

PRE-DOMESTICATION BOTTLENECKS OF THE CULTIVATED SEAWEED *GRACILARIA CHILENSIS*

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Abstract

Gracilaria chilensis is the main cultivated seaweed in Chile. The low genetic diversity observed in the Chilean population has been associated with the over-exploitation of natural beds and/or the founder effect that occurred during the post-glacial colonization from New Zealand. How these processes have affected its evolutionary trajectory before farming and incipient domestication is poorly understood. In this study, we used 2,232 SNPs to assess how the species evolutionary history in New Zealand (its region of origin), the founder effect linked to transoceanic dispersion and colonization of South America, and the recent over-exploitation of natural populations have influenced the genetic architecture of *G. chilensis* in Chile. The contrasting patterns of genetic diversity and structure observed between the two main islands in New Zealand attest to the important effects of Quaternary glacial cycles on *G. chilensis*. ABC analyses indicated that Chatham Island and South America were colonized independently near the end of the Last Glacial Maximum and emphasized the importance of coastal and oceanic currents during that period. Furthermore, ABC analyses inferred the existence of a recent and strong genetic bottleneck in Chile, matching the period of over-exploitation of the natural beds during the 1970s, followed by rapid demographic expansion linked to active clonal propagation used in farming. Recurrent genetic bottlenecks strongly eroded the genetic diversity of *G. chilensis* prior to its cultivation, raising important challenges for the management of genetic resources in this incipiently domesticated species.

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