

The following supplement accompanies the article

**Effects of diet nutritional quality on the growth and grazing
of *Noctiluca scintillans***

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Supplement.

Table S1. Absolute value of fatty acid contents (pg cell⁻¹) of *Noctiluca scintillans*, and *Thalassiosira weissflogii* (TW), *Platymonas helgolandica* (PLA) and *Prorocentrum dentatum* (PD) that grown under nutrient-replete (f/2), N-depleted (-N) and P-depleted (-P) conditions. The values are averaged from duplicate samples. The symbol of “Σ” indicates the sum. FA, all fatty acids; PUFA, poly-unsaturated fatty acids (2 or more double bonds); ALA+EPA, sum of 18:3ω3 and 20:5ω3.

Fatty acids	TW-f/2	TW-N	TW-P	PLA-f/2	PLA-N	PLA-P	PD-f/2	PD-N	PD-P	NOC
12:0	0.069	0.069	0.065	0.156	0.073	0.120	0.109	0.111		
14:0	2.478	3.212	2.656	0.486	0.219	0.349	0.432	1.660	3.346	1034.188
14:1	0.139		0.128							
15:0	0.135		0.231							
16:0	3.825	7.438	5.157	7.440	4.976	7.094	9.099	33.483	73.791	2525.641
16:1ω7	1.356	4.612	2.751	0.079		0.145	0.044	0.141		
17:0	0.198	0.249	0.230	0.464	0.152	0.356	0.541	0.304		
18:0	2.383	2.108	2.323	5.029	2.691	3.763	4.694	7.696	12.931	1498.291
18:1ω9	0.315	0.405	0.318	1.233	1.479	1.553	0.901	2.872	10.142	605.128
18:2ω6	0.881	0.492	0.662	1.391	0.670	1.566	1.300	9.780	25.537	
18:3ω3 ALA	0.307	0.342	0.248	5.989	2.383	4.185	0.284	0.445	1.885	122.222
20:0	0.111	0.081	0.111	0.156	0.072	0.128	0.297	1.011		
20:1ω9					0.329	0.311	7.066	17.352	43.471	
20:2ω6						0.032		0.036		
20:4ω6				0.264		0.313				
20:5ω3 EPA	3.172	4.525	3.954	0.887	0.852	0.744	0.403	1.099	3.231	522.222
22:0							0.294	1.057		
22:2								0.407		
24:1	0.057	0.072	0.052					0.189		
22:6ω3DHA	0.259	0.557	0.655				5.737	19.837	41.909	2454.701
Σ FA	15.686	24.162	19.541	23.574	13.895	20.660	31.202	97.479	216.243	8762.393
Σ PUFA	4.619	5.916	5.518	8.531	3.905	6.840	7.724	31.604	72.561	3099.145
Σ ALA+EPA	3.479	4.867	4.202	6.875	3.235	4.928	0.687	1.544	5.115	644.444

Table S2. *Noctiluca scintillans* growth rate regression models (hyperbolic) result for 9 food sources (3 algal species × 3 nutrient statuses) using C, N, P and various fatty acid contents (ng ml⁻¹) as variables (n=171). The best-fit model with the highest R^2 is showing in **bold**.

Independent variable	Formula	R^2	p -value
C	$\mu = \frac{0.30 \times (x - 106.10)}{167.64 + (x - 106.10)}$	0.17	< 0.0001
N	$\mu = \frac{0.32 \times (x - 15.77)}{28.51 + (x - 15.77)}$	0.20	< 0.0001
P	$\mu = \frac{\mathbf{0.50} \times (\mathbf{x} + \mathbf{0.60})}{\mathbf{16.93} + (\mathbf{x} + \mathbf{0.60})}$	0.40	< 0.0001
ΣALA+EPA	$\mu = \frac{0.45 \times (x - 0.13)}{26.49 + (x - 0.13)}$	0.32	< 0.0001
ΣPUFA	$\mu = \frac{0.29 \times (x - 6.32)}{7.36 + (x - 6.32)}$	0.15	< 0.0001
ΣFA	$\mu = \frac{0.29 \times (x - 21.41)}{24.75 + (x - 21.41)}$	0.13	< 0.0001

Table S3. *Noctiluca scintillans* growth rate regression models (hyperbolic) result for treatments of *Thalassiosira weissflogii* using C, N, P and various fatty acid contents (ng ml⁻¹) as variables (n=57). The best-fit model with the highest R^2 is showing in **bold**. Em-dashes mean unsuccessful model fitting.

Independent variable	Formula	R^2	p -value
C	$\mu = \frac{0.30 \times (x - 109.77)}{113.78 + (x - 109.77)}$	0.22	0.0012
N	$\mu = \frac{0.34 \times (x - 19.75)}{32.29 + (x - 19.75)}$	0.28	0.0001
P	$\mu = \frac{\mathbf{0.74} \times (\mathbf{x} - \mathbf{1.46})}{\mathbf{25.17} + (\mathbf{x} - \mathbf{1.46})}$	0.67	< 0.0001
ΣALA+EPA	—	—	—
ΣPUFA	—	—	—
ΣFA	—	—	—

Table S4. *Noctiluca scintillans* growth rate regression models (hyperbolic) result for treatments of *Platymonas helgolandica* using C, N, P and various fatty acid contents (ng ml⁻¹) as variables (n=57). The best-fit model with the highest R² is showing in **bold**.

Independent variable	Formula	R ²	p-value
C	$\mu = \frac{0.53 \times (x - 44.98)}{405.72 + (x - 44.98)}$	0.45	< 0.0001
N	$\mu = \frac{0.56 \times (x - 8.55)}{49.30 + (x - 8.55)}$	0.60	< 0.0001
P	$\mu = \frac{\mathbf{0.69 \times (x + 3.06)}}{\mathbf{14.43 + (x + 3.06)}}$	0.74	< 0.0001
ΣALA+EPA	$\mu = \frac{0.58 \times (x - 3.54)}{20.63 + (x - 3.54)}$	0.67	< 0.0001
ΣPUFA	$\mu = \frac{0.57 \times (x - 4.34)}{24.64 + (x - 4.34)}$	0.64	< 0.0001
ΣFA	$\mu = \frac{0.57 \times (x - 13.72)}{76.89 + (x - 13.72)}$	0.64	<0.0001

Table S5. *Noctiluca scintillans* growth rate regression models (hyperbolic) result for treatments of *Prorocentrum dentatum* using C, N, P and various fatty acid contents (ng ml⁻¹) as variables (n=57). The best-fit model with the highest R² is showing in **bold**.

Independent variable	Formula	R ²	p-value
C	$\mu = \frac{0.20 \times (x - 170.22)}{1203 + (x - 170.22)}$	0.29	< 0.0001
N	$\mu = \frac{0.22 \times (x - 41.34)}{174.81 + (x - 41.34)}$	0.41	< 0.0001
P	$\mu = \frac{\mathbf{0.33 \times (x - 5.49)}}{\mathbf{28.52 + (x - 5.49)}}$	0.80	< 0.0001
ΣALA+EPA	$\mu = \frac{0.17 \times (x - 0.64)}{2.60 + (x - 0.64)}$	0.21	0.002
ΣPUFA	$\mu = \frac{0.16 \times (x - 5.91)}{24.46 + (x - 5.91)}$	0.15	0.012
ΣFA	$\mu = \frac{0.17 \times (x - 22.66)}{157.53 + (x - 122.66)}$	0.19	0.003