## Intra-clonal variation in the red seaweed Gracilaria chilensis

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## Abstract

The phenotypic plasticity often found in seaweed populations has been explained only from the perspective of inter-population or inter-individual differences. However, many seaweeds grow and propagate by fragmentation of genetically identical units, each with the capacity to function on its own. If significant differences in performance exist among these supposedly identical units, such differences should be expressed upon the release and growth of these units. In this study we document two such types of variation in the red seaweed Gracilaria chilensis. Populations of sporelings, each grown under similar culture conditions and derived from carpospores shed by the same cystocarp exhibit significant differences in growth. In this species, each cystocarp develops from a simple gametic fusion, and cystocarp fusions occur too infrequently to account for the growth differences observed among recruits. In adult thalli, branches (ramets) derived from the same thallus (genet) and grown under similar conditions exhibit significant variation in growth rates and morphology. These findings have several implications. They suggest that carpospore production is not only an example of zygote amplification but that it also could increase variability among mitotically replicated units. Intra-clonal variability followed by fragmentation and reattachment may increase intra-population variation which, in species of Gracilaria, is often larger than inter-population variation. In addition, the existence of intraclonal variability suggests that strain selection in commercially important species may require a more continuous screening of highquality strains because of frequent genotypic or phenotypic changes in the various cultivars.