

We know what you ate last summer: Determining trophic position of endemic New Zealand dung beetles using N and C stable isotopes

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Eligible for student prize

Worldwide, dung beetles (Coleoptera: Scarabaeidae: Scarabaeinae) are recurrently linked to a number of critical ecological processes, yet in some regions the role of dung beetles has not been examined. The enigmatic nature of New Zealand's endemic dung beetle fauna, coupled with their high abundance in indigenous forests, presents an intriguing conundrum as to their role in current ecosystems. This is compounded by New Zealand's lack of native terrestrial mammals and the widespread use of mammal dung by dung beetles elsewhere. Stable isotope analysis is an excellent tool for investigating such anomalies, as it reveals trophic level and food resource use over extended periods. We used nitrogen stable isotope analysis to investigate the trophic position of four endemic New Zealand dung beetle species: *Saphobius edwardsi*, *S. inflatipes*, *S. squamulosus* and *Boreobius lescheni*. Additionally, nitrogen and carbon stable isotope analyses were used to determine if the dung beetle *S. edwardsi* will incorporate squid carrion into its diet, in the field. We found that on average, *Saphobius* species were more ¹⁵N enriched than detritivores, but were less enriched than predators. In contrast, *B. lescheni* was less ¹⁵N enriched than detritivores and omnivores. Nitrogen and carbon stable isotope ratios of *S. edwardsi* provided with squid carrion shifted significantly towards that of squid compared to controls. These findings suggest *Saphobius* species exploit higher quality food resources than *B. lescheni*. This possibly reflects the availability of nutrient rich resources such as dung or carrion in different habitats. Moreover, *S. edwardsi* appear to readily incorporate squid carrion into their diets, suggesting potential associations with marine-derived carrion.

