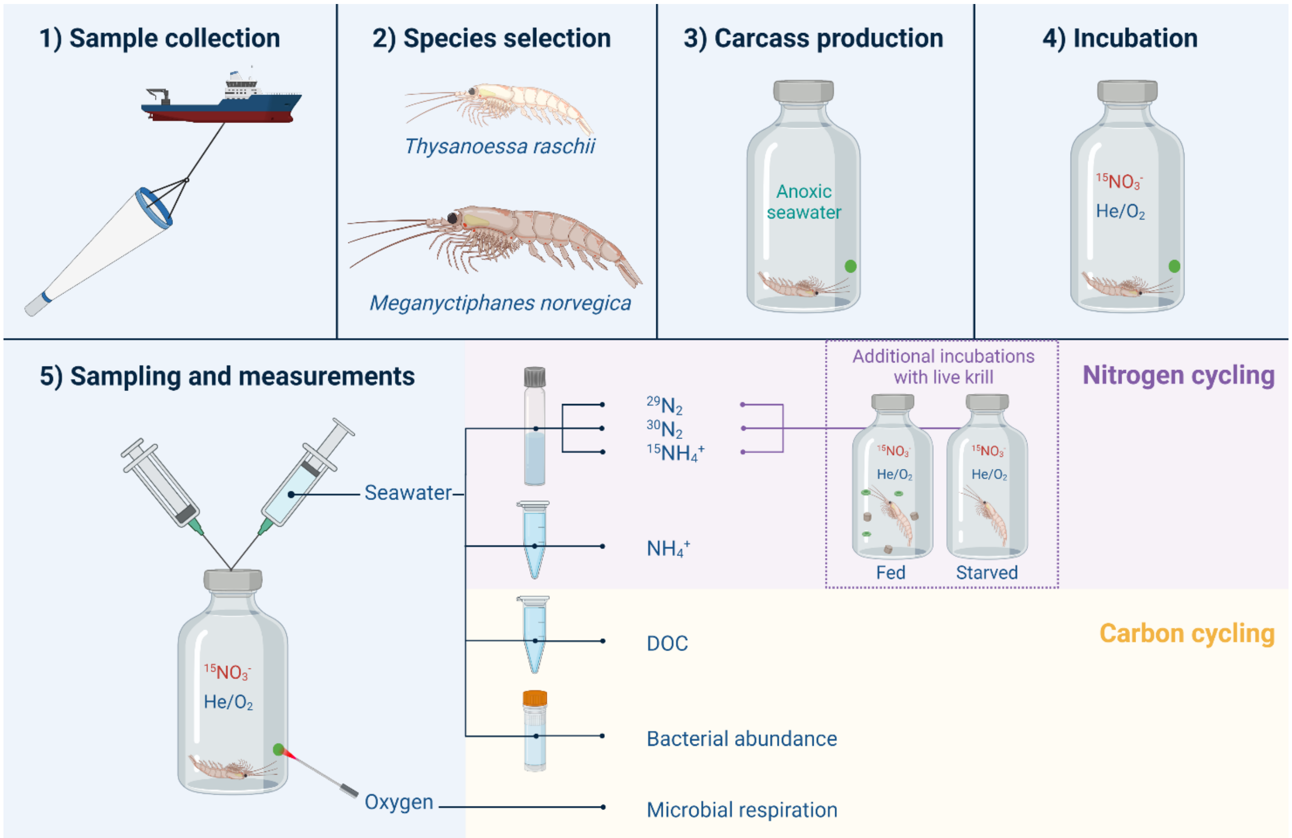
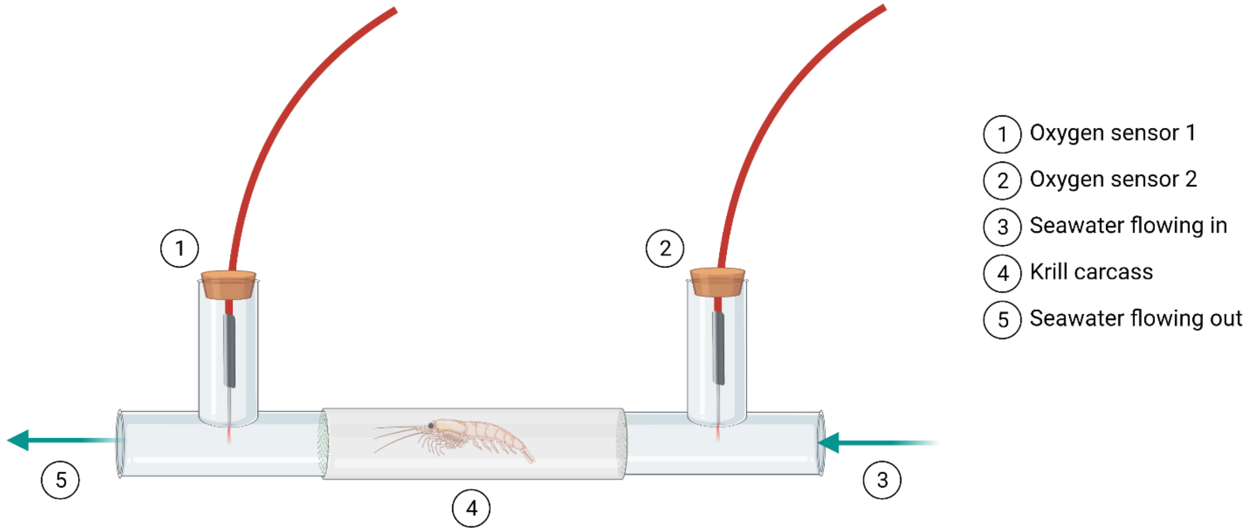
Supplementary Material

