

[10.1071/MF21351](https://doi.org/10.1071/MF21351)

*Marine and Freshwater Research*

### **Supplementary Material**

#### **Establishment and proliferation under climate change: temperate tunicates in south-western Iceland**

*Joana Micael<sup>A,\*</sup>, Pedro Rodrigues<sup>B</sup>, Alfonso A. Ramos-Esplá<sup>C</sup>, and Sindri Gíslason<sup>A</sup>*

<sup>A</sup>Southwest Iceland Nature Research Centre, Garðvegur 1, 245 Suðurnesjabær, Iceland.

<sup>B</sup>Rif Field Station, Aðalbraut 16, 675 Raufarhöfn, Iceland.

<sup>C</sup>Research Marine Centre of Santa Pola (CIMAR), University of Alicante, E-03080 Alicante, Spain.

\*Correspondence to: Joana Micael Southwest Iceland Nature Research Centre, Garðvegur 1, 245 Suðurnesjabær, Iceland. Email: [joana@natturustofa.is](mailto:joana@natturustofa.is)

**Table S1.** Pairwise multiple comparison of *Botryllus schlosseri* oocytes throughout 12 months (Duncan test: MS = 1046.6; d.f = 108.00).

	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
	0.40000	1.9000	1.5000	1.0000	2.6000	7.5000	58.700	57.900	65.100	3.5000	13.000	1.8000
1		0.930505	0.944360	0.967090	0.899274	0.687753	<b>0.000487</b>	<b>0.000546</b>	<b>0.000114</b>	0.859670	0.473268	0.934377
2	0.930505		0.981074	0.957784	0.961605	0.729734	<b>0.000489</b>	<b>0.000521</b>	<b>0.000120</b>	0.918486	0.504034	0.994602
3	0.944360	0.981074		0.972595	0.948416	0.726249	<b>0.000538</b>	<b>0.000593</b>	<b>0.000128</b>	0.907433	0.503874	0.983596
4	0.967090	0.957784	0.972595		0.925885	0.709830	<b>0.000521</b>	<b>0.000577</b>	<b>0.000122</b>	0.885628	0.490507	0.960071
5	0.899274	0.961605	0.948416	0.925885		0.752722	<b>0.000509</b>	<b>0.000537</b>	<b>0.000132</b>	0.950598	0.520103	0.960071
6	0.687753	0.729734	0.726249	0.709830	0.752722		<b>0.001129</b>	<b>0.001075</b>	<b>0.000322</b>	0.782822	0.704708	0.732644
7	<b>0.000487</b>	<b>0.000489</b>	<b>0.000538</b>	<b>0.000521</b>	<b>0.000509</b>	<b>0.001129</b>		0.956100	0.659233	<b>0.000549</b>	<b>0.002947</b>	<b>0.000528</b>
8	<b>0.000546</b>	<b>0.000521</b>	<b>0.000593</b>	<b>0.000577</b>	<b>0.000537</b>	<b>0.001075</b>	0.956100		0.643125	<b>0.000550</b>	<b>0.002577</b>	<b>0.000575</b>
9	<b>0.000114</b>	<b>0.000120</b>	<b>0.000128</b>	<b>0.000122</b>	<b>0.000132</b>	<b>0.000322</b>	0.659233	0.643125		<b>0.000145</b>	<b>0.000925</b>	<b>0.000127</b>
10	0.859670	0.918486	0.907433	0.885628	0.950598	0.782822	<b>0.000549</b>	<b>0.000550</b>	<b>0.000145</b>		0.540753	0.920361
11	0.473268	0.504034	0.503874	0.490507	0.520103	0.704708	<b>0.002947</b>	<b>0.002577</b>	<b>0.000925</b>	0.540753		0.508653
12	0.934377	0.994602	0.983596	0.960071	0.960071	0.732644	<b>0.000528</b>	<b>0.000575</b>	<b>0.000127</b>	0.920361	0.508653	

**Table S2.** Pairwise multiple comparison of *Botryllus schlosseri* larvae throughout 12 months (Duncan test: MS = 615.09; d.f = 108.00).

