

The following supplement accompanies the article

Effect of algal phenology on seasonal dynamics of gammarid assemblages: differences between canopy and understory strata in a *Sargassum yezoense* bed

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Table S1. Total dry weight (DW) and relative dry weight (%DW) for each macrophyte taxa collected in this study.

Phyla	Order	Taxon	Canopy		Understory		Total	
			DW (g)	%DW	DW (g)	%DW	DW (g)	%DW
Heterokontophyta	Fucales	<i>Sargassum yezoense</i>	1779.341	99.4%	476.183	80.3%	2255.524	94.7%
	Dictyotales	<i>Dictyota dichotoma</i>	0.706	0.0%	6.838	1.2%	7.544	0.3%
	Laminariales	<i>Laminaria religiosa</i>	0.770	0.1%	0.094	0.0%	0.864	0.0%
	Scytosiphonales	<i>Colpomenia sinuosa</i>	0.008	0.0%	0.001	0.0%	0.009	0.0%
Rhodophyta	Ceramiales	<i>Ceramium</i> spp.	0.003	0.0%	0.015	0.0%	0.018	0.0%
	Corallinales	<i>Bossiella cretacea</i>	6.242	0.4%	107.024	17.9%	113.266	4.8%
	Gigartinales	<i>Ahnfeltiopsis paradoxa</i>	0.329	0.0%	2.488	0.4%	2.817	0.1%
	Gigartinales	<i>Chondrus</i> spp.	0.004	0.0%	0.045	0.0%	0.049	0.0%
Chlorophyta	Cladophorales	<i>Cladophora</i> spp.	0.021	0.0%	0.002	0.0%	0.023	0.0%
Magnoliophyta	Alismatales	<i>Phyllospadix iwatensis</i>	0.624	0.0%	0.251	0.1%	0.875	0.0%
Other		unidentified macrophytes	1.407	0.1%	0.412	0.1%	1.819	0.1%
Total			1789.455	100.0%	593.353	100.0%	2382.808	100.0%

Table S2. Number (inds) and relative number (%inds) of individuals for each gammarid taxa collected in this study. Gammarids for which the relative number was higher than 10% are shown in bold.

Family	Taxon	feeding habit*	life form**	Canopy		Understory		Total	
				inds	% inds	inds	% inds	inds	% inds
Ampeliscidae	<i>Ampelisca</i> sp.	F	T			1	0.0%	1	0.0%
Amphilochoidea	Amphiochidae spp.	D	F	127	0.5%	34	0.2%	161	0.3%
Ampithoidea	<i>Ampithoe akuolaka</i>	G	T	13	0.0%	577	2.6%	590	1.2%
	<i>Ampithoe lacertosa</i>	G	T	6	0.0%	8	0.0%	14	0.0%
	<i>Ampithoe ramondi</i>	G	T	267	1.0%	59	0.3%	326	0.6%
	<i>Ampithoe tarasovi</i>	G	T	22	0.1%	149	0.7%	171	0.3%
	<i>Biancolina japonica</i>	G	A	12	0.0%			12	0.0%
	<i>Sunamphitoe</i> spp.	G	T	3438	12.4%	438	1.9%	3876	7.7%
Aoridae	<i>Aoroides</i> sp.	F	T	15	0.1%	302	1.3%	317	0.6%
Atylidae	<i>Atylus</i> sp.	D	F	1	0.0%	9	0.0%	10	0.0%
Corophiidae	<i>Lobatocorophium</i> sp.	F	T			12	0.1%	12	0.0%
	<i>Monocorophium uenoi</i>	F	T	282	1.0%	3708	16.4%	3990	7.9%
	<i>Pareuryustheus</i> spp.	F	T	282	1.0%	232	1.0%	514	1.0%
Cyproideidae	<i>Cyproidea liodactyla</i>	D	F	2	0.0%			2	0.0%
	<i>Moolapheonoides</i> sp.	D	F	2	0.0%	2	0.0%	4	0.0%
Dexaminidae	<i>Guerunea</i> sp.	D	F			4	0.0%	4	0.0%
	<i>Paradexamine</i> sp. A	D	F	1	0.0%	0	0.0%	1	0.0%
	<i>Paradexamine</i> sp. B	D	F	4	0.0%	9	0.0%	13	0.0%
	<i>Polycheria</i> spp.	C	C	5	0.0%	9	0.0%	14	0.0%
Eophliantidae	<i>Ceinina japonica</i>	G	A	8	0.0%	1	0.0%	9	0.0%
Hyalidae	<i>Protohyale</i> spp.	G	F	778	2.8%	1239	5.5%	2017	4.0%
Ischyroceridae	<i>Ericthonius pugnax</i>	F	T	2994	10.8%	2467	10.9%	5461	10.9%
	<i>Jassa morinoi</i>	F	T	15133	54.7%	1208	5.4%	16341	32.5%
	<i>Jassa slatteryi</i>	F	T	19	0.1%	1	0.0%	20	0.0%
	<i>Jassa</i> spp.	F	T	17	0.1%	5	0.0%	22	0.0%

