

Today's Antarctic terrestrial biodiversity – multiple signals of long-term presence and habitat persistence

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Abstract

Today's Antarctic terrestrial and freshwater biota is dominated by cryptogams, microarthropods and other microinvertebrates, and microbial groups. Most currently ice-free ground in Antarctica and on at least some of the surrounding sub-Antarctic islands shows evidence of being covered and scoured by glacial advances at the Last Glacial Maximum or previous maxima. However, as new baseline survey data have become available, combined with modern molecular biological analyses, two important features have become clear. First, that long-term persistence and isolation is a general feature of the Antarctic terrestrial and freshwater biota and, second, that Antarctic biogeographic patterns show far more complexity and structure (intra-continental regionalisation) than previously suspected. Together, these features have led to the erection of a new biological paradigm for Antarctica, of long-term persistence on at least multi-million year timescales of terrestrial biota through multiple glacial cycles in all regions of Antarctica with current exposure of ice-free habitats. Over evolutionary timescales, this biota has still been linked with those of lower southern latitudes, including the tropics, and even the northern polar regions. As well as creating a new paradigm in which to consider the evolution and adaptation of Antarctic terrestrial and freshwater biota, and how this compares with these processes at lower latitudes, important new cross-disciplinary linkages have opened in the fields of understanding the geological and glaciological history of the continent itself and its neighbouring landmasses, and of the climatic and oceanographic process that can both lead to isolation and support colonisation processes.

Keywords: biogeographic regionalisation, endemism, ice-free habitats, evolutionary isolation