SUPPLEMENTARY INFORMATION

Table S1. List of sampling dates for 2010 and 2011.

2010	2011
11-Mar	24-Mar
18-Mar	06-Apr
25-Mar	20-Apr
01-Apr	05-May
08-Apr	19-May
22-Apr*	06-Jun
30-Apr	20-Jun
10-May	05-Jul
18-May	19-Jul
02-Jun	03-Aug
14-Jun	17-Aug
28-Jun	
15-Jul	
27-Jul	
12-Aug	

*No LOPC data

Table S2. logarithmic size bins based on equivalent spherical diameter (ESD) from the lab-LOPC. Lower and upper limit of each size bin as mg wet weight and geometric mean size bin reported in wet and carbon weights (mg). Wet weights were converted to carbon weight assuming carbon weight = 0.0961 x wet weight from Kiørboe (2013).

Lower limit wet weight (mg)	Upper limit wet weight (mg)	Geometric mean size bin	
		Wet weight (mg)	Carbon weight (mg)
0.005	0.008	0.006	0. 0006
0.008	0.012	0.010	0.001
0.012	0.019	0.015	0.001
0.019	0.030	0.024	0.002
0.030	0.048	0.038	0.003
0.048	0.076	0.060	0.004
0.076	0.120	0.096	0.006
0.120	0.191	0.152	0.010
0.191	0.302	0.240	0.016
0.302	0.479	0.381	0.025
0.479	0.759	0.603	0.040
0.759	1.203	0.956	0.063
1.203	1.907	1.515	0.100
1.907	3.023	2.401	0.159
3.023	4.791	3.806	0.252
4.791	7.593	6.032	0.399
7.593	12.035	9.560	0.632
12.035	19.074	15.151	1.001
19.074	30.230	24.013	1.587
30.230	47.911	38.057	2.516
47.911	75.934	60.317	3.987
75.934	120.348	95.596	6.319
120.348	190.738	151.509	10.015
190.738	302.300	240.125	15.872

Table S3. Testing the assumptions of normality and homoscedasticity using the LOPC and microscope abundance and biomass data.

Data	Shapiro-Wilks (Normality)		Breusch-Pagan (Homoscedasticity)	
	W	p	BP	p
Abundance 2010	0.96	0.67	0.26	0.61
Abundance 2011	0.92	0.33	0.15	0.69
Abundance 2010 & 2011	0.94	0.15	0.37	0.54
Biomass 2010	0.98	0.96	2.38	0.12
Biomass 2011	0.97	0.87	1.71	0.19
Biomass 2010 & 2011	0.97	0.54	4.07	0.05

Table S4. Testing the assumptions of normality and homoscedasticity for correlations of growth model (Hirst-Bunker, Hirst-Lampitt, Huntley-Lopez) estimates of mesozooplankton production against chitobiase (CBA) for total water column and top 5 m excluded.

Data	Year(s)	Shapiro-Wilks (Normality)		Breusch-Pagan (Homoscedasticity)	
		W	p	BP	p
Total watercolumn CBA					
Hirst-Bunker	2010	0.78	0.003*	1.18	0.28
	2011	0.96	0.74	0.12	0.72
Hirst-Lampitt	2010	0.78	0.003*	0.79	0.37
	2011	0.95	0.68	0.46	0.50
Huntley- Lopez	2010	0.78	0.003*	0.22	0.64
	2011	0.97	0.88	0.06	0.81
CBA excluding top 5m					
Hirst-Bunker	2010	0.92	0.4	0.66	0.42
	2011	0.88	0.12	0.09	0.77
Hirst-Lampitt	2010	0.92	0.23	0.48	0.49
	2011	0.87	0.08	0.24	0.63
Huntley- Lopez	2010	0.92	0.19	0.13	0.72
	2011	0.89	0.14	0.11	0.74

Table S5. Results from linear regression between LOPC and microscope abundance and biomass for 2010 and 2011 combined and separated.

	Adjusted-R2	Degrees of freedom	F-value	p-value
Abundance 2010	0.41	1, 11	9.88	0.008*
Abundance 2011	0.71	1, 9	26.00	<0.001*
Abundance 2010 & 2011	0.45	1, 22	20.77	<0.001*
Biomass 2010	0.35	1, 11	8.13	0.015*
Biomass 2011	0.41	1, 9	8.00	0.020*
Biomass 2010 & 2011	0.35	1, 22	13.95	0.001*

Table S6. Results from Spearman's rank correlation between LOPC model estimates of crustacean production and chitobiase (CBA) based estimates of crustacean production (e.g., log10(chitobiase production) ~ log10(model production)) for 2010 and 2011 separated.

