

Figure S1: In situ incubations of *O. longicauda*, NWMS, n = 2, April 2014. (a) Differential clearance rate of marine microorganisms by *O. longicauda*. Centerlines show the medians; X in boxes shows the average; box limits indicate the 25th and 75th percentiles; whiskers extend 1.5 times the interquartile range from the 25th and 75th percentiles, outliers are represented by dots. (b) The relation between the retention efficiency (%) of different prey types and their relative size calculated as the ratio of cells forward scatter (FSC) to the FSC of 1  $\mu\text{m}$  beads. Vertical error bars are lower and upper quartiles of retention efficiency (%), horizontal error bars are lower and upper quartiles of the forward scatter (FSC) normalized to the FSC of 1  $\mu\text{m}$  beads. NanoEuk, nano eukaryotic algae; PicoEuk, pico eukaryotic algae; Syn., Synechococcus; Pro, Prochlorococcus; HNA-Ls, high nucleic acid low-scatter non-photosynthetic bacteria; HNA-Hs, high nucleic acid high-scatter non-photosynthetic bacteria; LNA, low nucleic acid non-photosynthetic bacteria. (c) Clearance rates of the 20 most abundant OTUs in the water, Grey lines divide OTUs into taxonomic categories;  $\alpha$ , Alphaproteobacteria,  $\beta$ , Betaproteobacteria,  $\gamma$ , Gammaproteobacteria, Bact, Bacteroidetes, Act, Actinobacteria, Cyan, Cyanobacteria. Pink-members of the SAR11 clade, Green- autotrophs, Blue-other non-photosynthetic bacteria. The vertical line represents the expected clearance rate assuming equal clearance rate probability for all cells. Size of circles represents relative abundance in ambient water during sampling (Circles in the upper right shows scale for 5 and 25% of total reads). Error bars are CI95%, squares represent median clearance rates.

