Foraging and photons: Do weta find artificial light aversive?

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Rodents avoid foraging under increased predation risk, such as amplified ambient lighting. Artificially creating such circumstances could be useful for deterring introduced mice and rats that degrade New Zealand's biodiversity. However, the effect of artificial lighting on New Zealand's native species has not been studied. The influence of illumination on insect abundance and distribution in particular, has relevance for urban restoration projects, especially where native insects (i.e. weta) are indicator species. We therefore considered how artificial light influences the behaviour of cave and tree weta at Maungatautari Ecological Island, Waikato, New Zealand.

Our 15 study sites experienced light (illuminated LED fixture), dark (unilluminated LED fixture) and baseline (no lighting fixture) treatments for three nights each while infra-red trail cameras captured the frequency of weta visitation. We recorded 246 observations of cave weta and 315 observations of tree weta. Observations per night of cave and tree weta under lights [cave: 0.63 (+/- 0.86); tree: 0.47 (+/- 0.89)] were significantly lower than those under dark conditions [cave: 2.23 (+/- 2.23) tree: 3.77 (+/- 4.45)] (cave: $Z=2.48$; $p=0.013$; $\alpha<0.017$; tree: $Z=2.87$; $p=0.004$; $\alpha<0.017$). The response of weta to artificial light highlights a behavioural phenomenon that ecologists may need to account for when restoring functional urban ecosystems within city forest fragments.