Correlation	Year(s)	S	*r*	p-value
Total water column				
Hirst and Bunker (2003)	2010	279	0.39	0.17
	2011	102	0.54	0.094
	2010 & 2011	1551	0.40	0.05
Hirst and Lampitt (1998)	2010	259	0.43	0.12
	2011	86	0.61	0.05
	2010 & 2011	1485	0.43	0.030*
Huntley and Lopez (1992)	2010	208	0.54	0.05
	2011	154	0.30	0.371
	2010 & 2011	1499	0.42	0.035*
Top 5 m removed				
Hirst and Bunker (2003)	2010	466	-0.02	0.94
	2011	72	0.67	0.030*
	2010 & 2011	2064	0.21	0.32
Hirst and Lampitt (1998)	2010	386	0.15	0.61
	2011	114	0.48	0.14
	2010 & 2011	1962	0.25	0.24
Huntley and Lopez (1992)	2010	436	0.042	0.89
	2011	58	0.74	0.013*
	2010 & 2011	1984	0.24	0.25

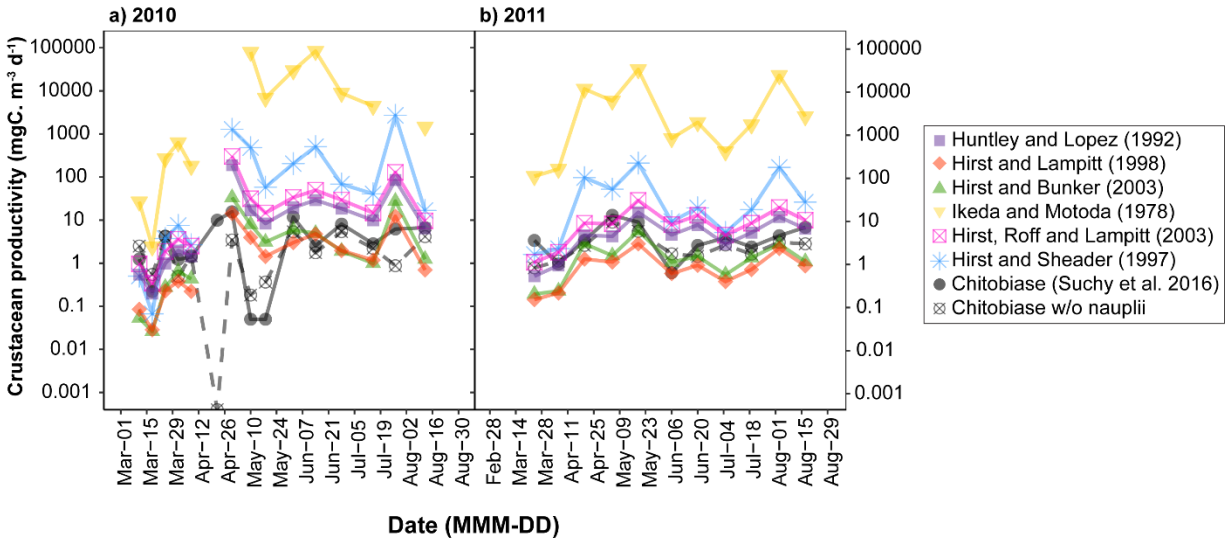

Figure S1. Mesozooplankton production estimated using various empirical models, *in situ* measurements of chitobiase and with total chlorophyll-*a* (green). Here, we also provide depth integrated chitobiase after removing the surface estimate, which was dominated primarily by nauplii productivity not captured in the 236 µm net tows. Total chlorophyll-*a* is expressed on the secondary y-axis for comparison.

Table S7. Differences between total water column chitobiase (TCB), chitobiase excluding top 5 m (CB5) and model estimates (i.e., Hirst and Bunker (2003; HB); Hirst and Lampitt (1998; HL); Huntley and Lopez (1992; HLo)) of crustacean production. Mean and standard deviation (SD) for each year is provided. Values exceeding mean ± 1SD are bold.

