

'Multifaceted deception in the North Island lichen moth, *Declana atronivea*'.

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Eligible for student prize

Predation places significant selection pressures on prey taxa and many species have evolved various behavioural, chemical, and/or morphological defensive mechanisms in response to these pressures. While some mechanisms, such as secondary chemical defences and warning displays are important for post-detection survival, other defences, such as camouflage, allow prey to avoid detection or recognition in the first place. Camouflage can be achieved through several different mechanisms, including background matching, disruptive colouration, and masquerade. The former two encompass strategies that prevent detection: in background matching, the colouration and patterning of the animal are indistinguishable from the background, thereby allowing it to blend in and remain undetected by predators; conversely, disruptive colouration utilises high-contrast markings to obscure the animals outline, thereby preventing predators from detecting its true shape. Slightly removed from the former two is masquerade; rather than preventing detection, the purpose of masquerade is to inhibit recognition through misclassification as an object of no value. The North Island lichen moth, *Declana atronivea*, presents a fascinating system for investigating camouflage as a defensive mechanism. Not only do the adults possess forewing colouration and patterning that allows them to be disguised amongst lichen, but the caterpillars display two different behaviours that allow them to be misclassified as inedible objects: in one instance, the caterpillars can extend their rigid body to resemble a dead twig, and in the other, they can curl up and look like a bird dropping. These descriptions are based only on human observations however, and there is no current scientific evidence that validates the value of such traits as anti-predation strategies. I therefore aim to investigate the effective multi-faceted camouflage of this species using a combination of image analysis, predation experiments, behavioural observations, and computer modelling.

