

Phylogeographic mismatches in guest-host relationships among Antarctic invertebrates: a key to understand (and date) past climatic events?

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Abstract

In all marine habitats, species naturally interact with other species throughout a series of different possible guest-host relationships, usually grouped under the broad categories of ‘symbiotic’ interactions. In Antarctica, for a long time, these kinds of relationships have been considered to be absent but, in recent years, it has been shown that these are present even there, are common, and encompass a wide variety of taxonomical groups (Schiaparelli, 2014). From a biogeographic and a phylogeographic point of view, the study of biotic interactions offers unique perspectives of analysis and hints, since the finding of ‘mismatches’ in the biogeographic distribution of the partners of a symbiotic association may indicate the occurrence of host-shift phenomena (i.e. the disruption of the original interaction and the adoption of a new host). These processes naturally occur in all seas but, in Antarctica, host-shift phenomena are likely to be directly related to climate-driven extinction of host populations and, in turn, at wider spatial and temporal scales, to the ice sheets dynamics during glacial and interglacial cycles. Today, the always-growing body of genetic studies performed on Antarctic species is revealing complex patterns of colonisation and extinction events in several groups of organisms and, thanks to molecular clock methods, it is also (potentially) possible to date these host-shift events and link their biological evolution with Antarctic paleo-ice sheet dynamics and the climate history. In this contribution we’ll show a series of examples of these ‘host-guest mismatches’ and illustrate the current knowledge about the timing of these events. These ecological and molecular studies could represent, in the next future, a valid help in cross-calibrating climate reconstructions and ice-sheets dynamics by offering an independent tool based on biological evidences. This kind of cross-disciplinary studies is especially important in Antarctic research and could represent a great improvement in the knowledge of past climatic history of Antarctica.

Keywords: symbiotic interactions, phylogeography, ice sheets dynamics

References

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