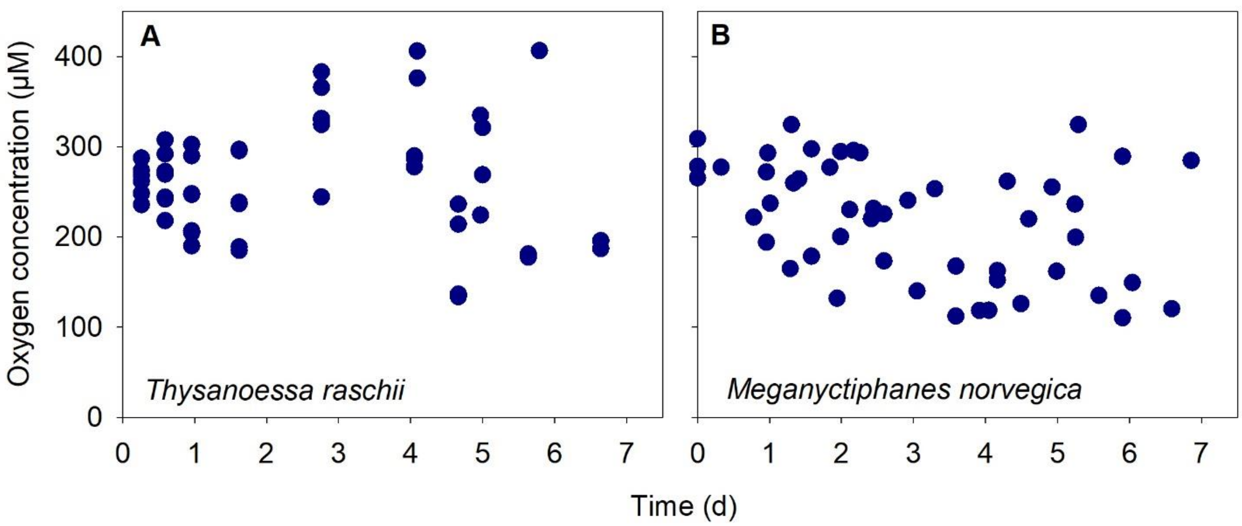
Franco-Cisterna et al.



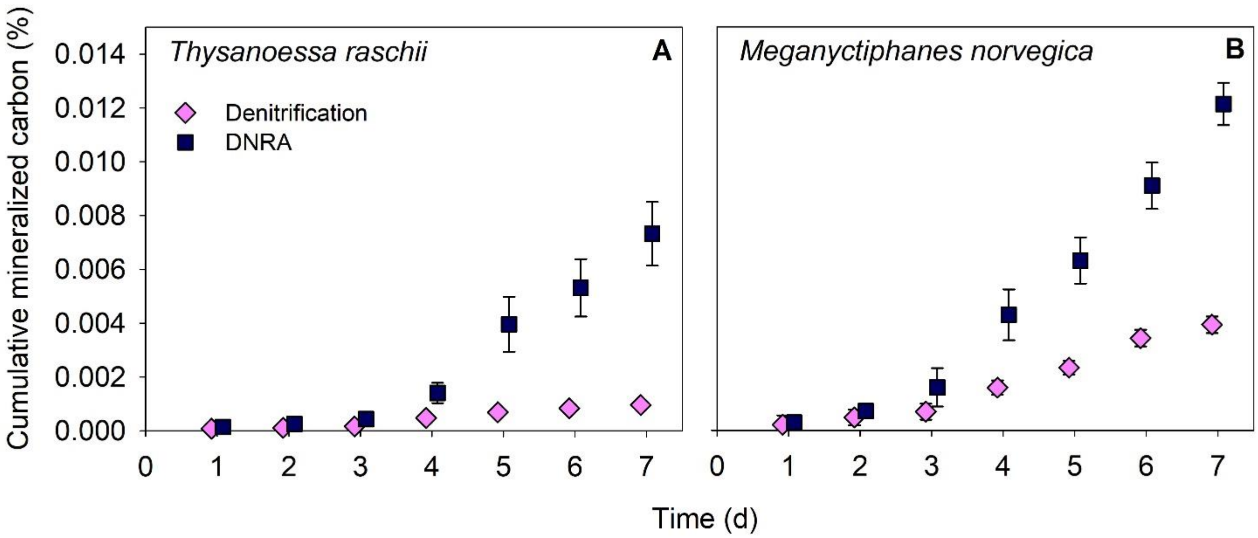
Supplementary Figure 1. Scheme of the experimental workflow to study carbon and nitrogen cycling on the arctic and northern krill. Created with Bio Render.



