

The utility of owl pellets for monitoring threatened mammal communities: an Australian case study

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Project summary report

This Honours project assessed the utility of feeding remains (regurgitated pellets) from the Lesser Sooty Owl (*Tyto tenebricosa multipunctata*) for monitoring mountaintop communities of small to medium sized mammals within Queensland's Wet Tropics bioregion. On-ground biodiversity monitoring is required to inform management decisions in light of recent predictive modelling of the impacts of climate change on species distributions within the region (Krockenberger *et al.* 2003; Williams *et al.* 2003). However, conventional mammal survey techniques, such as live trapping and spotlighting, are labour-intensive and often incapable of detecting rare, trap-shy or otherwise elusive species, effectively rendering them invisible to researchers even when substantial resources are applied (e.g. Laurance 1992).

The fieldwork component of the study was undertaken between August and October 2009 within Danbulla National Park (17°6'S, 145°36'E) on the Lamb Range, approximately 25 km south-west of Cairns. The chosen study site was an area of approximately 5,000 Ha of mountainous tropical rainforest ranging in elevation from 700 to 1270 metres above sea level. Three female Lesser Sooty Owls were captured and radio-tagged during this study, representing a first for this sub-species and the first radio-tracking study of large forest owls within Queensland. Radio-tracking and targeted ground searches were used to locate diurnal roosts containing Lesser Sooty Owl pellets from which prey species were identified. Owl pellet prey species data were then directly compared to data from standard live-trap small mammal surveys within three putative owl home ranges.

Owl pellet analysis detected 14 mammal species (840 individuals) from 152 man-hours compared to six mammal species (361 individuals) from 194 man-hours of live trapping. Both survey methods identified *Rattus fuscipes*, *Melomys sp.* and *Antechinus sp.* as the most abundant species but live-trap data were found to under represent abundance of *Melomys sp.* and over

represent abundance of *R. fuscipes* in comparison to owl pellet data. Additionally, analyses of a dataset spanning more than 15 years from a single Lesser Sooty Owl roost demonstrated methodology by which owl pellet data can be used to detect changes in mammal community structure.

The results suggest that analysis of Lesser Sooty Owl pellets is a particularly useful method for compilation of species inventories of small to medium-sized mammals; more effective than standard live trapping surveys within the rainforests of the Wet Tropics. Owl pellet analysis overcomes factors such as bait selection, trap placement, low abundance or patchy distribution of species, seasonality of biological and behavioural cycles and trap wariness, all of which may impact upon the effectiveness and representativeness of standard live trapping surveys. Animal ethics implications are also noteworthy, with owl pellet analysis potentially able to serve objectives of many ecological studies without the need for trapping and handling of mammals.

However, some aspects of Lesser Sooty Owl ecology require additional study before analyses of their pellets permit robust comparison of mammal community structure between study sites. Firstly, additional radio-tracking data is required, particularly of male owls, in order to more confidently identify habitat areas from which prey within owl pellets have likely been sampled relative to the roost from which they were collected and to identify factors, such as gender, that may influence Lesser Sooty Owl home range size and levels of variability. Secondly, research is needed to identify any significant differences in dietary preferences between individual owls and to further elucidate roost usage patterns, such as whether more than one owl ever uses a single roost site and whether there are any seasonal patterns associated with roost selection. Installation of infrared camera traps or DNA analyses of moulted owl feathers across multiple Lesser Sooty Owl roosts are options worthy of consideration for future studies aimed at addressing the aforementioned remaining gaps in knowledge.

References

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