
Distribution of genetic diversity of the subantarctic crab *Halicarcinus planatus*: first marine alien reaching Antarctica

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Abstract

Antarctica remains the most pristine and isolated continent on earth, surrounded by oceanographic, bathymetric, geographic and climatic barriers. Nevertheless the latter is being softened by the global warming, which is especially strong on the West Antarctic Peninsula. This warming enhances the probabilities of introduction of subantarctic alien species, and their subsequent proliferation. Shallow marine benthic communities around Antarctica exhibit high levels of endemism, gigantism, slow growth, longevity and late maturity. Several families of durophagous predators that are highly abundant and diverse in subantarctic shallow waters are almost completely absent in the Southern Ocean, this is the case of decapods. In 2015, a breeding female *Halicarcinus planatus* was reported in Deception Island (South Shetlands, West Antarctic Peninsula). This species is a brachyuran crab with a circum-subantarctic distribution. *Halicarcinus planatus* has a low bathymetric range, a planktonic larval duration of 45-60 days, and unlike other decapods, it tolerates temperatures near 0°C. This crab is able to reduce the magnesium concentration in its haemolymph that increases with the cold. The present project evaluates the level of genetic diversity of *Halicarcinus planatus* along in southern South-America as well as in Subantarctic Islands, determinates the phylogeographic structure of the species, the geographic scale at which the genetic differentiation operates and the connectivity pattern between remote island populations such as those from Falkland/Malvinas and Kerguelen Islands. The phylogenetic relationships are inferred from mitochondrial and nuclear haplotypes from the Magellanic Region, Falklands/Malvinas and Kerguelen Islands. The levels of diversity of *Halicarcinus*

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planatus populations are the highest in southern South-America, but tend to decrease toward the north, whereas in Subantarctic Islands they are significantly lower. The mitochondrial haplotype network is dense and strongly reticulated, showing no sign of population-size reduction in Patagonia. The phylogeographic relationships across the Southern Ocean indicate that the species originally expanded its range in Patagonia and dispersed to Falkland and Kerguelen Islands by long distance dispersal.

Keywords: circumpolar current, Falkland/Malvinas, Kerguelen, long distance dispersal, phylogeography