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Marine Biology

Host selection and ovipositor length in eight sympatric species of sculpins that deposit their eggs into tunicates or sponges

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<i>Vellitor centropomus</i> -17	<i>Vellitor centropomus</i>	Kitakoura, Sado, Japan	March-13	same sequence as LC424816
<i>Vellitor centropomus</i> -18	<i>Vellitor centropomus</i>	Kitakoura, Sado, Japan	March-13	same sequence as LC424820
<i>Vellitor centropomus</i> -19	<i>Vellitor centropomus</i>	Tassya, Sado, Japan	October-13	same sequence as LC424820
<i>Vellitor centropomus</i> -20	<i>Vellitor centropomus</i>	Tassya, Sado, Japan	October-13	same sequence as LC424820
<i>Vellitor centropomus</i> -21	<i>Vellitor centropomus</i>	Tassya, Sado, Japan	October-13	same sequence as LC424820
<i>Vellitor centropomus</i> -22	<i>Vellitor centropomus</i>	Sado, Japan	November-13	same sequence as LC424820
<i>Vellitor centropomus</i> -23	<i>Vellitor centropomus</i>	Sado, Japan	November-13	LC424819
<i>Vellitor centropomus</i> -24	<i>Vellitor centropomus</i>	Sado, Japan	November-13	same sequence as LC424820
<i>Pseudoblennius zonostigma</i> -3	<i>Pseudoblennius zonostigma</i>	Kitakoura, Sado, Japan	December-12	LC424821
<i>Pseudoblennius zonostigma</i> -4	<i>Pseudoblennius zonostigma</i>	Kitakoura, Sado, Japan	December-12	LC424822
<i>Pseudoblennius zonostigma</i> -7	<i>Pseudoblennius zonostigma</i>	Tassya, Sado, Japan	November-14	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -8	<i>Pseudoblennius zonostigma</i>	Kotoura, Sado, Japan	April-15	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -9	<i>Pseudoblennius zonostigma</i>	Kotoura, Sado, Japan	April-15	same sequence as LC424821
<i>Pseudoblennius zonostigma</i> -12	<i>Pseudoblennius zonostigma</i>	Mushizaki, Sado, Japan	February-16	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -13	<i>Pseudoblennius zonostigma</i>	Mushizaki, Sado, Japan	September-16	same sequence as LC424821
<i>Pseudoblennius zonostigma</i> -15	<i>Pseudoblennius zonostigma</i>	Kotoura, Sado, Japan	October-16	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -16	<i>Pseudoblennius zonostigma</i>	Tassya, Sado, Japan	December-16	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -17	<i>Pseudoblennius zonostigma</i>	Mushizaki, Sado, Japan	December-16	same sequence as LC424822
<i>Pseudoblennius zonostigma</i> -18	<i>Pseudoblennius zonostigma</i>	Mushizaki, Sado, Japan	December-16	same sequence as LC424822
<i>Furcina osimae</i> -16	<i>Furcina osimae</i>	Tassya, Sado, Japan	July-13	LC424823
<i>Furcina osimae</i> -19	<i>Furcina osimae</i>	Tassya, Sado, Japan	August-13	LC424824
<i>Furcina osimae</i> -20	<i>Furcina osimae</i>	Tassya, Sado, Japan	August-13	same sequence as LC424823
<i>Furcina osimae</i> -27	<i>Furcina osimae</i>	Tassya, Sado, Japan	November-13	same sequence as LC424823
<i>Furcina osimae</i> -37	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -38	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -39	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -43	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -44	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -45	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -47	<i>Furcina osimae</i>	Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -48	<i>Furcina osimae</i>	Mushizaki, Sado, Japan	January-14	same sequence as LC424824
<i>Furcina osimae</i> -48	<i>Furcina osimae</i>	Mushizaki, Sado, Japan	January-14	same sequence as LC424824
<i>Furcina osimae</i> -49	<i>Furcina osimae</i>	Tassya, Sado, Japan	December-13	same sequence as LC424823
<i>Furcina osimae</i> -50	<i>Furcina osimae</i>	Tassya, Sado, Japan	January-15	same sequence as LC424823
<i>Furcina osimae</i> -51	<i>Furcina osimae</i>	Tassya, Sado, Japan	January-15	same sequence as LC424824
<i>Furcina osimae</i> -52	<i>Furcina osimae</i>	Tassya, Sado, Japan	January-15	same sequence as LC424823
<i>Furcina osimae</i> -57	<i>Furcina osimae</i>	Tassya, Sado, Japan	November-15	same sequence as LC424823
<i>Furcina osimae</i> -58	<i>Furcina osimae</i>	Tassya, Sado, Japan	November-15	same sequence as LC424823
<i>Furcina osimae</i> -62	<i>Furcina osimae</i>	Kotoura, Sado, Japan	October-16	same sequence as LC424823
<i>Furcina ishikawae</i> -1	<i>Furcina ishikawae</i>	Kotoura, Sado, Japan	November-12	LC424825
<i>Furcina ishikawae</i> -2	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424825
<i>Furcina ishikawae</i> -3	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424825
<i>Furcina ishikawae</i> -5	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424826
<i>Furcina ishikawae</i> -6	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424827
<i>Furcina ishikawae</i> -7	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424825
<i>Furcina ishikawae</i> -8	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424825
<i>Furcina ishikawae</i> -9	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424828
<i>Furcina ishikawae</i> -10	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424829
<i>Furcina ishikawae</i> -11	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424830
<i>Furcina ishikawae</i> -12	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424826
<i>Furcina ishikawae</i> -13	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	same sequence as LC424826
<i>Furcina ishikawae</i> -14	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	November-12	LC424831
<i>Furcina ishikawae</i> -15	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	December-12	LC424832
<i>Furcina ishikawae</i> -16	<i>Furcina ishikawae</i>	Kitakoura, Sado, Japan	December-12	same sequence as LC424826
<i>Furcina ishikawae</i> -33	<i>Furcina ishikawae</i>	Kotoura, Sado, Japan	December-15	same sequence as LC424826
<i>Jordania zonope</i> -4	<i>Jordania zonope</i>	Ucluelet, BC, Canada	February-17	LC424833
<i>Jordania zonope</i> -6	<i>Jordania zonope</i>	Ucluelet, BC, Canada	February-17	same sequence as LC424833

Table S2 Results of genetic identification of parental species of egg masses deposited in colonial tunicates and sponges. Sampling date, locality, depth, water temperature (WT), number of eggs in hosts, number of hatched larvae, the average egg diameter, egg (yolk) coloration and number of young analyzed for genetic species identification are shown. *ND*, no data.

