

Forecasting the combined effects of disparate disturbances on the persistence of long-lived gorgonians: a case study of *Paramuricea clavata*

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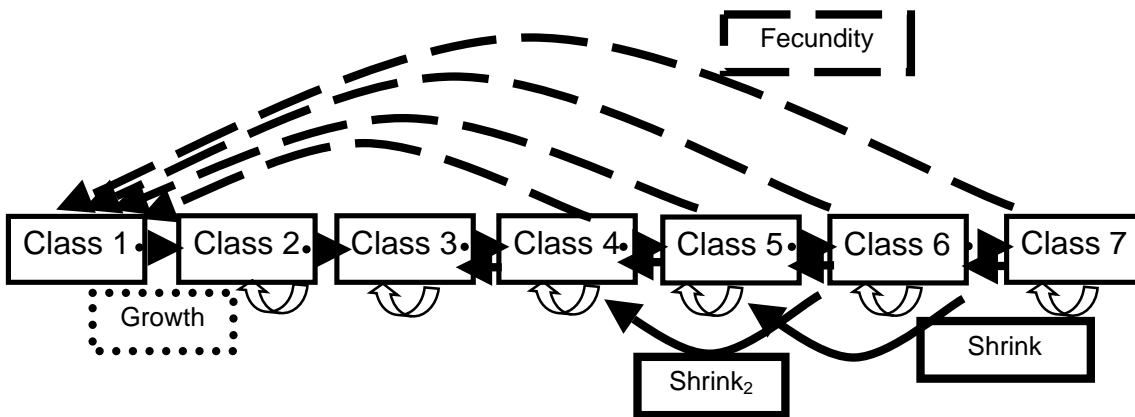
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Marine Ecology Progress Series 402: 59–68 (2010)

Fig. S1. (A) *Paramuricea clavata*. Life cycle graph of the red gorgonian showing all the possible transitions between the different age-size classes used to construct the age-size structured matrix models developed in this study. (B) Size-class transition matrix; matrix elements represent 4 types of variables (F_i , G_i , H_i , H_{2i} , S_i). F : fecundity; G : growth; H : shrink to 1 smaller class; H_2 : shrink to 2 smaller classes; S : survival



B Size class at time $t + 1$	Size class at time t						
	1	2	3	4	5	6	7
1	0	0	0	F_4	F_5	F_6	F_7
2	$S_1 * G_1$	$S_2 * (1 - G_2)$	$S_3 * (1 - G_3) * H_3$	0	0	0	0
3	0	$S_2 * G_2$	$S_3 * (1 - G_3) * (1 - H_3)$	$S_4 * (1 - G_4) * H_4$	0	0	0
4	0	0	$S_3 * G_3$	$S_4 * (1 - G_4) * (1 - H_4)$	$S_5 * (1 - G_5) * H_5$	$S_6 * (1 - G_6) * H_6 * H_{26}$	0
5	0	0	0	$S_4 * G_4$	$S_5 * (1 - G_5) * (1 - H_5)$	$S_6 * (1 - G_6) * (1 - H_{26}) * H_6$	$S_7 * H_7 * H_{27}$
6	0	0	0	0	$S_5 * G_5$	$S_6 * (1 - G_6) * (1 - H_6)$	$S_7 * (1 - H_{27}) * H_7$
7	0	0	0	0	0	$S_6 * G_6$	$S_7 * (1 - H_7)$

Table S1. (A) Averaged matrix obtained from the annual size-class transition matrices obtained at Medes Islands (Spain) from 2001 to 2004 and Cap de Creus from 2002 to 2004. (B) Size-class transition matrices for red gorgonian *Paramuricea clavata* population at Port-Cros National Park (France) from 1999 to 2003

(A) Size class at $t + 1$	Size class at time t						
Medes Islands	1	2	3	4	5	6	7
1	0	0	0	0.003	0.089	0.378	0.814
2	0.684	0.483	0.017	0	0	0	0
3	0	0.202	0.813	0.034	0	0	0
4	0	0	0.087	0.833	0.057	0.019	0
5	0	0	0	0.071	0.758	0.124	0.019
6	0	0	0	0	0.051	0.731	0.059
7	0	0	0	0	0	0.063	0.850
Cap de Creus	1	2	3	4	5	6	7
1		0	0	0.003	0.089	0.378	0.814
2	0.765	0.471	0.048	0	0	0	0
3	0	0.294	0.774	0.093	0.008	0	0
4	0	0	0.032	0.713	0.129	0.028	0.017
5	0	0	0	0.053	0.689	0.229	0.051
6	0	0	0	0	0.061	0.569	0.254
7	0	0	0	0	0	0.092	0.627

(B) Size class at $t + 1$	Size class at time t						
1999–2000	1	2	3	4	5	6	7
1		0	0	0.003	0.089	0.378	0.814
2	0.765	0.471	0.048	0	0	0	0
3	0	0.294	0.774	0.093	0.008	0	0
4	0	0	0.032	0.713	0.129	0.028	0.017
5	0	0	0	0.053	0.689	0.229	0.051
6	0	0	0	0	0.061	0.569	0.254
7	0	0	0	0	0	0.092	0.627
2000–2001	1	2	3	4	5	6	7
1		0	0	0.003	0.089	0.378	0.814
2	0.698	0.372	0.041	0	0	0	0
3	0	0.326	0.633	0.097	0	0.012	0
4	0	0	0.065	0.694	0.228	0.071	0.043
5	0	0	0	0.075	0.496	0.188	0.021
6	0	0	0	0	0.063	0.518	0.234
7	0	0	0	0	0	0.094	0.532
2001–2002	1	2	3	4	5	6	7
1		0	0	0.003	0.089	0.378	0.814
2	0.692	0.449	0.007	0	0	0	0
3	0	0.244	0.711	0.070	0	0	0
4	0	0	0.126	0.746	0.099	0	0
5	0	0	0	0.106	0.747	0.172	0.061
6	0	0	0	0	0.077	0.719	0.091
7	0	0	0	0	0	0.016	0.758
2002–2003	1	2	3	4	5	6	7
1	0	0	0	0.003	0.089	0.378	0.814
2	0.686	0.490	0.000	0	0	0	0
3	0	0.196	0.816	0.038	0.0104	0	0
4	0	0	0.080	0.765	0.083	0.018	0.038
5	0	0	0	0.098	0.760	0.127	0.000
6	0	0	0	0	0.063	0.727	0.115
7	0	0	0	0	0	0.073	0.731