Phylogeographic analyses of the 30 degrees S south-east Pacific biogeographic transition zone establish the occurrence of a sharp genetic discontinuity in the kelp Lessonia nigrescens: Vicariance or parapatry?

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Abstract

Phylogeographic studies are lacking in the Southern Hemisphere, and in particular in the south-eastern Pacific. To infer the possible scenario for the debated biogeographic transition zone located at 30–33S along the Chilean coast, we investigated whether there is a concordance between the phylogeographic pattern and the biogeographic transition in the intertidal kelp Lessonia nigrescens whose distribution is continuous across this transition zone. Using a combination of four makers located in the three genomic compartments (chloroplast, mitochondria and nucleus), we showed the presence of two main divergent lineages, possibly cryptic species. There was an exact match of the phylogeographic break with the 30S biogeographic transition zone, suggesting a common origin. The combined information given by the multilocus approach and by the population analysis suggested the occurrence of a budding speciation, with a northward range expansion.

Keywords: atp8/trnS, Budding speciation, Coastal biogeographic transition, ITS, Kelp, Phylogeography, RuBisCo spacer, South-east Pacific