No	Egg mass ID	Fish species	Host ID	Host animal	Host species	Date	Locality	Depth (m)	WT (°C)	Number of eggs	Number of hatched larva	Average egg	Egg (yolk) coloration	Number of analyzed young
												Diameter (mm)		
1	SPE-001	<i>Vellitor centropomus</i>	SP-0001	Colonial tunicate	Didemnidae sp.	02-Apr-12	Kotoura	7.0-9.0	9.2		15	1.4 (N = 10)	Orange	2
2	SPE-002	<i>Vellitor centropomus</i>	SP-0001	Colonial tunicate	Didemnidae sp.	02-Apr-12	Kotoura	7.0-9.0	9.2		124	1.4 (10)	Orange, yellow, clear	3
3	SPE-003	<i>Vellitor centropomus</i>	SP-0001	Colonial tunicate	Didemnidae sp.	02-Apr-12	Kotoura	7.0-9.0	9.2	138	57	1.4 (10)	Orange	3
4	SPE-004	<i>Vellitor centropomus</i>	SP-0002	Colonial tunicate	Didemnidae sp.	02-Apr-12	Kotoura	7.0-9.0	9.2		11	1.3 (10)	Yellow	2
5	SPE-006	<i>Vellitor centropomus</i>	SP-0007	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	29	16	1.4 (10)	Yellow	3
6	SPE-008	<i>Vellitor centropomus</i>	SP-0014	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	121	2	1.4 (10)	Yellow	2
7	SPE-011	<i>Vellitor centropomus</i>	SP-0014	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	95	1	1.4 (10)	Orange	1
8	SPE-014	<i>Vellitor centropomus</i>	SP-0025	Colonial tunicate	Didemnidae sp.	02-May-12	Kotoura	6.0-9.0	13.6	54	1	ND	Yellow	1
9	SPE-015	<i>Vellitor centropomus</i>	SP-0027	Sponge	Demospongiae sp.	05-May-12	Kotoura	4.0-7.0	9.7	6	1	1.3 (6)	Yellow	2
10	SPE-016	<i>Vellitor centropomus</i>	SP-0031	Colonial tunicate	Didemnidae sp.	05-May-12	Kotoura	4.0-7.0	9.7	25	0	1.4 (10)	Yellow	1
11	SPE-017	<i>Vellitor centropomus</i>	SP-0031	Colonial tunicate	Didemnidae sp.	05-May-12	Kotoura	4.0-7.0	9.7	33	31	1.3 (10)	Yellow	2
12	SPE-018	<i>Vellitor centropomus</i>	SP-0032	Sponge	Demospongiae sp.	05-May-12	Kotoura	4.0-7.0	9.7	8	8	1.3 (5)	Yellow	2
13	SPE-020	<i>Vellitor centropomus</i>	SP-0034	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	85	85	1.3 (10)	Yellow	3
14	SPE-021	<i>Vellitor centropomus</i>	SP-0035	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	82	82	1.3 (8)	Yellow	3
15	SPE-022	<i>Vellitor centropomus</i>	SP-0036	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	29	21	1.3 (9)	Yellow	3
16	SPE-023A	<i>Vellitor centropomus</i>	SP-0037	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	40	1	1.3 (10)	Yellow	3
17	SPE-023B	<i>Vellitor centropomus</i>	SP-0037	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	63	47	1.3 (10)	Yellow	3
18	SPE-024	<i>Vellitor centropomus</i>	SP-0038	Colonial tunicate	Didemnidae sp.	20-Mar-13	Kotoura	6.0-8.0	10.4	79	69	1.2 (10)	Yellow	3
19	SPE-026	<i>Vellitor centropomus</i>	SP-0040	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	68	29	1.4 (10)	Yellow	2
20	SPE-027A	<i>Vellitor centropomus</i>	SP-0041	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	66	66	1.4 (10)	Yellow	2
21	SPE-027B	<i>Vellitor centropomus</i>	SP-0041	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	46	46	1.3 (10)	Yellow	2
22	SPE-029	<i>Vellitor centropomus</i>	SP-0043	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	19	19	1.3 (10)	Yellow	2
23	SPE-030	<i>Vellitor centropomus</i>	SP-0044	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	33	33	1.3 (10)	Yellow	3
24	SPE-031	<i>Vellitor centropomus</i>	SP-0045	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	49	42	1.4 (10)	Yellow	2
25	SPE-032A	<i>Vellitor centropomus</i>	SP-0046	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	31	23	1.3 (10)	Yellow	3
26	SPE-032B	<i>Vellitor centropomus</i>	SP-0046	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8	53	12	1.3 (10)	Yellow	2
27	SPE-034	<i>Vellitor centropomus</i>	SP-0048	Sponge	Demospongiae sp.	06-Mar-14	Kitakoura	2.0	8.8	21	5	ND	Yellow	2
28	SPE-035	<i>Vellitor centropomus</i>	SP-0049	Colonial tunicate	Didemnidae sp.	13-Apr-14	Kitakoura	2.0	9.9	2	2	1.5 (2)	Yellow	1
29	SPE-037	<i>Vellitor centropomus</i>	SP-0051	Sponge	Demospongiae sp.	11-Mar-16	Kotoura	6.0	10.7	7	2	1.4 (7)	Yellowish orange	2
30	SPE-039	<i>Vellitor centropomus</i>	SP-0053	Colonial tunicate	Didemnidae sp.	11-Mar-16	Kotoura	6.0	10.7	2	2	1.5 (2)	Yellowish orange	2
31	SPE-019	<i>Pseudoblennius marmoratus</i>	SP-0033	Sponge	Demospongiae sp.	05-May-12	Kotoura	4.0-7.0	9.7	10	10	1.6 (10)	Orange	3
32	SPE-025	<i>Pseudoblennius marmoratus</i>	SP-0039	Sponge	Demospongiae sp.	24-Mar-13	Kitakoura	9.0	9.8	33	33	1.6 (10)	Orange	3
33	SPE-033	<i>Pseudoblennius marmoratus</i>	SP-0047	Sponge	Demospongiae sp.	11-Feb-14	Kitakoura	1.0	10.2	16	6	1.5 (7)	Orange	1
34	SPE-038	<i>Pseudoblennius marmoratus</i>	SP-0052	Sponge	Demospongiae sp.	11-Mar-16	Kotoura	2.0	10.7	14	1	1.6 (7)	Orange	1
35	SPE-005	Not identified	SP-0002	Colonial tunicate	Didemnidae sp.	02-Apr-12	Kotoura	7.0-9.0	9.2		0	1.4 (10)	Yellow	0
36	SPE-007	Not identified	SP-0008	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	29	0	1.4 (10)	Orange	0
37	SPE-009	Not identified	SP-0014	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	89	0	1.4 (10)	Yellow	0
38	SPE-010	Not identified	SP-0014	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	196	0	1.4 (10)	Yellow	0
39	SPE-012	Not identified	SP-0014	Colonial tunicate	Didemnidae sp.	15-Apr-12	Kotoura	8.0-12.0	9.4	44	0	1.5 (10)	Yellow	0
40	SPE-013	Not identified	SP-0024	Colonial tunicate	Didemnidae sp.	02-May-12	Kotoura	6.0-9.0	13.6	109	0	ND	Yellow	0
41	SPE-028	Not identified	SP-0042	Colonial tunicate	Didemnidae sp.	26-Apr-13	Kotoura	8.0-11.0	10.8			Lost		0
42	SPE-036	Not identified	SP-0050	Sponge	Demospongiae sp.	11-Mar-16	Kotoura	6.0	10.7	29	0	1.4 (10)	Yellowish orange	0

