Small mammal habitat preferences in Ravensbourne National Park, south-east Queensland

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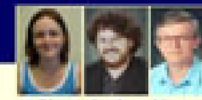

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Introduction

Habitat preferences for small mammals in coastal and arid regions of Australia have been well documented. Correlations have been shown between the diversity of the habitat in terms of plant species diversity and vegetation structure, and small mammal abundance and richness (e.g. Catling & Burt 1995). However, there is also conflicting data that suggests habitat preferences for species may differ considerably from region to region.

The aim of this study was to examine species distributions and habitat correlates for small ground-dwelling mammals across five different habitat types occurring in Ravensbourne National Park and nearby Nature Reserve, south-east Queensland.

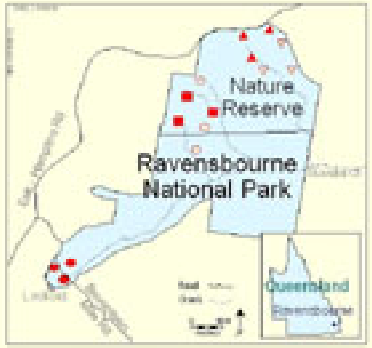

Fig. 1. Map of Ravensbourne National Park showing study sites: closed forest (notophyll vine scrub) (●); woodland with shrub (○); heath (■); grass (▽); and fern understorey (▲).

Study Area & Methods

- Replicate sites in Ravensbourne NP and adjacent Nature Reserve (Fig. 1) were selected within each of five broad vegetation/habitat types: closed forest (notophyll vine scrub); and woodland with shrub, heath, grass and fern understories (Fig. 2), and sampled between July and August.
- 40 Elliott traps (4 x 10 grid) were used to trap small mammals over 3 nights. 32 habitat variables, including geophysical attributes (site slope, landform etc), disturbance (grazing, logging, fire etc, - scale of 0-3), vegetation (FPC within distinct strata), and others (cover of rocks, bare ground, logs, density of standing stags, litter depth), were determined within the 15 x 45 m plot at each site.
- Environmental variables were analysed by Correspondence Analysis (CA) (ter Braak 1988) to confirm the *apriori* classification of habitats. Oneway ANOVAs were used to test differences in species abundance, species richness and total captures across habitats.

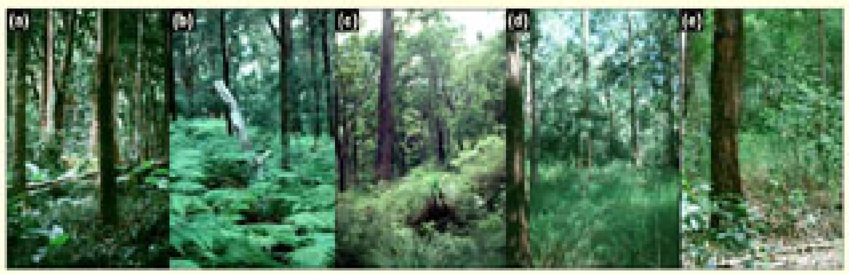

Fig. 2. Habitats sampled - (a) closed forest; and woodland with: (b) fern understorey; (c) heath understorey; (d) grass understorey; and (e) shrub understorey.

Results

- Correspondence Analysis (Fig. 3) shows measured environmental variables effectively grouped replicates of habitat types:
  - The fern understorey woodland was characterised by high shrub cover and low density of standing stags.
  - High grass cover, basalt soils, moderate to high disturbance and lack of shrubs characterised the grass understorey woodland.
  - Soil type (sandstone soils), high shrub cover and lack of grass cover influenced heath understorey woodland.
  - High density of stags, high cover of bare ground, lack of shrub and grass cover, and low disturbance characterised closed forest.

Results (cont.)

- 240 captures were recorded over 5 species: Yellow-footed Antechinus (*Antechinus flavipes*), Fawn-footed Melomys (*Melomys cervinipes*), Bush Rat (*Rattus fuscipes*), Common Dunnart (*Sminthopsis murina*) and House Mouse (*Mus musculus*).
- The total number of small mammal captures was significantly lower ($P<0.05$; Fig. 4a) in closed forest than shrub and heath understorey woodlands. Species richness did not differ across the habitats ($P>0.05$; Fig. 4b).
- *A. flavipes* was more abundant in fern, heath and shrub understorey woodlands than closed forest ($P<0.05$; Fig. 4c). *M. cervinipes* was more abundant in shrub and heath understorey woodlands than in closed forest ($P<0.05$; Fig. 4d). *S. murina* occurred in fern and grass understorey woodlands; *M. musculus* was caught in closed forest and grass understorey woodland; while the *R. fuscipes* was caught in grass understorey woodland.

Fig. 3. Ordination of scores from correspondence analysis (eigenvalues axis 1 = 0.09; axis 2 = 0.05), showing habitat correlates of closed forest (●); woodland with shrub (○); heath (■); grass (▽); fern understorey (▲).

Discussion

The abundance of *A. flavipes* and *M. cervinipes*, while present in all habitats, were associated with greater structural complexity of the understorey, agreeing with previous studies (e.g. Hockings 1981). *S. murina* was also observed associated with a well-developed understorey, particularly the high cover of logs, agreeing with reported habitat use (e.g. Fox 1998).

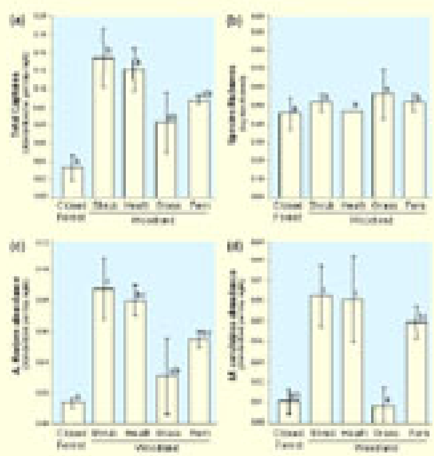

Fig. 4. Comparison of (a) total captures, (b) species richness and abundance of (c) *Antechinus flavipes* and (d) *Melomys cervinipes* across habitats. Values are means; error bars are standard errors. Means sharing the same letter are not significantly different ($P < 0.05$).

M. musculus was caught in low numbers in the grass understorey woodland and closed forest; however, the low captures of this species makes generalisations difficult.

R. fuscipes was associated with high grass cover, absence of shrub layers and low litter, contradicting previous studies (e.g. Hockings 1981). *R. fuscipes* is often regarded as a generalist, inhabiting a wide range of habitats. This species was negatively correlated with *A. flavipes* (r_s = -0.567; $P<0.05$), possibly indicating interaction between these two species, modifying the response of the *R. fuscipes* to habitat variables.

Conclusions

Vegetation structural and, to a lesser extent, geophysical correlates, can adequately explain patterns in small mammal species. These results confirm reported habitat preferences of *Antechinus flavipes*, *Melomys cervinipes* and *Sminthopsis murina*, and contradict those for *Rattus fuscipes*. The distribution patterns of *R. fuscipes* at local scales may be modified by inter-specific competition with other species.

The research also suggests that caution is required when extrapolating habitat preferences from one region to another.

References

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