

STABLE ISOTOPE ANALYSIS REVEALS A NEW ZEALAND ALPINE BEETLE'S LICHEN DIET

John Marris , David Hawke , and David Glenny 

Study Description

Protodendrophagus antipodes beetles and their larvae live at high elevation in rock outcrops on mountains along New Zealand's Southern Alps. Living above the tree line, they require a different diet from their forest-dwelling relatives that feed on fungi under loose bark. Stable isotope analysis of potential food sources revealed that the probable diet for *P. antipodes* was either, or both, of two species of ammonia-absorbing lichens; one crustose and one fruticose species. The lichen diet is possibly unique among the family Silvanidae and is surprisingly rare globally among the hyper-diverse beetle fauna.



Photo 1. A larva of *Protodendrophagus antipodes* on the crustose lichen, *Rhizocarpon geographicum*. This lichen was identified as one of two lichen species on which *P. antipodes* probably feeds. Photo credit: John Marris.



Photo 2. An adult *Protodendrophagus antipodes*. Both the adult and larval stages of *P. antipodes* live in narrow crevices in lichen-encrusted rock outcrops. Photo credit: John Marris.



Photo 3. A rock outcrop on Mount Hutt ski field used as one of the sample sites for the study. The outcrop is at 1,723 m elevation and is surrounded by bare rock scree. The tree line lies several hundred meters below on the lower slopes of the mountain. Photo credit: John Marris.



Photo 4. Co-author, John Marris searching for *Protodendrophagus antipodes* specimens in typical habitat in the Sealy Range, Aoraki/Mt Cook National Park. Photo credit: Sophie Marris.



Photo 5. A *Protodendrophagus antipodes* larva. Specimens have been collected from New Zealand's Southern Alps at elevations from 1,500 m to over 2,000 m. Photo credit: John Marris.

These photographs illustrate the article “Eating at high elevation: an herbivorous beetle from alpine rock outcrops relies on ammonia-absorbing lichens” by John Marris, David Hawke, and David Glenn published in *Ecology*. <https://doi.org/10.1002/ecy.2598>