	<i>Ventojassa dentipalma</i>	F	T	61	0.2%	1319	5.8%	1380	2.7%
Liljeborgiidae	<i>Liljeborgia</i> sp.	S	F			7	0.0%	7	0.0%
Lysianassoidea	<i>Anonyx</i> sp. A	S	F			150	0.7%	150	0.3%
	<i>Anonyx</i> sp. B	S	F			10	0.0%	10	0.0%
	Lysianassoidea sp.	S	F			21	0.1%	21	0.0%
Maeridae	<i>Elasmopus</i> sp.	D	F	1	0.0%	4	0.0%	5	0.0%
	<i>Orientomaera brevispina</i>	D	F	14	0.1%	426	1.9%	440	0.9%
	<i>Quadrinemaera pacifica</i>	D	F	70	0.3%	1434	6.4%	1504	3.0%
Melitidae	<i>Melita</i> spp.	D	F	20	0.1%	790	3.5%	810	1.6%
Najnidae	<i>Najna consiliorum</i>	G	A	2	0.0%			2	0.0%
Ochlesidae	<i>Gordonodius</i> sp.	D	F	3	0.0%			3	0.0%
	<i>Postodius</i> sp.	D	F			1	0.0%	1	0.0%
Oedicerotidae	<i>Monoculoides</i> sp.	S	S			1	0.0%	1	0.0%
	<i>Synchelidium</i> sp. A	S	S			1	0.0%	1	0.0%
	<i>Synchelidium</i> sp. B	S	S			13	0.1%	13	0.0%
	<i>Synchelidium</i> sp. C	S	S			1	0.0%	1	0.0%
Phliantidae	<i>Iphiplateia whiteleggei</i>	G	F	13	0.0%	63	0.3%	76	0.2%
	<i>Pereionotus</i> sp.	G	F	68	0.2%	191	0.8%	259	0.5%
Photidae	<i>Gammaropsis japonicus</i>	F	T	371	1.3%	2576	11.4%	2947	5.9%
	<i>Gammaropsis nitida</i>	F	T			72	0.3%	72	0.1%
	Photis sp	F	T	54	0.2%	745	3.3%	799	1.6%
Phoxocephalidae	Phoxocephalidae spp.	S	S			5	0.0%	5	0.0%
Pleustidae	Pleustidae spp. A (<i>Pleustes</i> and <i>Tholaksonius</i>)	D	F	161	0.6%	214	0.9%	375	0.7%
	Pleustidae spp. B (<i>Pleusymtinae</i> and <i>Parapleustinae</i>)	D	F	863	3.1%	1429	6.3%	2292	4.6%
	<i>Dactylopleustes</i> spp.	C	C	11	0.0%	9	0.0%	20	0.0%
Iphimediidae	<i>Iphimedia</i> sp.	D	F	2	0.0%	9	0.0%	11	0.0%
Podoceridae	<i>Podocerus</i> sp.	F	F	1884	6.8%	1644	7.3%	3528	7.0%

Pontogeneidae	<i>Pontogeneia</i> spp.	S	F	87	0.3%	753	3.3%	840	1.7%
Stenothoidae	Stenothoidae spp.	S	F	498	1.8%	22	0.1%	520	1.0%
Others	Unidentified amphipods	-	-	55	0.2%	188	0.8%	243	0.5%
Total				27666	100.0%	22572	100.0%	50238	100.0%

*feeding habit: F = filter-feeder, G = macroalgal-grazer, D = deposit- or epiphytic- feeder, S = scavenger or predator, C = commensal

**life form: T = tube-dwelling, F = free-living, A = algal-boring, S = sand-burrowing, C = commensal

Table S3. Parameter estimates of the best fit model for gammarid abundance, gammarid richness and gammarid H' .

