

Origin and evolution of the antarctic benthic marine fauna: genetic diversity and molecular divergence between congeneric species from Antarctica and South America.

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The present project proposes to estimate the divergence times between Antarctic and South American benthonic species in genus of echinoderms and mollusks with contrasting developmental modes. Among them, we initiated analysis of COI gene in several antarctic and subantarctic echinoid species of *Sterechinus* (planktotrophic development) and *Abatus* (brooder) genus. Several species of the mollusk *Nacella* collected from Patagonia and Antarctic Peninsula are also currently studied. Divergence times among taxa located in different continents is expected to be greater for brooding species than for planktotrophic developers. Estimated time of molecular divergence among antarctic and south American brooding species (i.e. *Abatus*) may coincide with the beginning of the separation between the Antarctic continent and South America (28 My approx). On the contrary, the existence of a planktotrophic larva (*Sterechinus*, *Nacella* or *Odontaster* species) that remains several weeks or months in the water column, may have maintain the contact between taxa for a longer time. These molecular divergence data will also allow the evaluation of the hypothesis of a permanent connection between benthonic fauna through submarine mounts of the Scotia Arc.

The second objective of the present project consists on comparing the genetic diversity between Antarctic and South American species within the same genus to infer the demographic history of these species. By this way, we pretend to evaluate how the last glacial periods have affected the marine invertebrates in relation to their geographic distribution (Antarctica versus South America) and their developmental mode (planktotrophic versus brooding). In general, the intense glaciation events of the Pleistocene may have impacted much more the species that live on the narrow Antarctic continental platform than to those of South America. This would be test for all genus. Nevertheless, when comparing among them, it would be hoped to observe a greater impact in the species that develop through planktotrophic larva. This prediction is based on the hypothesis that the predominance in the number of brooding species over those that have pelagic larvae resulted from a greater extinction rate of the latter during the glacial periods of the Pleistocene (Poulin et al. 2002¹).

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¹ Poulin E., A. T. Palma and J-P. Féral 2002. Evolutionary versus ecological success of developmental modes in coastal Antarctic benthic invertebrates. Trends in Ecology and Evolution 17: 218-222.