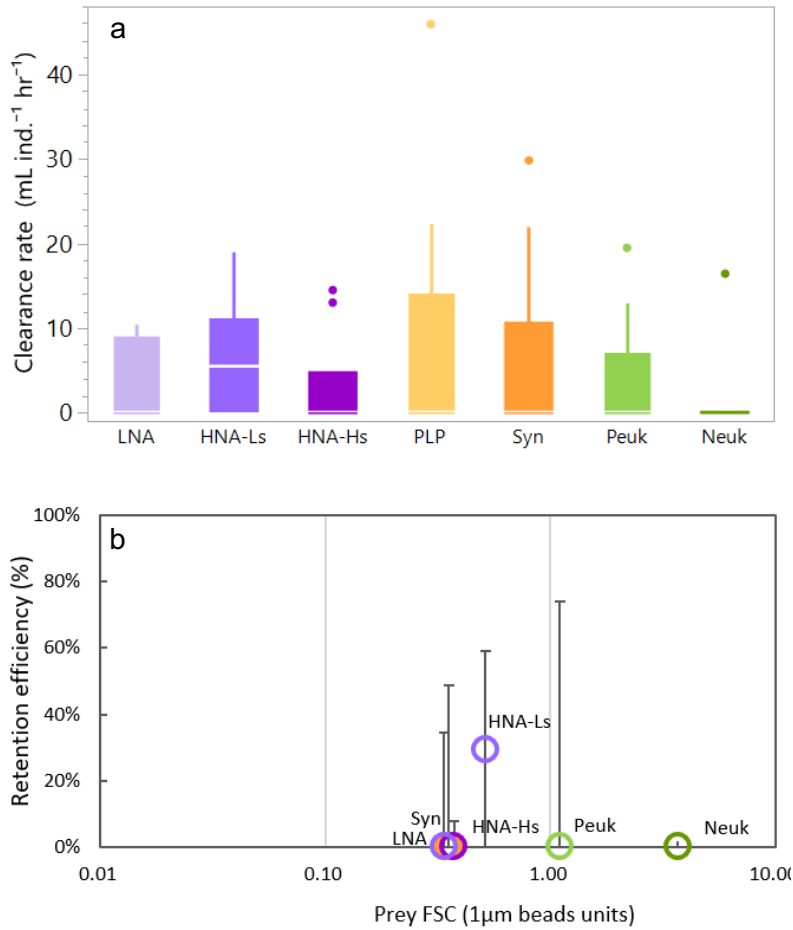


Figure S2: Differential clearance rate of marine microbes by the appendicularian *O. dioica* measured under controlled laboratory conditions in University of Bergen facilities using ambient water, during December 2015, n= 10. (a) Differential clearance rates of different prey types counted by flow cytometry between the beginning of incubation and the first hour. (b) The relation between the retention efficiency (%) of different prey types and their relative size calculated as the ratio of cells forward scatter (FSC) to the FSC of 1 µm beads. While the relative size estimates of all particles below 0.6 µm are probably a good representation of reality, the absolute size estimates of minute particles are unrealistic but suggest very small cells. All abbreviations, box plot markers, and error bars are as in Fig. S1.

Table S1: Relative accumulation of bacterial prey type on discarded appendicularians houses collected at the end of the in-situ experiments.  $n$  is the number of houses examined from each species. The clearance rate is presented for each of the dominant bacterial prey phylotypes as measured during *in-situ* experiments for each of the appendicularian species. The mean relative accumulation (%) of each prey type was calculated from the relative abundance of each prey type on the house ( $H$ ) and its abundance in ambient water ( $Con$ ) as

$$\frac{100}{n} \sum_i \frac{Con_i - H_i}{Con_i}$$

Prey types	<i>O. albicans</i> (n=12)		<i>O. fusiformis</i> (n=3)		<i>O. longicauda</i> (n=3)				
	Clearance rate (ml/(ind*hr))	Average (T0-H)/T0	Clearance rate (ml/(ind*hr))	Average (T0-H)/T0	Clearance rate (ml/(ind*hr))	Average (T0-H)/T0			
SAR11-I	4.00	↑	31%	2.29	↓↓	-65%	1.26		1%
SAR11-II	1.86	↓	-7%	2.27	↑↑	84%	0.90	↑	23%
SAR11-IV	9.58	↑	8%	3.04	↓↓	-54%	1.61	↑	11%
SAR11 (Unclassified)	4.88	↑↑	59%	2.01	↓↓	-52%	1.04	↓	-24%
SAR116	5.29	↑↑	106%	2.79	↓↓	-63%	2.18	↓	-8%
Roseobacter OCT	4.31		3%	1.58	↓	-21%	1.49	↓	-47%
Rhodobacteraceae	10.80	↑	11%	4.05	↓↓	-71%	1.72	↓↓	-54%
Rickettsiales S25-593	10.04	↑	10%	3.57	↓	-48%	1.74	↑	44%
SAR86	13.52	↑↑	159%	5.33	↓	-44%	9.03	↓↓	-98%
Pseudoalteromonas	10.25	↑↑	183%	2.69	↓↓	-55%	1.65	↑↑	64%
OM60/NOR5	12.07	↑↑	101%	4.68	↓↓	-70%	1.06	↓↓	-50%
KI89A clade	2.85	↑↑	324%	5.33	↑↑	134%	19.88	↑↑	302%
NS5	13.01	↑↑	91%	5.19	↑	33%	3.53	↓	-30%
NS4	4.72	↓	-8%	3.25	↓	-14%	3.02	↓↓	-50%
Balneola	9.15	↓↓	-100%	1.95	↓↓	-99%	2.13	↓↓	-100%
Ralstonia	5.85	↑↑	183%	2.44	↑	34%	3.24	↑↑	64%
Candidatus Actinomarina	6.97	↑↑	72%	6.76	↓↓	-52%	2.80	↓	-22%
Syn-Pro	13.42	↑↑	84%	2.27	↓↓	-72%	2.55	↓	-39%
Prochlorococcus	13.53	↑	31%	2.17	↑↑	84%	2.43	↑	18%
No Relative	7.23	↑	8%	1.86	↓↓	-81%	0.09	↓↓	-66%

↑↑ indicate concentration on the house is higher than ambient concentration, range 50-500%

↑ indicate concentration on the house is higher than ambient concentration, range 5-50%

↓ indicate ambient concentration is higher than concentration on the house, range (-5)-(-50)%

↓↓ indicate ambient concentration is higher than concentration on the house, range (-50)-(-500)%