Table S3 Results of genetic identification of parental species of egg masses deposited in solitary tunicates. Sampling date, locality, depth, water temperature (WT), number of eggs in hosts, number of hatched larvae, the average egg diameter, egg (yolk) coloration and number of young analyzed for genetic species identification are shown. *ND*, no data.

No	Egg mass ID	Fish species	Host ID	Host animal	Host species	Date	Locality	Depth (m)	WT (°C)	Number of eggs	Number of hatched larva	Average egg	Egg (yolk) coloration	Number of analyzed young
												Diameter (mm)		
1	STE-004	<i>Pseudoblennius cottoides</i>	ST-0021	Solitary tunicate	<i>Halocynthia ritteri</i>	22-Dec-12	Kitakoura	8.0-18.0	13.9	200	195	1.8 (10)	Yellowish orange	3
2	STE-005	<i>Pseudoblennius cottoides</i>	ST-0050	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-12	Kitakoura	3.0-7.0	13.3	90	86	1.9 (10)	Orange	1
3	STE-006	<i>Pseudoblennius cottoides</i>	ST-0078	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-12	Kitakoura	3.0-7.0	13.3	93	83	1.9 (10)	Yellow	2
4	STE-007	<i>Pseudoblennius cottoides</i>	ST-0078	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-12	Kitakoura	3.0-7.0	13.3	185	176	1.9 (10)	Orange	2
5	STE-008	<i>Pseudoblennius cottoides</i>	ST-0078	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-12	Kitakoura	3.0-7.0	13.3	150	143	1.9 (10)	Yellow	3
6	STE-015	<i>Pseudoblennius cottoides</i>	ST-0156	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	210	208	1.9 (10)	Orange	1
7	STE-018	<i>Pseudoblennius cottoides</i>	ST-0180	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	66	68	1.8 (10)	Yellow	1
8	STE-021	<i>Pseudoblennius cottoides</i>	ST-0191	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	318	257	1.9 (10)	Yellow	2
9	STE-022	<i>Pseudoblennius cottoides</i>	ST-0198	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	161	124	1.9 (10)	Yellow	2
10	STE-025	<i>Pseudoblennius cottoides</i>	ST-0262	Solitary tunicate	<i>Halocynthia ritteri</i>	26-Dec-13	Mushizaki	8.0-17.8	14.3	74	56	1.8 (10)	Yellow	1
11	STE-026	<i>Pseudoblennius cottoides</i>	ST-0270	Solitary tunicate	<i>Halocynthia ritteri</i>	26-Dec-13	Mushizaki	8.0-17.8	14.3	97	91	1.8 (10)	Yellow	3
12	STE-028	<i>Pseudoblennius cottoides</i>	ST-0301	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-4.0	13.3	92	42	1.9 (10)	Yellowish orange	1
13	STE-032	<i>Pseudoblennius cottoides</i>	ST-0375	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1		247	1.9 (10)	Yellow	2
14	STE-034	<i>Pseudoblennius cottoides</i>	ST-0381	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1		224	1.8 (10)	Yellowish orange	1
15	STE-035	<i>Pseudoblennius cottoides</i>	ST-0391	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	255	115	1.8 (10)	Yellowish orange	2
16	STE-036	<i>Pseudoblennius cottoides</i>	ST-0397	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	256	35	1.8 (10)	Yellow	2
17	STE-038	<i>Pseudoblennius cottoides</i>	ST-0431	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	164		1.9 (10)	Yellow	2
18	STE-040	<i>Pseudoblennius cottoides</i>	ST-0485	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	122	109	1.8 (10)	Orange	2
19	STE-042	<i>Pseudoblennius cottoides</i>	ST-0545b	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	440	434	1.8 (10)	Yellow	2
20	STE-043	<i>Pseudoblennius cottoides</i>	ST-0566	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	400	344	1.9 (10)	Yellow	2
21	STE-050	<i>Pseudoblennius cottoides</i>	ST-0631	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	240	213	1.9 (10)	Orange	2
22	STE-051A	<i>Pseudoblennius cottoides</i>	ST-0635	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	179	179	1.8 (6)	Yellow	2
23	STE-051B	<i>Pseudoblennius cottoides</i>	ST-0635	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	250	178	1.9 (10)	Orange	1
24	STE-052	<i>Pseudoblennius cottoides</i>	ST-0636	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	170	162	1.8 (10)	Yellowish orange	2
25	STE-053	<i>Pseudoblennius cottoides</i>	ST-0641	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	170	202	1.9 (10)	Orange	1
26	STE-054	<i>Pseudoblennius cottoides</i>	ST-0644	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	361	354	2.0 (10)	Orange	1
27	STE-055	<i>Pseudoblennius cottoides</i>	ST-0649	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	196	145	1.9 (10)	Orange	1
28	STE-056	<i>Pseudoblennius cottoides</i>	ST-0650	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	146	146	1.9 (10)	Yellow	2
29	STE-057	<i>Pseudoblennius cottoides</i>	ST-0654	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	85	85	1.8 (3)	Yellow	2
30	STE-058	<i>Pseudoblennius cottoides</i>	ST-0655	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	172	112	1.9 (10)	Yellowish orange	2
31	STE-059	<i>Pseudoblennius cottoides</i>	ST-0658	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	269	267	1.9 (10)	Yellowish orange	2
32	STE-063	<i>Pseudoblennius cottoides</i>	ST-0744	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	323	278	1.8 (10)	Orange	1
33	STE-064	<i>Pseudoblennius cottoides</i>	ST-0751	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	390	353	1.9 (10)	Yellowish orange	1
34	STE-065	<i>Pseudoblennius cottoides</i>	ST-0754	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	291	291	1.9 (10)	Yellow	2
35	STE-066	<i>Pseudoblennius cottoides</i>	ST-0755	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	292	158	1.9 (10)	Reddish orange	2
36	STE-067A	<i>Pseudoblennius cottoides</i>	ST-0757	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	360	7	1.9 (10)	Yellowish orange	1
37	STE-067B	<i>Pseudoblennius cottoides</i>	ST-0757	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	300	300	2.0 (10)	Yellow	1
38	STE-071	<i>Pseudoblennius cottoides</i>	ST-0824	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	311	297	1.9 (10)	Orange	1
39	STE-072	<i>Pseudoblennius cottoides</i>	ST-0856	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	371	316	2.0 (10)	Orange	2
40	STE-073	<i>Pseudoblennius cottoides</i>	ST-0857	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	300	286	1.8 (10)	Orange	1
41	STE-074	<i>Pseudoblennius cottoides</i>	ST-0869	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	380	339	1.8 (10)	Orange	1
42	STE-075	<i>Pseudoblennius cottoides</i>	ST-0873	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	260	184	1.8 (10)	Yellowish orange	1
43	STE-076	<i>Pseudoblennius cottoides</i>	ST-0884	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	400	384	1.9 (10)	Yellowish orange	1
44	STE-077	<i>Pseudoblennius cottoides</i>	ST-0887	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	157	138	1.9 (10)	Orange	1
45	STE-080	<i>Pseudoblennius cottoides</i>	ST-0918	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	293	379	1.9 (10)	Orange	2
46	STE-081	<i>Pseudoblennius cottoides</i>	ST-0922	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	312	314	2.0 (10)	Yellowish orange	2
47	STE-082	<i>Pseudoblennius cottoides</i>	ST-0923	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	344	313	1.9 (10)	Yellowish orange	1
48	STE-083A	<i>Pseudoblennius cottoides</i>	ST-0924	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	430	425	1.8 (10)	Yellowish orange	3