	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
	0.0000	0.0000	0.0000	0.0000	1.7000	0.0000	8.0000	31.300	73.000	0.0000	1.2000	0.40000
1		1.000000	1.000000	1.000000	0.893452	1.000000	0.530092	<b>0.012641</b>	<b>0.000020</b>	1.000000	0.920248	0.971403
2	1.000000		1.000000	1.000000	0.900719	1.000000	0.559148	<b>0.017757</b>	<b>0.000011</b>	1.000000	0.929397	0.976265
3	1.000000	1.000000		1.000000	0.900103	1.000000	0.554500	<b>0.016920</b>	<b>0.000017</b>	1.000000	0.928871	0.976052
4	1.000000	1.000000	1.000000		0.899365	1.000000	0.549659	<b>0.016004</b>	<b>0.000017</b>	1.000000	0.928239	0.975800
5	0.893452	0.900719	0.900103	0.899365		0.897421	0.571327	<b>0.011968</b>	<b>0.000046</b>	0.898477	0.964225	0.913626
6	1.000000	1.000000	1.000000	1.000000	0.897421		0.538226	<b>0.013884</b>	<b>0.000017</b>	1.000000	0.926651	0.974639
7	0.530092	0.559148	0.554500	0.549659	0.571327	0.538226		<b>0.038071</b>	<b>0.000057</b>	0.544503	0.567989	0.539919
8	<b>0.012641</b>	<b>0.017757</b>	<b>0.016920</b>	<b>0.016004</b>	<b>0.011968</b>	<b>0.013884</b>	<b>0.038071</b>		<b>0.000373</b>	<b>0.014997</b>	<b>0.012937</b>	<b>0.012382</b>
9	<b>0.000020</b>	<b>0.000011</b>	<b>0.000017</b>	<b>0.000017</b>	<b>0.000046</b>	<b>0.000017</b>	<b>0.000057</b>	<b>0.000373</b>		<b>0.000016</b>	<b>0.000029</b>	<b>0.000024</b>
10	1.000000	1.000000	1.000000	1.000000	0.898477	1.000000	0.544503	<b>0.014997</b>	<b>0.000016</b>		0.927488	0.975518
11	0.920248	0.929397	0.928871	0.928239	0.964225	0.926651	0.567989	<b>0.012937</b>	<b>0.000029</b>	0.927488		0.942720
12	0.971403	0.976265	0.976052	0.975800	0.913626	0.974639	0.539919	<b>0.012382</b>	<b>0.000024</b>	0.975518	0.942720	

**Table S3.** Pairwise multiple comparison of *Diplosoma listerianum* oocytes throughout 12 months (Duncan test: MS = 4230.2; d.f = 108.00).

	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
	6.5000	0.0000	0.0000	0.0000	0.0000	0.0000	7.3000	182.90	112.70	241.50	251.20	10.300
1		0.852436	0.850922	0.842693	0.835452	0.823703	0.978209	<b>0.000029</b>	<b>0.000783</b>	<b>0.000024</b>	<b>0.000020</b>	0.903677
2	0.852436		1.000000	1.000000	1.000000	1.000000	0.835949	<b>0.000017</b>	<b>0.000704</b>	<b>0.000017</b>	<b>0.000011</b>	0.771785
3	0.850922	1.000000		1.000000	1.000000	1.000000	0.834527	<b>0.000016</b>	<b>0.000644</b>	<b>0.000017</b>	<b>0.000017</b>	0.770168
4	0.842693	1.000000	1.000000		1.000000	1.000000	0.830038	<b>0.000017</b>	<b>0.000581</b>	<b>0.000016</b>	<b>0.000017</b>	0.766095
5	0.835452	1.000000	1.000000	1.000000		1.000000	0.823376	<b>0.000020</b>	<b>0.000514</b>	<b>0.000017</b>	<b>0.000016</b>	0.759481
6	0.823703	1.000000	1.000000	1.000000	1.000000		0.815510	<b>0.000024</b>	<b>0.000453</b>	<b>0.000020</b>	<b>0.000017</b>	0.752054
7	0.978209	0.835949	0.834527	0.830038	0.823376	0.815510		<b>0.000046</b>	<b>0.000693</b>	<b>0.000029</b>	<b>0.000024</b>	0.918137
8	<b>0.000029</b>	<b>0.000017</b>	<b>0.000016</b>	<b>0.000017</b>	<b>0.000020</b>	<b>0.000024</b>	<b>0.000046</b>		<b>0.017574</b>	<b>0.046508</b>	<b>0.027178</b>	<b>0.000057</b>
9	<b>0.000783</b>	<b>0.000704</b>	<b>0.000644</b>	<b>0.000581</b>	<b>0.000514</b>	<b>0.000453</b>	<b>0.000693</b>	<b>0.017574</b>		<b>0.000088</b>	<b>0.000056</b>	<b>0.000748</b>
10	<b>0.000024</b>	<b>0.000017</b>	<b>0.000017</b>	<b>0.000016</b>	<b>0.000017</b>	<b>0.000020</b>	<b>0.000029</b>	<b>0.046508</b>	<b>0.000088</b>		0.739544	<b>0.000046</b>
11	<b>0.000020</b>	<b>0.000011</b>	<b>0.000017</b>	<b>0.000017</b>	<b>0.000016</b>	<b>0.000017</b>	<b>0.000024</b>	<b>0.027178</b>	<b>0.000056</b>	0.739544		<b>0.000029</b>
12	0.903677	0.771785	0.770168	0.766095	0.759481	0.752054	0.918137	<b>0.000057</b>	<b>0.000748</b>	<b>0.000046</b>	<b>0.000029</b>	

