

Genetic variation in wild and cultivated populations of the haploid diploid red alga *Gracilaria chilensis*: How farming practices favor asexual reproduction and heterozygosity

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Abstract

The extent of changes in genetic diversity and life-history traits associated with farming was investigated in the haploid–diploid red alga, *Gracilaria chilensis*, cultivated in Chile. This alga belongs to one of the most frequently cultivated seaweed genera around the world. Fifteen farmed populations, 11 wild populations, and two subspontaneous populations were sampled along the Chilean coast. The frequency of reproductive versus vegetative individuals and of haploid versus diploid individuals was checked in each population. In addition, the distribution of genetic variation in wild and cultivated populations was analyzed using six microsatellite markers. Our results first demonstrated that farmed populations are maintained almost exclusively by vegetative propagation. Moreover, the predominance of diploid individuals in farms showed that farming practices had significantly modified life-history traits as compared to wild populations. Second, the expected reduction in genetic diversity due to a cultivation bottleneck and subsequent clonal propagation was detected in farms. Finally, our study suggested that cultural practices in the southern part of the country contributed to the spread of selected genotypes at a local scale. Altogether, these results document for the first time that involuntary selection could operate during the first step of domestication in a marine plant.