

Supplement 1. Results of three-way analysis of variance for the content of chlorophyll a and c in *Ascophyllum nodosum* thalli in Zavalishin Bay and Korabelnaya Bay (Teriberskaya Bay of the Barents Sea)

Variable	Chlorophyll a				Chlorophyll c			
	<i>df</i>	<i>F</i>	<i>p</i>	η^2 , %	<i>df</i>	<i>F</i>	<i>p</i>	η^2 , %
FDTZ	2	4.09	0.03	23.27	2	6.74	0.00	33.31
Phase of reproduction	1	2.39	0.13	8.14	1	9.33	0.01	25.67
Habitat	1	0.10	0.75	0.38	1	0.36	0.55	1.31
FDTZ * phase of reproduction	2	2.05	0.15	13.20	2	4.74	0.02	26.00
FDTZ * habitat	2	0.66	0.53	4.64	2	0.30	0.75	2.15
Phase of reproduction * habitat	1	0.18	0.67	0.67	1	0.80	0.38	2.88
FDTZ * phase of reproduction * habitat	2	0.96	0.40	6.62	2	0.39	0.68	2.80

Note: FDTZ, functionally differentiated thallus zone; *df*, degrees of freedom; *F*, *F*-test; *p*, *p*-value; η^2 , partial eta squared, a measure of effect size. The values of η^2 for which $p < 0.05$ are highlighted in color.

Supplement 2. Results of three-way analysis of variance for the content of total carotenoids and fucoxanthin in *Ascophyllum nodosum* thalli in Zavalishin Bay and Korabelnaya Bay (Teriberskaya Bay of the Barents Sea)

Variable	Total carotenoids				Fucoxanthin			
	<i>df</i>	<i>F</i>	<i>p</i>	η^2 , %	<i>df</i>	<i>F</i>	<i>p</i>	η^2 , %
FDTZ	2	3.80	0.04	21.95	2	21.99	0.00	61.96
Phase of reproduction	1	0.05	0.82	0.20	1	0.48	0.50	1.73
Habitat	1	2.42	0.13	8.23	1	39.70	0.00	59.52
FDTZ * phase of reproduction	2	0.20	0.82	1.48	2	0.74	0.49	5.18
FDTZ * habitat	2	1.84	0.18	12.01	2	5.49	0.01	28.93
Phase of reproduction * habitat	1	1.34	0.26	4.73	1	3.95	0.06	12.77
FDTZ * phase of reproduction * habitat	2	0.76	0.48	5.33	2	0.46	0.63	3.32

Supplement 3. Results of three-way analysis of variance for the content of total polyphenols in *Ascophyllum nodosum* thalli in Zavalishin Bay and Korabelnaya Bay (Teriberskaya Bay of the Barents Sea)

Variable	Polyphenols			
	<i>df</i>	<i>F</i>	<i>p</i>	η^2 , %
FDTZ	2	2.88	0.07	17.60
Phase of reproduction	1	21.99	0.00	44.89
Habitat	1	142.93	0.00	84.11
FDTZ * phase of reproduction	2	0.10	0.90	0.75
FDTZ * habitat	2	1.06	0.36	7.29
Phase of reproduction * habitat	1	33.42	0.00	55.31
FDTZ * phase of reproduction * habitat	2	5.75	0.01	29.88

Supplement 4. Results of three-way analysis of variance for the content of proteins, lipids, and carbohydrates in *Ascophyllum nodosum* thalli in Zavalishin Bay and Korabelnaya Bay (Teriberskaya Bay of the Barents Sea)

Variable	Proteins				Lipids				Carbohydrates			
	<i>df</i>	<i>F</i>	<i>p</i>	$\eta^2, \%$	<i>df</i>	<i>F</i>	<i>p</i>	$\eta^2, \%$	<i>df</i>	<i>F</i>	<i>p</i>	$\eta^2, \%$
FDTZ	2	18.65	0.00	58.01	2	17.78	0.00	56.84	2	7.82	0.00	36.69
Phase of reproduction	1	37.93	0.00	58.42	1	5.49	0.03	16.90	1	0.22	0.64	0.80
Habitat	1	96.38	0.00	78.12	1	9.34	0.01	25.70	1	9.50	0.00	26.02
FDTZ * phase of reproduction	2	5.45	0.01	28.76	2	10.55	0.00	43.88	2	5.09	0.01	27.40
FDTZ * habitat	2	4.85	0.02	26.44	2	1.03	0.37	7.07	2	1.26	0.30	8.53
Phase of reproduction * habitat	1	28.20	0.00	51.09	1	7.54	0.01	21.83	1	2.42	0.13	8.21
FDTZ * phase of reproduction * habitat	2	1.82	0.18	11.85	2	0.79	0.46	5.52	2	0.46	0.64	3.30