Supplementary Figure 2. Scheme of the flow-through system to measure aerobic microbial respiration associated with krill carcasses. Created with Bio Render.



Supplementary Figure 3. Oxygen concentration in the incubation bottles with carcasses of **(A)** *Thysanoessa raschii* and **(B)** *Meganyctiphanes norvegica*.



Supplementary Figure 4. Contribution of denitrification and dissimilatory nitrate reduction to ammonium (DNRA) to carbon mineralization of carcasses of **(A)** *Thysanoessa raschii* and **(B)** *Meganyctiphanes norvegica*. Mean and standard deviations of 6-7 replicates are shown.

Supplementary Table 1. Carbon-specific rates of aerobic microbial respiration, denitrification, and dissimilatory nitrate reduction to ammonium (DNRA) in carcasses of *Thysanoessa raschii* and *Meganyctiphanes norvegica*.

Species		**Aerobic respiration rate (d^{-1})**	**Denitrification rate (nmol N mg C^{-1} d^{-1})**	**DNRA rate (nmol N mg C^{-1} d^{-1})**
T. raschii	Maximum	0.008	0.380	1.356
	Minimum	0.000	0.000	0.000
	Average ± SD	0.004 ± 0.003	0.071 ± 0.094	0.248 ± 0.362
M. norvegica	Maximum	0.005	1.697	1.815
	Minimum	0.001	0.000	0.000
	Average ± SD	0.003 ± 0.002	0.263 ± 0.345	0.443 ± 0.506

Supplementary Table 2. Results of the t-test to determine if the rates of denitrification and dissimilatory nitrate reduction to ammonium (DNRA) in incubations with live krill were different from 0 at different time intervals. Rates significantly different from 0 are depicted in bold.

Species	Incubation	Time interval (h)	Statistics DEN	Statistics DNRA
Thysanoessa raschii	Fed	0-4	T= 0.82 p-value= 0.4579	T= 1.78 p-value= 0.1096
		4-8	T= 1.02 p-value= 0.3638	T= 1.28 p-value= 0.2574
		8-12	T= -1.25 p-value= 0.2810	T= -3.01 **p-value= 0.0298**
		12-24	T= -0.72 p-value= 0.5062	T= 1.78 p-value= 0.1356
	Starved	0-4	T= 0.47 p-value= 0.6563	T= -1.96 p-value= 0.1073
		4-8	T= -0.66 p-value= 0.5367	T= 1.03 p-value= 0.3513
		8-12	T= -0.06 p-value= 0.9573	T= 0.78 p-value= 0.4812
		12-24	T= 0.12 p-value= 0.9129	T= -0.82 p-value= 0.4489
Meganyctiphanes norvegica	Fed	0-4	- -	T= 2.98 **p-value= 0.0308**
		4-8	T= -2.32 p-value= 0.0676	T= -1.97 p-value= 0.1060
		8-12	T= -0.91 p-value= 0.4035	T= 0.33 p-value= 0.7531
		12-24	T= 1.78 p-value= 0.1346	T= 3.22 **p-value= 0.0235**
	Starved	0-4	T= 0.55 p-value= 0.6119	T= -1.64 p-value= 0.1611
		4-8	T= -1.64 p-value= 0.1609	T= 3.15 **p-value= 0.0254**
		8-12	T= 2.20 *p*-value= 0.0793	T= -3.01 ***p*-value= 0.0299**
		12-24	T= 0.74 *p*-value= 0.4928	T= 1.84 *p*-value= 0.1249

Supplementary Table 3. Reported denitrification rates in different environments from subarctic and Arctic areas.

Environment	Area	Depth (m)	Denitrification rate (µmol N m^{-2} d^{-1})	Reference
Copepod carcasses	Nuup Kangerlua	–	0.06	Glud et al. 2015
Copepod carcasses	Disko Bay	250	3.8	Stief et al. 2018
Copepod fecal pellets	Disko Bay	250	19.9	Stief et al. 2018
Krill carcasses	Nuup Kangerlua	–	0.01-10	This study
Sediment	Svalbard	115 – 329	160-630	Glud et al. 1998
Sediment	East and West coast Greenland	36 – 100	33-265	Rysgaard et al. 2004
Sediment	Chukchi Sea	87 – 3210	1-425	Chang & Devol 2009
Sediment	Bering Sea	40 – 3500	860	Horak et al. 2013
Sediment	Kangerluarsunnguaq	110	15-600	Sørensen et al. 2015
Sediment	Nuup Kangerlua	–	125	Glud et al. 2015
Sea ice	Franklin Bay	220	0-194	Rysgaard et al. 2008

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