Fixed effect	Abundance				Richness				H'			
	Est.	SE	z	p	Est.	SE	z	p	Est.	SE	t	p
(Intercept)	3.96	0.22	17.97	<0.001	2.47	0.04	64.13	0.00	3.09	0.14	22.21	<0.001
Habitat												
Canopy v.s. understory	1.09	0.31	3.53	<0.001	0.52	0.05	10.54	<0.001	0.37	0.17	2.22	0.031
Month												
Jan v.s. Feb	0.38	0.38	1.00	0.317					-0.18	0.22	-0.83	0.407
Jan v.s. Mar	0.48	0.38	1.27	0.206					-0.18	0.22	-0.84	0.401
Jan v.s. Apr	1.46	0.37	3.90	<0.001					-0.69	0.22	-3.16	0.002
Jan v.s. May	1.44	0.37	3.85	<0.001					-0.99	0.22	-4.53	<0.001
Jan v.s. Jun	2.98	0.37	7.99	<0.001					-1.17	0.22	-5.36	<0.001
Jan v.s. July	3.63	0.31	11.86	<0.001					-1.47	0.18	-8.06	<0.001
Jan v.s. Aug	2.53	0.31	8.25	<0.001					-0.21	0.18	-1.13	0.263
Jan v.s. Sep	1.32	0.31	4.31	<0.001					-0.96	0.18	-5.28	<0.001
Jan v.s. Oct	0.84	0.31	2.71	0.007					-1.00	0.18	-5.48	<0.001
Jan v.s. Nov	-0.07	0.31	-0.24	0.812					-0.67	0.18	-3.68	<0.001
Jan v.s. Dec	-0.18	0.31	-0.58	0.561					-0.67	0.18	-3.65	<0.001
Interaction												
Habitat×Month (Jan v.s. Feb)	0.52	0.53	0.98	0.325					0.35	0.29	1.21	0.231
Habitat×Month (Jan v.s. Mar)	-0.04	0.53	-0.07	0.944					0.36	0.29	1.22	0.227
Habitat×Month (Jan v.s. Apr)	-1.13	0.53	-2.14	0.033					1.01	0.29	3.44	0.001
Habitat×Month (Jan v.s. May)	-1.43	0.53	-2.70	0.007					1.26	0.29	4.32	<0.001
Habitat×Month (Jan v.s. Jun)	-2.39	0.53	-4.55	<0.001					1.63	0.29	5.56	<0.001
Habitat×Month (Jan v.s. July)	-2.98	0.43	-6.90	<0.001					1.49	0.24	6.24	<0.001
Habitat×Month (Jan v.s. Aug)	-0.46	0.43	-1.06	0.288					0.14	0.24	0.58	0.563
Habitat×Month (Jan v.s. Sep)	-0.11	0.43	-0.25	0.800					0.87	0.24	3.64	<0.001
Habitat×Month (Jan v.s. Oct)	-0.11	0.43	-0.26	0.792					0.89	0.24	3.74	<0.001
Habitat×Month (Jan v.s. Nov)	0.63	0.49	1.30	0.195					0.20	0.27	0.74	0.464
Habitat×Month (Jan v.s. Dec)	0.61	0.49	1.25	0.213					-0.13	0.27	-0.46	0.645