49	STE-083B	<i>Pseudoblennius cottoides</i>	ST-0924	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	310	303	1.8 (10)	Orange	1
50	STE-086	<i>Pseudoblennius cottoides</i>	ST-0940	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	400	316	1.9 (10)	Orange	1
51	STE-088	<i>Pseudoblennius cottoides</i>	ST-0944	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	300	240	1.9 (10)	Yellowish orange	2
52	STE-090	<i>Pseudoblennius cottoides</i>	ST-0986	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	206	176	2.0 (10)	Orange	1
53	STE-003	<i>Pseudoblennius zonostigma</i>	ST-0021	Solitary tunicate	<i>Halocynthia ritteri</i>	22-Dec-12	Kitakoura	8.0-18.0	13.9	338	203	1.8 (10)	Orange	2
54	STE-009A	<i>Pseudoblennius zonostigma</i>	ST-0079	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-12	Kitakoura	3.0-7.0	13.3	37	27	2.0 (10)	Orange	3
55	STE-009B	<i>Pseudoblennius zonostigma</i>	ST-0079	Solitary tunicate	<i>Halocynthia ritteri</i>	26-Dec-12	Kitakoura	3.0-7.0	13.3	7	6	1.9 (6)	Orange	2
56	STE-011	<i>Pseudoblennius zonostigma</i>	ST-0120	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	290	222	1.8 (10)	Yellow	1
57	STE-014	<i>Pseudoblennius zonostigma</i>	ST-0149	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	163	135	1.7 (10)	Yellowish orange	2
58	STE-016A	<i>Pseudoblennius zonostigma</i>	ST-0172	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	57		1.7 (10)	Orange	1
59	STE-016B	<i>Pseudoblennius zonostigma</i>	ST-0172	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	83	81	1.8 (10)	Yellow	2
60	STE-017	<i>Pseudoblennius zonostigma</i>	ST-0178	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	106	84	1.8 (10)	Orange	1
61	STE-019	<i>Pseudoblennius zonostigma</i>	ST-0185	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	136	137	1.7 (10)	Orange	1
62	STE-020	<i>Pseudoblennius zonostigma</i>	ST-0190	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	52	28	1.8 (10)	Orange	1
63	STE-027	<i>Pseudoblennius zonostigma</i>	ST-0273	Solitary tunicate	<i>Halocynthia ritteri</i>	26-Dec-13	Mushizaki	8.0-17.8	14.3	229	156	1.8 (10)	Yellowish orange	1
64	STE-030	<i>Pseudoblennius zonostigma</i>	ST-0331	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	139	158	1.8 (10)	Orange	1
65	STE-049	<i>Pseudoblennius zonostigma</i>	ST-0623	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-4.0	10.2	140	128	1.8 (7)	Yellowish orange	2
66	STE-002	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0000B	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Dec-11	Tassha	3.0	15.5	450	443	1.9 (10)	Yellow	3
67	STE-010	<i>Pseudoblennius</i> sp. "Kirin-anahaze"		Solitary tunicate	<i>Halocynthia ritteri</i>						525	ND		3
68	STE-013	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0134	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	702	690	1.9 (10)	Yellow	3
69	STE-024	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0259	Solitary tunicate	<i>Halocynthia roretzi</i>	26-Dec-13	Mushizaki	8.0-17.8	14.3	655	214	2.0 (10)	Yellow	3
70	STE-029	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0317	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-4.0	13.3	395	144	2.0 (10)	Yellow	2
71	STE-033	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0379	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	1200	642	2.0 (10)	Yellow	2
72	STE-037	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0399	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	870	15	2.0 (10)	Yellow	2
73	STE-044	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0567	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	1000	913	2.0 (10)	Yellow	2
74	STE-046	<i>Pseudoblennius</i> sp. "Kirin-anahaze"	ST-0576	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	680	624	2.0 (10)	Yellow	2
75	STE-023	<i>Pseudoblennius percoides</i>	ST-0222	Solitary tunicate	<i>Pyura saciformis</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	147	125	1.9 (10)	Yellowish green	2
76	STE-031	<i>Pseudoblennius percoides</i>	ST-0369	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	37	23	1.9 (10)	Yellow	1
77	STE-045	<i>Pseudoblennius percoides</i>	ST-0574	Solitary tunicate	<i>Halocynthia roretzi</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	121	121	1.8 (10)	Yellowish orange	2
78	STE-047	<i>Pseudoblennius percoides</i>	ST-0588	Solitary tunicate	<i>Halocynthia ritteri</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	161	106	1.9 (10)	Orange	2
