LAY SUMMARY

Behavioural predictability describes individual variation in behaviour. Unpredictability can arise via non-adaptive passive plasticity, in which an environmental factor acts directly on the individual to create non-adaptive phenotypic variation. In this study, I use radio telemetry to field test the hypothesis that Cook Strait giant weta *Deinacrida rugosa* (Orthoptera: Anostostomatidae) exhibit a sex difference in the predictability of their nightly travel distance due to passive behavioural plasticity. As predicted, I found that male mobility was less predictable than female mobility. Females travel short and predictable distances each night for food and refuge that are close by and readily available. In contrast, male travel is less predictable because they search for female mates that are stochastically dispersed across the landscape. Therefore, their travel distance can vary considerably across nights.