

Quantification of the Effects of Sporeling Coalescence on the Early Development of *Gracilaria Chilensis* (Rhodophyta)

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Abstract

Sporeling coalescence in species of Gracilariales and Gigartinales is predicted to result in larger basal areas of growing disks as well as earlier initiation, increased abundance, and faster growth rates of erect shoots as compared to noncoalescent sporelings. These responses have been interpreted as providing mutual benefits for organisms living in aggregation, counterbalancing disadvantages associated with crowding. Quantitative evaluations of sporelings of *Gracilaria chilensis* failed to support several of these predictions. Sporelings were grown in the laboratory from a range of single sporelings to coalescent masses of 20 sporelings. Coalescent sporeling masses of *G. chilensis* exhibited larger basal areas than noncoalescent ones, but because the specific growth rates were inversely related to the original number of carpospores, no significant differences in actual area increments, during most of the experiment, were found among sporelings derived from one, two, or three to five coalescing sporelings. Initiation of erect shoots occurred at a similar time, regardless of their origin, i.e. coalescent or noncoalescent. Abundance of erect shoots was only loosely related to the number of coalescing sporelings. Even though by the end of the experiment (week 18), the total length of the longer erect shoots arising from coalescent sporeling masses was significantly greater than that of shoots arising from noncoalescent sporelings, total length was independent of the original number of coalescing sporelings. Furthermore, specific elongation rates between week 12 and week 18 were significantly greater for noncoalescent sporelings than for coalescent sporeling masses. Quantitative screening of other species seems necessary before generalizations on the ecological advantages of sporeling coalescence in seaweeds can be made.