79	STE-060	<i>Pseudoblennius percoides</i>	ST-0728	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	89		1.9 (10)	Yellow	2
80	STE-062	<i>Pseudoblennius percoides</i>	ST-0735	Solitary tunicate	<i>Pyura saciformis</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8		107	1.9 (10)	Yellowish green	2
81	STE-068	<i>Pseudoblennius percoides</i>	ST-0773	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	140	140	2.0 (10)	Yellowish green	2
82	STE-078	<i>Pseudoblennius percoides</i>	ST-0910	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8	80	80	2.0 (10)	Yellowish green	1
83	STE-048	<i>Furcina osimae</i>	ST-0612	Solitary tunicate	<i>Pyura saciformis</i>	11-Feb-14	Kitakoura	0.5-3.9	10.2	73	72	1.6 (10)	Reddish orange	2
84	STE-069	<i>Furcina osimae</i>	ST-0786	Solitary tunicate	<i>Pyura saciformis</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	75	75	1.6 (10)	Red	2
85	STE-070	<i>Furcina osimae</i>	ST-0794	Solitary tunicate	<i>Pyura saciformis</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	83	83	1.7 (10)	Red	2
86	STE-001	<i>Furcina ishikawae</i>	ST-0000A	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Dec-11	Tassha	2.0	15.5	35	31	ND	Reddish orange	2
87	STE-012	Not identified	ST-0130	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.9	13.3	26	0	Dead	White (dead)	0
88	STE-039	Not identified	ST-0435	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	250	0	Dead	White (dead)	0
89	STE-041	Not identified	ST-0491	Solitary tunicate	<i>Halocynthia ritteri</i>	25-Dec-13	Kitakoura	0.5-3.0	14.1	300	0	Dead	White (dead)	0
90	STE-061	<i>Aulichthys japonicas</i>	ST-0731	Solitary tunicate	<i>Halocynthia ritteri</i>	06-Mar-14	Kitakoura	0.5-3.9	8.8	58	48	2.6 (10)	Orange	-
91	STE-079	<i>Aulichthys japonicas</i>	ST-0863	Solitary tunicate	<i>Halocynthia roretzi</i>	06-Mar-14	Kitakoura	0.5-4.0	8.8		208	ND	Orange	-
92	STE-084	<i>Aulichthys japonicas</i>	ST-0938	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	64	69	2.5 (10)	Orange	-
93	STE-085	<i>Aulichthys japonicas</i>	ST-0939	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	110	81	2.6 (10)	Orange	-
94	STE-087	<i>Aulichthys japonicas</i>	ST-0943	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	95	133	2.6 (10)	Orange	-
95	STE-089A	<i>Aulichthys japonicas</i>	ST-0948	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	38	46	2.6 (10)	Reddish orange	-
96	STE-089B	<i>Aulichthys japonicas</i>	ST-0948	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	59	56	2.6 (10)	Orange	-
97	STE-091	<i>Aulichthys japonicas</i>	ST-0987	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	61	49	2.7 (10)	Orange	-
98	STE-092	<i>Aulichthys japonicas</i>	ST-0991	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	94	106	2.7 (10)	Reddish orange	-
99	STE-093	<i>Aulichthys japonicas</i>	ST-0992	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-3.9	9.9	72	73	2.6 (10)	Orange	-
100	STE-094	<i>Aulichthys japonicas</i>	ST-1021	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	71	75	2.6 (10)	Orange	-
101	STE-095	<i>Aulichthys japonicas</i>	ST-1043	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	70	0	2.6 (10)	Orange	-
102	STE-096	<i>Aulichthys japonicas</i>	ST-1051	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	72	0	2.7 (10)	Orange	-
103	STE-097A	<i>Aulichthys japonicas</i>	ST-1086	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	59	63	2.8 (10)	Orange	-
104	STE-097B	<i>Aulichthys japonicas</i>	ST-1086	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	55	27	2.8 (10)	Reddish orange	-
105	STE-097C	<i>Aulichthys japonicas</i>	ST-1086	Solitary tunicate	<i>Pyura saciformis</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	68	54	2.8 (10)	Orange	-
106	STE-098	<i>Aulichthys japonicas</i>	ST-1087	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	62	0	2.8 (10)	Orange	-
107	STE-099	<i>Aulichthys japonicas</i>	ST-1091	Solitary tunicate	<i>Halocynthia ritteri</i>	13-Apr-14	Kitakoura	0.5-4.0	9.9	59	33	2.7 (10)	Orange	-
108	STE-100	<i>Aulichthys japonicas</i>	ST-1126	Solitary tunicate	<i>Halocynthia ritteri</i>	25-May-14	Kitakoura	0.5-3.9	14.4	60	0	2.3 (6)	Reddish orange	-
109	STE-101	<i>Aulichthys japonicas</i>	ST-1144	Solitary tunicate	<i>Pyura saciformis</i>	25-May-14	Kitakoura	0.5-3.9	14.4	59	0	2.3 (7)	Orange	-