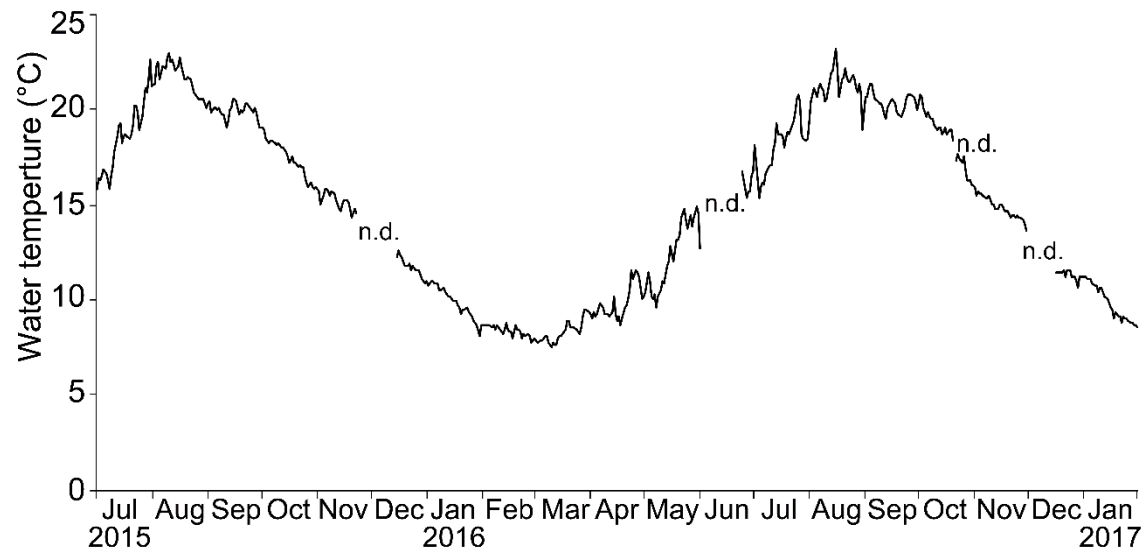


Fig. S1. Seasonal change of daily averaged water temperature in the study site, Akahama, Otsuchi Bay. The water temperature was monitored each 10 minutes at a depth of 1.0 m in the study site, and averaged per day.



Fig. S2. Photograph of several thalli of *Sargassum yezoense* in canopy samples. Measured parts of *S. yezoense* thallus was shown by (a) and (b): (a) total length, (b) length of defoliated part. *Sargassum yezoense* showed characteristic defoliation pattern looks like withering of the plant. In autumn, *S. yezoense* bed comprised of stipes and holdfasts (without leaves). The following pattern was found during defoliation period of *S. yezoense*, (1) Defoliation started with loss of leaves from the branches (especially from under/proximal part of thallus): Jul 2015. (2) Most of the leaves were lost from branches: Aug 2015. (3) All the leaves and branches were lost, and only the main axis remained attached to the holdfast. Newly developing thalli also occurred in this period: Sep 2015. (4) Newly occurred thalli growing: Oct 2015 and Mar 2016.

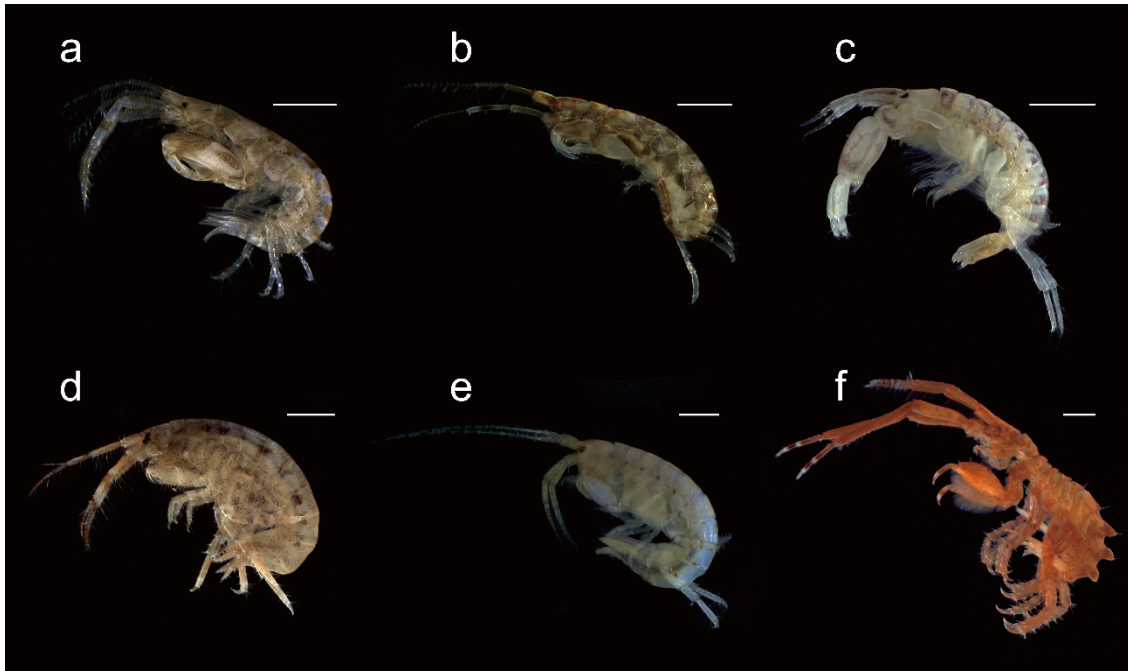


Fig. S3. Photographs showing several dominant gammarid species: a, *Jassa morinoi*; b, *Ericthonius pugnax*; c, *Monocorophium uenoi*; d, *Gammaropsis japonicus*; e, *Sunamphitoe* sp.; f, *Podocerus* sp.; scale bars, 1.0 mm.