

Do Diets of Woodland Jumping Mice and Southern Red-Backed Voles



Differ Across Forest Types?

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Poster Presentation 33

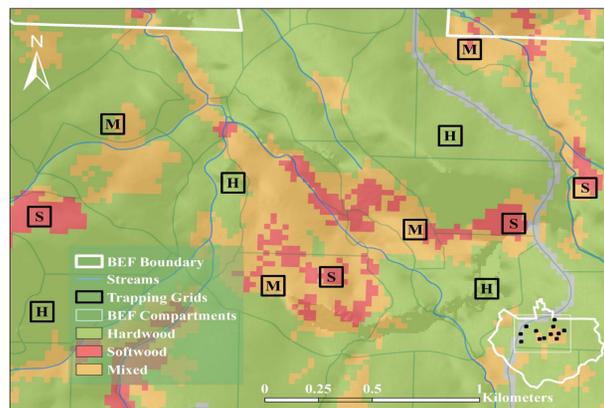
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Introduction

- The woodland jumping mouse and southern red-backed vole are important small mammals in the White Mountain National Forest (WMNF) region due to their abundance and the ecosystem services that they provide.
- They consume and disperse seeds and fungal spores. Additionally, they are a food source for predators higher up on the trophic scale.
- They differ in their distribution across hardwood, softwood, and mixed forest types in the WMNF, and we hypothesize that differences in diet are driving these distributional differences.
- We will use stable isotope measurements (¹⁵N:¹⁴N and ¹³C:¹²C ratios, expressed as δ¹⁵N and δ¹³C values) in small mammal hair and potential food sources to assess diets in these two small mammal species in three forest types at Bartlett Experimental Forest, WMNF.

Methods

Fig. 1. Location of small mammal sampling sites across Bartlett Experimental Forest, White Mountain National Forest, New Hampshire. Abbreviations for forest type are: **H** – Hardwood, **M** – Mixed, **S** – Softwood



Field Studies were performed in Bartlett Experimental Forest, WMNF (Fig. 1) and samples were analyzed in the Stable Isotope Lab at UNH.

- The White Mountain National Forest covers over 3,000 km² in central New Hampshire with elevations ranging from 115 to 1,197 m.
- At low elevation, sites are dominated by mature northern hardwoods; American beech (*Fagus grandifolia*), red maple (*Acer rubrum*), and sugar maple (*Acer saccharum*).

- Higher elevations are dominated by softwood species red spruce (*Picea rubens*) and balsam fir (*Abies balsamea*).
- Woodland jumping mouse and red-backed vole hair were collected at 12 trapping sites across Bartlett Experimental Forest (Fig. 1 & Fig. 2c & 2e). Arthropods, seeds and truffles were also collected across the Bartlett Experimental Forest.
- Collected samples were dried and homogenized prior to stable isotope analysis.

Methods Continued

- Carbon isotope values were calculated as: $\delta^{13}\text{C} = ((R_{\text{sample}}/R_{\text{standard}}) - 1) \times 1000$ and nitrogen isotopes were similarly calculated as: $\delta^{15}\text{N} = ((R_{\text{sample}}/R_{\text{standard}}) - 1) \times 1000$ (R= molar ratio of heavy-to-light isotopes, ¹³C:¹²C or ¹⁵N:¹⁴N)
- Isotopic data from small mammal hair samples were compared to potential food sources (arthropods, seeds, and truffles) after correction factors of 4‰ for δ¹³C and 5‰ for δ¹⁵N were added to values for food sources to account for trophic enrichment of hair relative to diet.

Results

- Voles and mice did not differ isotopically by forest type (Fig. 3).
- Seeds were high in δ¹³C and low in δ¹⁵N, truffles were low in δ¹³C and high in δ¹⁵N, and arthropods were high in δ¹³C and intermediate in δ¹⁵N. Vole and mice isotopes were most similar to seeds.