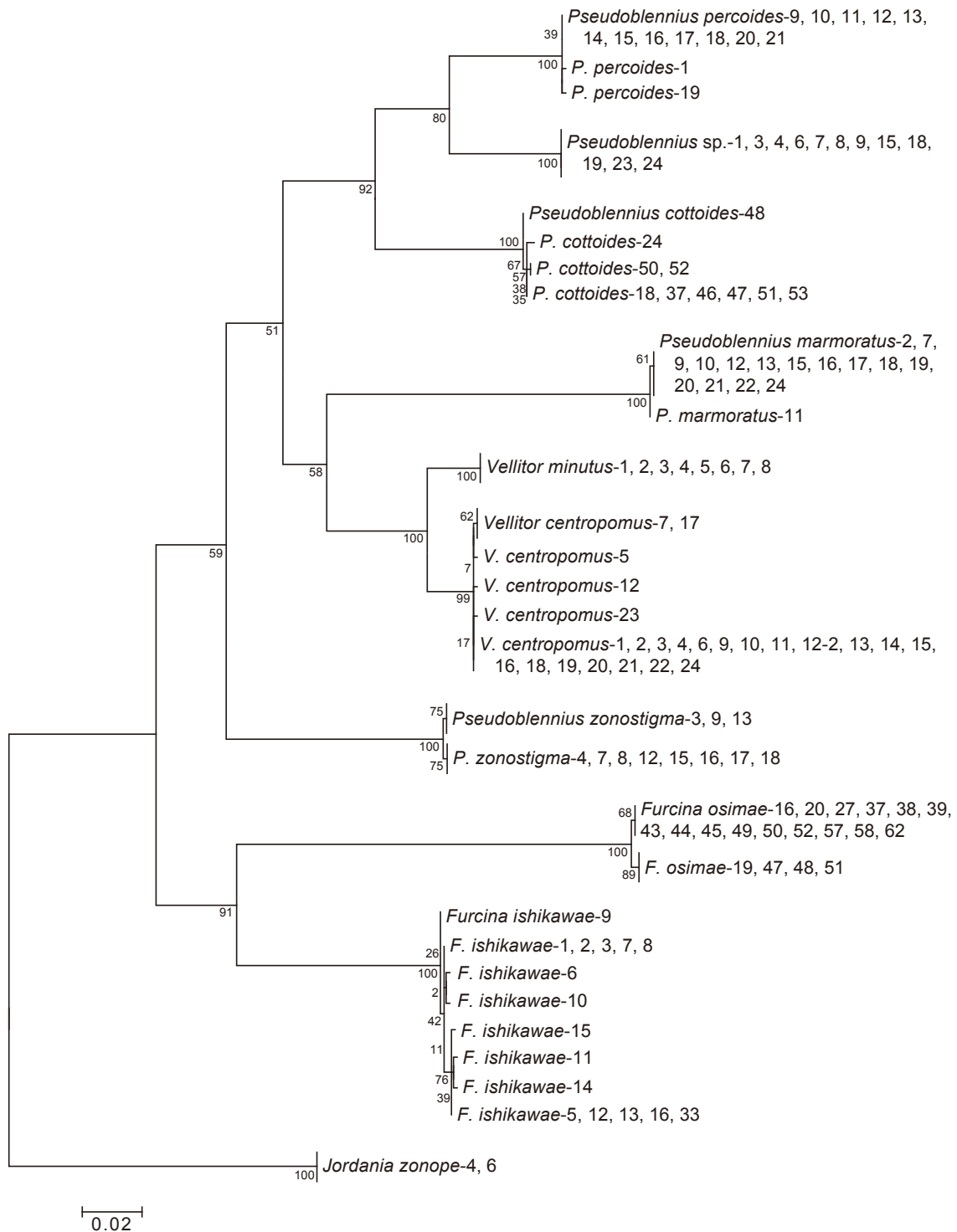
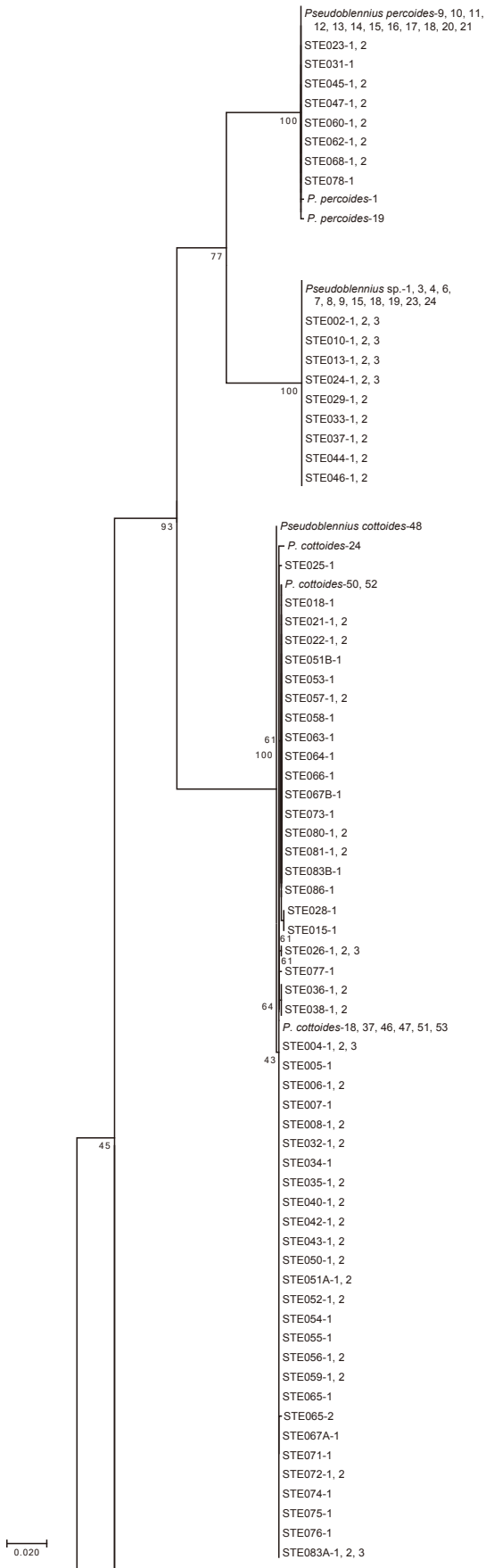