**Table S4.** Pairwise multiple comparison of *Diplosoma listerianum* larvae throughout 12 months (Duncan test: MS = 639.34; d.f = 108.00).

	{1}	{2}	{3}	{4}	{5}	{6}	{7}	{8}	{9}	{10}	{11}	{12}
	5.9000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.8000	15.700	122.70	56.300	2.3000
1		0.669170	0.663371	0.657249	0.650333	0.641048	0.627102	0.866974	0.419041	<b>0.000029</b>	<b>0.000081</b>	0.750950
2	0.669170		1.000000	1.000000	1.000000	1.000000	1.000000	0.572497	0.253857	<b>0.000011</b>	<b>0.000028</b>	0.866722
3	0.663371	1.000000		1.000000	1.000000	1.000000	1.000000	0.567287	0.250045	<b>0.000017</b>	<b>0.000027</b>	0.865555
4	0.657249	1.000000	1.000000		1.000000	1.000000	1.000000	0.562405	0.245413	<b>0.000017</b>	<b>0.000025</b>	0.864170
5	0.650333	1.000000	1.000000	1.000000		1.000000	1.000000	0.556268	0.239739	<b>0.000016</b>	<b>0.000025</b>	0.857085
6	0.641048	1.000000	1.000000	1.000000	1.000000		1.000000	0.548288	0.232638	<b>0.000017</b>	<b>0.000030</b>	0.850086
7	0.627102	1.000000	1.000000	1.000000	1.000000	1.000000		0.537197	0.223495	<b>0.000020</b>	<b>0.000030</b>	0.839315
8	0.866974	0.572497	0.567287	0.562405	0.556268	0.548288	0.537197		0.486409	<b>0.000046</b>	<b>0.000111</b>	0.650701
9	0.419041	0.253857	0.250045	0.245413	0.239739	0.232638	0.223495	0.486409		<b>0.000057</b>	<b>0.000600</b>	0.287091
10	<b>0.000029</b>	<b>0.000011</b>	<b>0.000017</b>	<b>0.000017</b>	<b>0.000016</b>	<b>0.000017</b>	<b>0.000020</b>	<b>0.000046</b>	<b>0.000057</b>		<b>0.000105</b>	<b>0.000024</b>
11	<b>0.000081</b>	<b>0.000028</b>	<b>0.000027</b>	<b>0.000025</b>	<b>0.000025</b>	<b>0.000030</b>	<b>0.000030</b>	<b>0.000111</b>	<b>0.000600</b>	<b>0.000105</b>		<b>0.000041</b>
12	0.750950	0.866722	0.865555	0.864170	0.857085	0.850086	0.839315	0.650701	0.287091	<b>0.000024</b>	<b>0.000041</b>	