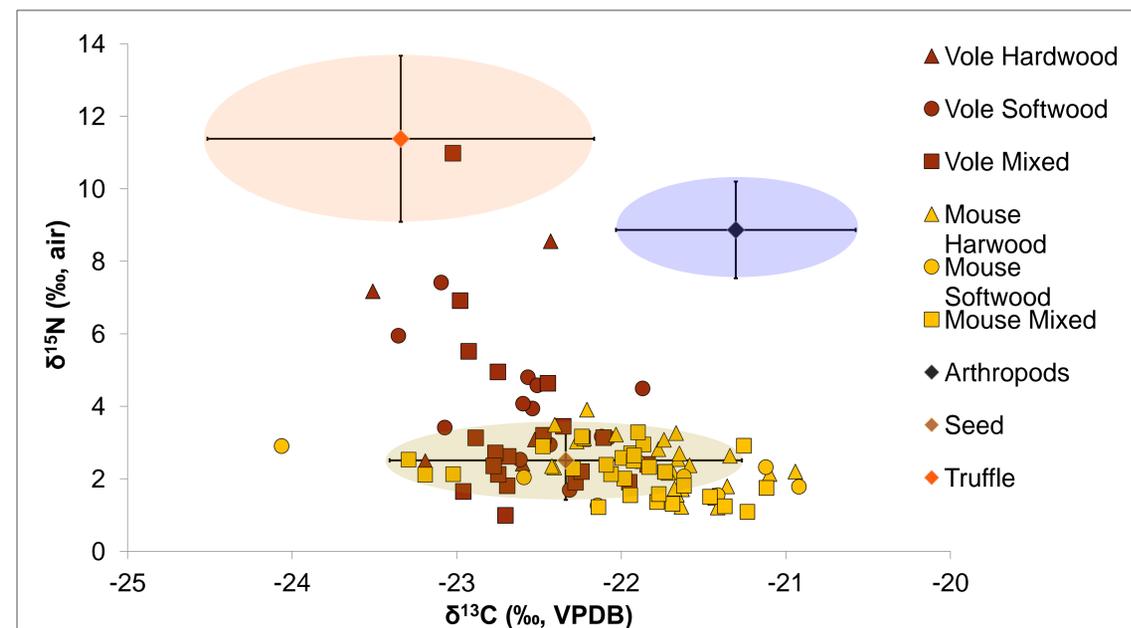


Fig. 3. Isotopic data of southern red-backed voles, woodland jumping mice, arthropods, seeds, and truffles from Bartlett Experimental Forest, New Hampshire. Abbreviations for small mammal species include: Vole - southern red-backed vole (*Myodes gapperi*); Mouse- woodland jumping mouse (*Napaeozapus insignis*).

Discussion

- Although there was a disparity between the food sources of the two small mammals, forest type did not affect isotopic diet signatures.
- Seeds were the primary food source of both the southern red-backed vole and woodland jumping mouse; however, the southern red-backed vole diet also consisted of truffles. Arthropods were not a source of food for either species.
- Red-backed voles averaged 2‰ higher in δ¹⁵N and 0.8‰ lower in δ¹³C than woodland jumping mice, indicating greater fungivory in red-backed voles and greater granivory in woodland jumping mice.
- Our results indicate that southern red-backed voles show greater dietary plasticity than woodland jumping mice. Combining isotopic analysis and fecal analysis will elucidate whether this is spatial or seasonal trend.

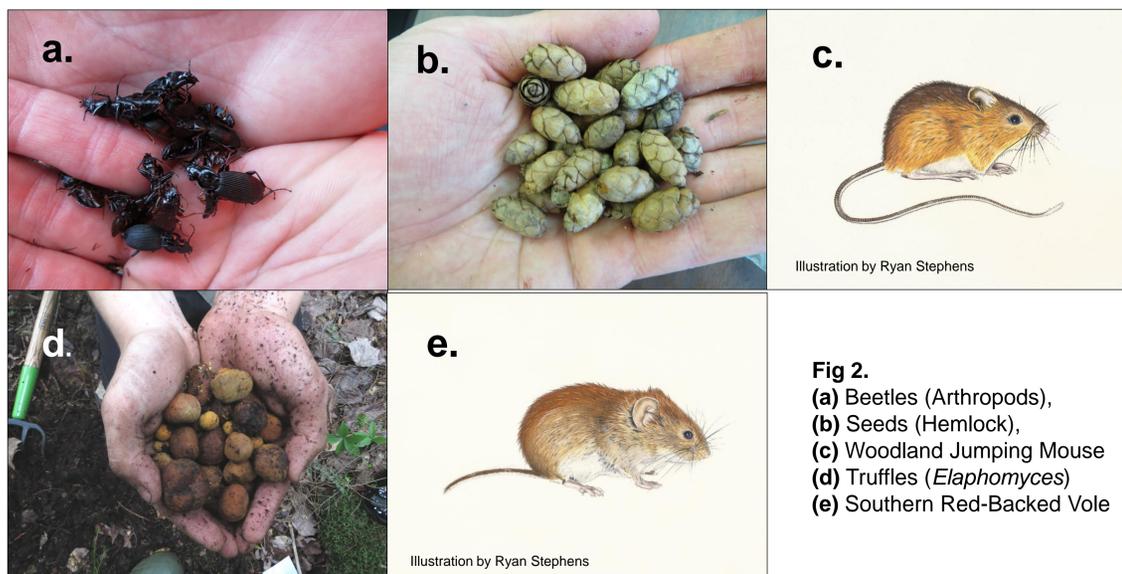


Fig 2.
 (a) Beetles (Arthropods),
 (b) Seeds (Hemlock),
 (c) Woodland Jumping Mouse
 (d) Truffles (*Elaphomyces*)
 (e) Southern Red-Backed Vole

Acknowledgements

This work was supported with a grant from the New Hampshire Agricultural Experimental Station. We thank Janet Chen for isotopic analyses and guidance on poster development.