

## Variation in ladybird (Coleoptera: Coccinellidae) activity and anti-predator behaviour

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Eligible for student prize

Traits associated with the establishment of populations of introduced species are a major focus of ecologists and conservation biologists. Species with greater levels of phenotypic variation are predicted to be more likely to establish in novel environments, but there is currently limited and conflicting evidence for this. Furthermore, there are very few studies that have investigated phenotypic variation in fitness related traits, to identify functionally important traits that influence the establishment of introduced populations. Variation in predator escape and avoidance behaviour is an important factor that facilitates the survival of introduced populations. Ladybird beetles (Coleoptera: Coccinellidae) are an excellent system to study the effect of phenotypic variation on establishment success as they are being introduced and established around the world as biological control agents and some of the introduced species are invasive. In this study, we compared variation in general activity and flight initiation distances of four ladybird species in a controlled setting. Video recordings of the activity of ladybirds were taken before and after a simulated predator approach. Videos were scored in R using 'pathtrackR' and analysed using generalised linear mixed effects models. We predicted that species with the widest geographic distribution have the greatest variation in escape behaviour as populations with high levels of variation in behaviour are expected to be more likely to establish in a new habitat compared to species with low levels of variation.