Figure S1 Maximum likelihood phylogeny of nine species of potentially ostracophilous sculpins, with *Jordania zonope* as an outgroup, as reconstructed by MEGA ver. 7.0.14. using 800 bp *cytb* sequences, with the settings of the Tamura Nei model and 1000 bootstrap replicates. Values at nodes are bootstrap percentages.



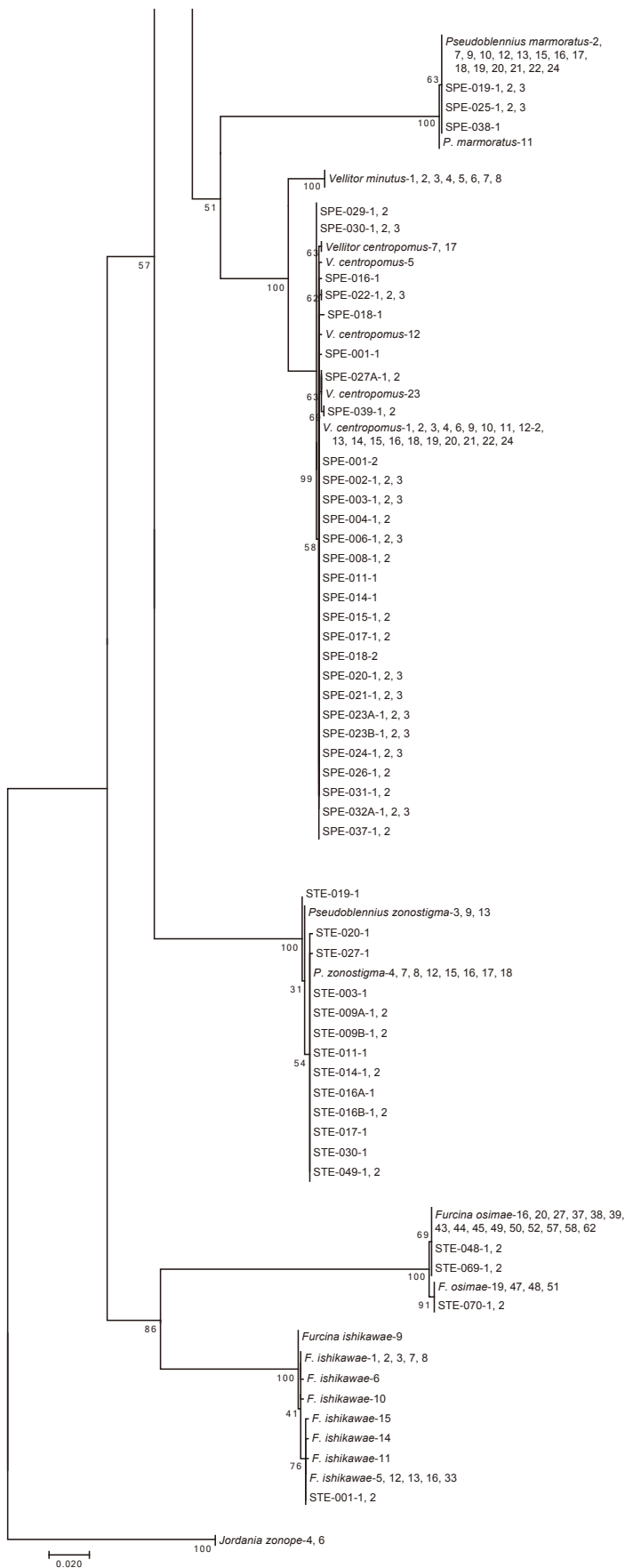


Figure S2 Maximum likelihood phylogeny of the potential parental species and 205 eggs from 113 egg masses as reconstructed by MEGA ver. 7.0.14. using 800 bp *cytb* sequences, with the settings of the Tamura Nei model and 1000 bootstrap replicates. Values at nodes are bootstrap percentages.

