

Small Mammal Community Dynamics in a Serpentine Grassland

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Introduction

- Despite accounting for only 1% of land cover in California, serpentine grasslands support 13% of the state's endemic plant species.¹
- Although there have been many studies on the floral composition and structure of these grasslands, few have investigated the native small mammals that rely on this rare habitat type.
- We here characterize the small mammal community composition over a year in a serpentine grassland at Jasper Ridge Biological Preserve (JRBP) using owl pellets.

Methods



(Photo: Barn Owl Trust)

(Photo: Elizabeth Hadly)

- 253 barn owl (*Tyto alba*) pellets, masses of fur and bones, were collected between September 2007 and October 2008 from a serpentine grassland at JRBP
- We identified small mammal craniodental elements within each pellet to the finest possible taxonomic resolution
- We calculated the number of individual specimens (NISP) for each small mammal species
- We analyzed the abundance trends on a monthly and seasonal scale

Results

- We identified 670 individuals from 9 small mammal taxa
- Reithrodontomys megalotis* was most abundant during fall and early winter, *Microtus californicus* peaked in late winter and again in late summer, and *Thomomys bottae* peaked in early summer (Figure 1A)
- However, these trends were not observed at the seasonal level

Results Continued

Microtus californicus and *Reithrodontomys megalotis*:

- Overall, *M. californicus* and *R. megalotis* were the most abundant taxa
- At the seasonal scale they exhibited parallel fluctuations in abundance
- At the monthly scale they were slightly negatively correlated ($R=-0.55$, $p=0.092$)

Ecotone versus grassland specialists:

- T. bottae* and *Sylvilagus sp.* are associated with grassland-chaparral ecotones.² These taxa were positively correlated in their abundances ($R=0.77$, $p=0.0097$).
- The ecotone-associated species and the grassland specialists (*M. californicus* and *R. megalotis*) were significantly negatively correlated ($R=-0.93$, $p=7.3e-05$).
- Grassland specialists dominated the community from September to March while ecotone species were the most abundant in May and June (Figure 1B).

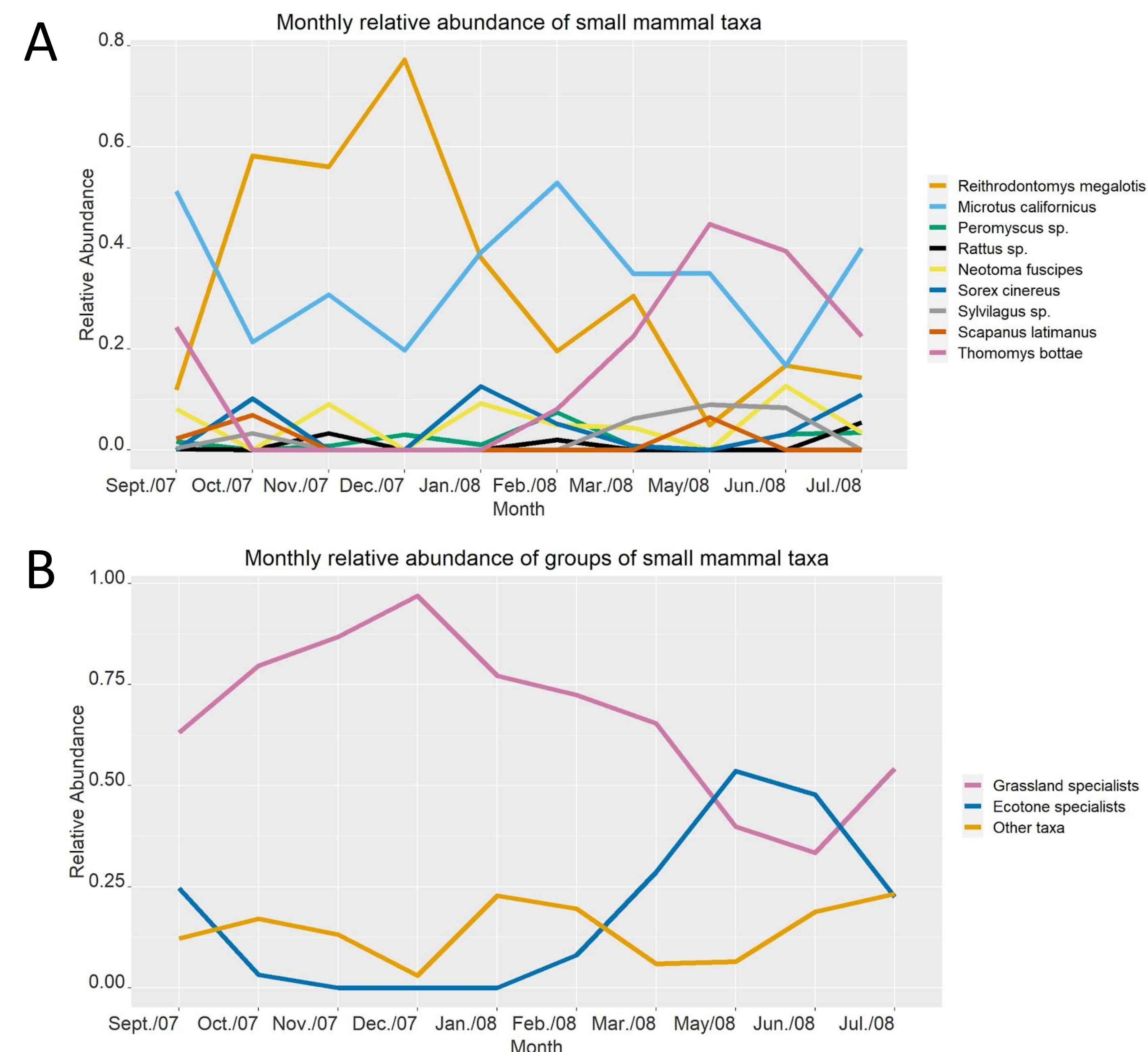


Figure 1: Relative abundance of A) all small mammal taxa, and B) ecotone-associated species, grassland specialists, and other small mammal taxa

Discussion

- The negative association between *M. californicus* and *R. megalotis* may suggest a competitive dynamic that was observed in previous studies in non-serpentine grasslands.^{3 4}
- The dynamic between ecotone and grassland specialists may be driven by vegetation changes that occur over the year.
- Small mammal feeding habits may also influence the observed dynamic since food sources also shift in abundance throughout the year.⁵
- Life history, such as the timing of the mating season, is another possible driver for the observed population dynamics.

Preliminary Conclusions

- Finer temporal resolutions can reveal trends not seen at coarser scales
- M. californicus* and *R. megalotis* may compete in serpentine grassland communities
- The dominant small mammal species shift over the year
- There is a turnover between ecotone and grassland associated species over the year, likely driven by a shift in vegetation

Future steps

- Collect more pellet data from this site to cover a larger temporal scale
- Verify our results with live trapping
- Conduct a similar survey of a small mammal community in nearby non-serpentine grasslands in order to compare their dynamics

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