Date	TCB – HB	TCB – HL	TCB - HLo	CB5 – HB	CB5 – HL	CB5 – HLo
2010						
11-Mar-10	1.19	1.16	0.70	2.45	2.42	1.95
18-Mar-10	0.20	0.19	0.02	0.52	0.52	0.35
25-Mar-10	3.97	4.02	3.26	3.90	3.94	3.18
01-Apr-10	0.58	0.84	-0.73	-0.15	0.11	-1.46
08-Apr-10	0.95	1.17	-0.05	1.06	1.27	0.06
22-Apr-10[a]	-	-	-	-	-	-
30-Apr-10	**-17.86**	1.30	**-173.68**	**-30.02**	**-10.86**	**-185.84**[b]
10-May-10	-7.88	**-3.90**	-16.84	-7.75	-3.77	-16.70
18-May-10	-3.05	-1.39	-8.27	-2.73	-1.07	-7.96
02-Jun-10	5.76	**8.74**	-7.78	-0.65	2.34	-14.19
14-Jun-10	-2.41	-2.23	-26.60	-3.20	-3.03	-27.39
28-Jun-10	6.16	6.09	-10.46	3.51	3.44	-13.11
15-Jul-10	1.84	1.65	-7.07	1.23	1.04	-7.68
27-Jul-10	**-21.41**	**-6.05**	**-79.23**	**-26.75**	**-11.39**	**-84.57**
12-Aug-10	5.46	**6.00**	0.26	2.91	3.46	-2.28
Mean	-1.89	1.26	-23.32	-4.0	-0.8	-25.4
SD	±8.45	±4.02	±48.13	±10.8	±4.9	±51.3
2011						
24-Mar-11	3.19	3.23	2.88	0.59	0.64	0.28
06-Apr-11	0.73	0.75	0.07	0.90	0.92	0.23
20-Apr-11	0.54	2.13	-1.09	-0.25	1.34	-1.88
05-May-11	**11.44**	**11.87**	**8.73**	**7.51**	**7.94**	**4.80**
19-May-11	3.43	6.18	-6.20	-0.07	2.67	**-9.70**
06-Jun-11	-0.45	0.03	-3.95	0.59	1.07	-2.91
20-Jun-11	1.15	1.70	-5.16	0.00	0.55	-6.30
05-Jul-11	3.37	3.54	1.18	2.11	2.28	-0.08
19-Jul-11	1.05	1.67	-2.74	0.28	0.91	-3.50
03-Aug-11	1.57	2.15	-7.50	0.30	0.87	**-8.78**
17-Aug-11	5.72	5.95	0.51	1.73	1.96	-3.49
Mean	2.89	3.56	-1.21	1.24	1.92	-2.85
SD	±3.33	±3.36	±4.64	±2.20	±2.11	±4.26

[a]No model estimates available for this date

[b]Data not shown in manuscript Fig. 7, as the value exceeds 2SD.

Table S8. Time average (TA) crustacean productivity used to calculate trophic-transfer efficiency for CBA: chitobiase, and the HB03: Hirst and Bunker (2003), HL98: Hirst and Lampitt (1998), and HL92: Huntley and Lopez (1992) models. Average values include only estimates of TTE ≤ 35%, as they can be indicative of a time lag between phytoplankton and zooplankton metabolic processes. Therefore, TTE estimates excluded from the calculation of average TTE are underlined. Note: The Huntley-Lopez growth rate model estimates presented here are not included in the discussion as they produce unrealistically high TTE.

Date	TA primary productivity (g C m^{-2} d^{-1})	TA CBA productivity (g C m^{-2} d^{-1})	TA HB03 productivity (g C m^{-2} d^{-1})	TA HL98 productivity (g C m^{-2} d^{-1})	TA HL92 productivity (g C m^{-2} d^{-1})	TTE CBA (%)	TTE HB03 (%)	TTE HL98 (%)	TTE HL92 (%)
15-Mar-2010	0.18	0.10	0.004	0.006	0.037	*56*	2	3	21
22-Mar-2010	0.35	0.21	0.015	0.013	0.060	*60*	4	4	17
29-Mar-2010	1.43	0.24	0.046	0.031	0.147	17	3	2	10
05-Apr-2010	2.67	0.13	0.054	0.030	0.170	5	2	1	6
15-Apr-2010	1.94	0.36	-	-	-	19	-	-	-
26-Apr-2010	5.02	0.59	-	-	-	12	-	-	-
05-May-2010	5.04	0.32	2.070	0.913	10.309	6	*41*	18	*205*
15-May-2010	0.70	0.02	0.551	0.270	1.260	3	*79*	*39*	*180*
25-May-2010	1.09	0.29	0.455	0.222	1.393	27	*42*	20	*128*
08-Jun-2010	1.56	0.35	0.547	0.389	2.434	22	35	25	*156*
21-Jun-2010	0.96	0.31	0.343	0.337	2.383	32	*36*	35	*248*
07-Jul-2010	0.59	0.33	0.145	0.158	1.421	*56*	25	27	*241*
21-Jul-2010	2.51	0.13	1.431	0.672	4.767	5	*57*	27	*190*
04-Aug-2010	5.71	0.22	1.443	0.648	4.594	4	25	11	*80*
					Average	14	14	16	14
31-Mar-2011	2.44	0.17	0.021	0.017	0.069	7	1	1	3
13-Apr-2011	1.85	0.34	0.153	0.073	0.268	18	8	4	14
28-Apr-2011	1.08	0.91	0.217	0.116	0.434	*84*	20	11	40
12-May-2011	0.81	1.03	0.353	0.194	0.970	*127*	*44*	24	*120*
28-May-2011	5.52	0.43	0.331	0.170	0.988	8	6	3	18
13-Jun-2011	8.51	0.15	0.125	0.074	0.615	2	1	1	7
28-Jun-2011	5.53	0.28	0.099	0.064	0.524	5	2	1	9
12-Jul-2011	6.12	0.31	0.094	0.055	0.393	5	2	1	6
27-Jul-2011	4.65	0.31	0.206	0.146	0.849	7	4	3	18
10-Aug-2011	2.82	0.38	0.194	0.154	0.908	13	7	5	32
					Average	8	6	5	17