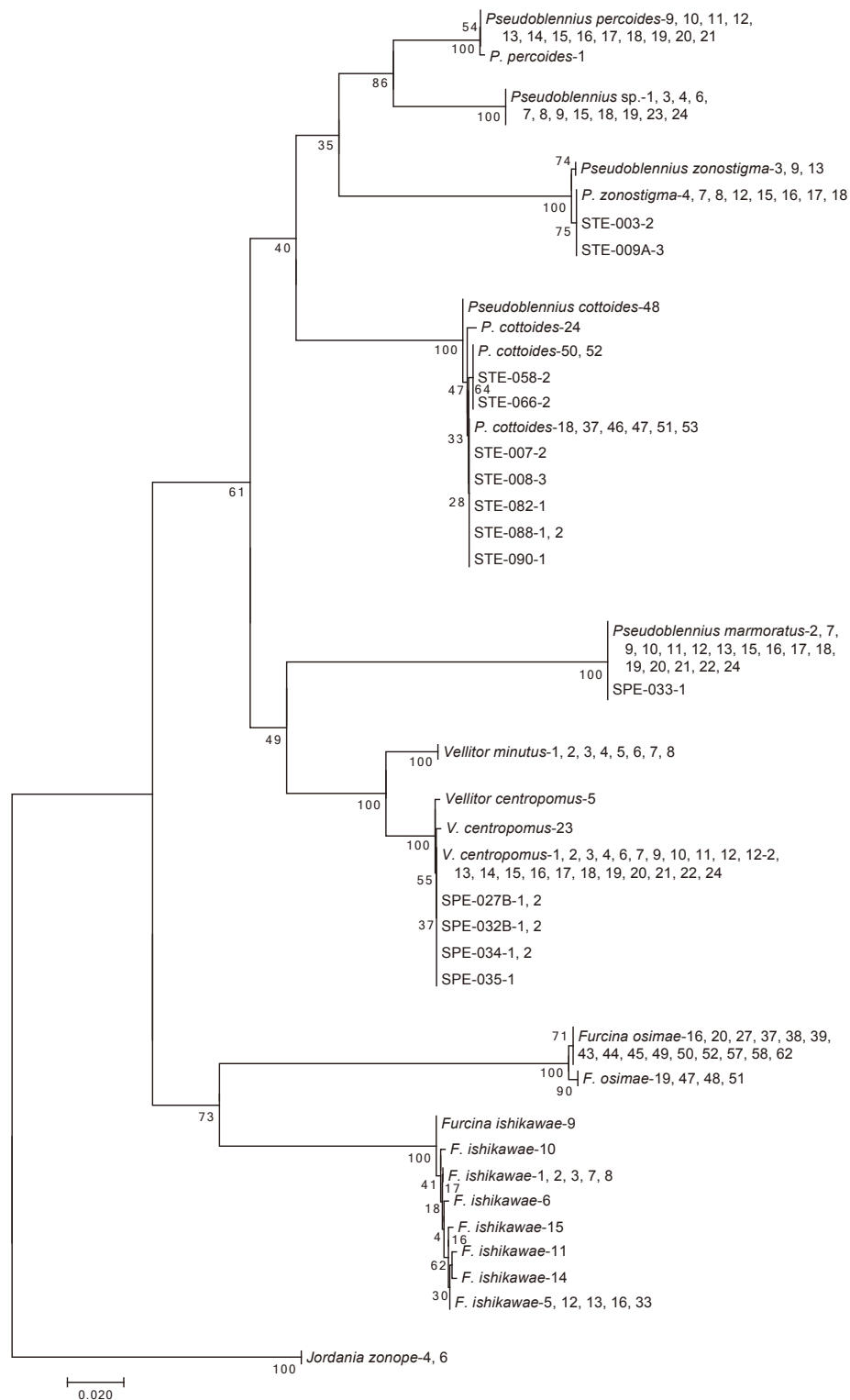


Figure S3 Maximum likelihood phylogeny of the potential parental species and 18 eggs from 14 egg masses as reconstructed by MEGA ver. 7.0.14., using 628 bp *cytb* sequences, with the settings of Tamura Nei model and 1000 bootstrap replicates. Values at nodes are bootstrap percentages.



Movie S1 Spawning behaviours of female *Pseudoblennius cottoides* in the aquarium. Six *Halocynthia ritteri* on wire-netting were placed in a $75 \times 45 \times 45$ cm aquarium. Eggs were deposited in the atrium of a tunicate through the atrial syphon using extremely long ovipositors. Eggs were probably released into the atrium when the female opened her mouth. The female stayed still on the tunicate after spawning. She ejected her ovipositor 1 min 22 sec and left the tunicate 2 min 34 sec after the insert, respectively (not shown). This movie was filmed by H. S. on Feb. 7, 2015. Fish and tunicates were collected on the coast of Sado Island in the Sea of Japan.



Movie S2 Failure of spawning by female *Pseudoblennius cottoides* in the aquarium. The atrial syphon of the tunicate closed before the sculpin female inserted her ovipositor. Settings were the same as in Movie S1. This movie was filmed by H. S. on Feb. 1, 2015.



Movie S3 Spawning behaviours of female *Pseudoblennius marmoratus* in the field. Eggs were deposited in the spongocoel of a sponge using short ovipositors. This movie was filmed by Tomonobu Uryu on Dec. 28, 2009 at Izu Oceanic Park, Izu Peninsula, Pacific coast of Japan. Water temperature was about 16 °C and water depth was about 5 m.