Population genetic structure of *Halozetes fulvus* on Marion Island

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The distribution patterns of microarthropods are well-documented on sub-Antarctic Marion Island[1,2,3]. However, with the exception of two studies focusing on indigenous arthropod species[4,5] and the cushion plant *Azorella selago*[6], few studies have characterized genetic variation across this sub-Antarctic island. Marion Island's landscape has been sculpted by numerous volcanic and glacial cycles[7] and as one would expect, significant population sub-structure was reported for indigenous/endemic species. However, the conclusions of these studies were derived from relatively small sample sizes and as such, described only broad geographic patterns. Our aim here was to extend and build on these earlier studies through a more comprehensive sampling strategy. For this, we selected the indigenous mite *Halozetes fulvus*. Our study is based on 291 specimens from 30 geographic localities across the island. Similar to previous studies, *H. fulvus* is characterized by significant population substructure with localities on the eastern (specifically Bullard Beach) and western (specifically Kaalkoppie) side of Marion being significantly differentiated to the majority of other localities. At a finer scale, populations on the western side (Kaalkoppie and surrounding area) are relatively young populations with high migration (and gene flow) among populations. In contrast, the populations on the eastern side of Marion (Bullard Beach and surrounding area) are much older with low levels of gene flow among populations. We interpret our genetic results within a geomorphologic and environmental framework and argue that the western side of Marion represents a more inhospitable environment characterized by recent volcanic eruptions with a strong influence from westerly winds that blow in from the Antarctic causing frequent population extinctions with subsequent recolonisations. In contrast, environmental conditions on the eastern side are more stable allowing for populations to reach an equilibrium state.

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