mm.

S4 A summary of sampling dates of water for the simultaneous measurements of of nitrate in the hyporheic and surface zones. Some dates were missing due to sample loss. Numbers in bracketed superscripts indicate replicated samples collected from multiple wells at each site; no superscripts indicate one sample. N denotes sample sizes.

Site	Habitat type	Dates			N
		2016	2017	2018	
A1	Surface		7/5, 7/14, 7/30, 8/30		4
	Hyporheic		7/5 ⁽³⁾ , 7/14 ⁽³⁾ , 7/30, 8/30		8
A2	Surface		7/5, 7/14, 8/30		3
	Hyporheic		7/5 ⁽³⁾ , 7/14 ⁽³⁾ , 7/30, 8/30		8
H1	Surface	7/8			1
	Hyporheic	7/8 ⁽²⁾			2
L4	Surface			8/9, 11/4	2
	Hyporheic			8/9, 11/4	2
L7	Surface			8/9	1
	Hyporheic			8/9	1
L8	Surface			8/9	1
	Hyporheic			8/9	1
L9	Surface			8/9	1
	Hyporheic			8/9	1
H4	Surface	7/8			1
	Hyporheic	7/8 ⁽³⁾			3
A3	Surface		7/5, 7/30, 8/30		3
	Hyporheic		7/5 ⁽⁶⁾ , 7/14 ⁽⁶⁾ , 7/30 ⁽³⁾ , 8/30 ⁽³⁾		18

S5 A summary of sampling dates of water for the simultaneous measurements of nitrate in the hyporheic and surface zones. Dates with asterisks indicate the measurements for which nitrate concentrations were also determined; (2) in superscripts indicate that there were two replicates collected at different time of a day. N denotes sample sizes of EC measurements; those in brackets denote sample size for samples with both nitrate and EC measurements.

Site	Dates			N
	2016	2017	2018	
A1		7/5*, 7/14*, 7/30*, 8/30*	7/23	5 (4)
A2		4/20, 5/25, 5/4, 5/11, 5/17, 5/23, 5/30, 6/9, 6/12, 6/20, 6/23, 7/5 ⁽²⁾ *, 7/7*, 7/10, 7/14*, 7/30*, 8/29*, 8/30*, 9/1, 10/14	5/9, 6/7, 6/12, 6/19, 6/23, 6/27, 7/1, 7/6, 7/10, 7/15, 7/23, 7/26, 7/30, 8/9, 8/31*	36 (8)
H1	6/9, 7/8*, 7/16	4/20, 4/25, 5/4, 5/11, 5/17, 5/23, 5/30, 6/9, 6/12, 6/20, 6/23, 7/7*, 7/10, 7/30*, 8/29*, 9/1, 10/14	5/9, 6/7, 6/12, 6/19, 6/23, 6/27, 7/1, 7/6, 7/10, 7/15, 7/23, 7/26, 7/30, 8/9	34 (4)
L4			7/6, 7/10, 7/26, 7/30, 8/9*, 8/31*, 9/8*, 11/4*	8 (4)
L7		5/30, 6/9, 6/12, 6/20, 6/23, 7/7*, 7/10, 7/30*, 8/29*	5/9, 6/7, 6/12, 6/19, 6/23, 6/27 ⁽²⁾ , 7/1, 7/6, 7/10, 7/15, 7/23, 7/26, 7/30, 8/9*, 8/31*, 9/8*	26 (6)
L8		4/20, 4/25, 5/4, 5/11, 5/17, 5/23, 5/30, 6/9, 6/12, 6/20, 6/23, 7/7*, 7/10, 7/30*, 8/29*, 9/1, 10/14	5/9, 6/7, 6/12, 6/19, 6/23, 6/27, 7/1, 7/6, 7/10, 7/15, 7/23, 7/26, 7/30, 8/9*, 8/31*, 9/8*	33 (6)
L9		4/20, 4/25, 5/4, 5/11, 5/17, 5/23, 5/30, 6/9, 6/12, 6/20, 6/23, 7/7, 7/10, 8/29, 10/14	5/9, 6/7, 6/12, 6/19, 6/23, 6/27, 7/1, 7/6, 7/10, 7/15, 7/23, 7/26, 7/30, 8/9*, 8/31*, 9/8*	31 (3)
H4	6/9, 7/8*, 7/16			3 (1)
A3		7/5*, 7/14, 7/30*, 8/30*	7/23, 7/26, 7/30, 8/31*	8 (4)



(B)

Results of a generalized linear mix model testing the effects of habitat types (benthic vs. hyporheic), size classes of POM (fine vs. coarse), and their interactions on carbon SIRs of POM, with collection dates and sampling sites as random factors. Gaussian error distribution was adapted. The full model and reduced model were compared using a log-likelihood test; when full model was insignificant, 1st reduced models were compared to 2nd reduced models and sequentially to the null models. Habitat (H) and size (S) denote habitat types (benthic or hyporheic), size classes of POM, respectively. Superscripts of p-values indicate the variables removed from the model to test with those from reduced models by one level

	logLik	AICc	p-value
<i>Full model</i>			
Habitat (H), size (S), H×S	-28.2	70.5	0.15
<i>1st Reduced model</i>			
H, S	-29.2	70.5	<0.01 ^H , 0.23 ^S
<i>2nd Reduced model</i>			
H	-29.9	69.9	<0.01
S	-32.8	75.6	0.30
<i>Null model</i>			
	-33.3	74.6	

Comparisons of carbon SIRs of POM in habitat types and size classes using a GLMM. Numbers above each boxplot in each group denote sample sizes (A). Results of GLMM was also presented

(B)