

Small mammal isotopic analysis of consumer roles across an experimental prairie woodland mosaic

Sabrina F. Gragg*, Jesse B. Nippert, Andrew G. Hope

Department of Biology, Kansas State University, Manhattan, KS 66502 USA

As the Great Plains experience progressive environmental change including climate and anthropogenic effects, we still lack clear understanding of vertebrate community responses or how wildlife impacts local resources. Historically, prairies that dominated this region were maintained by frequent wildfire and megaherbivore grazing. Here, we investigate the roles of small vertebrate consumers within a landscape-scale fire manipulation experiment where fire suppression may cause habitat conversion, species turnover, and increasingly complex interactions across a mosaic ecotone. Using stable isotopes we test the predictions that resource use will be significantly different between grassland and woodland, and dietary breadth will be greater in the more floristically diverse woody habitats, but more stable through time than within grasslands that experience frequent fire. We tested C and N isotopic ratios from fur and liver of dominant rodent species collected from treatments reflecting 1, 4, and 20 year fire intervals, and compared signatures with dietary reference samples. Preliminary results indicate that species occupy different fundamental niche space. Interestingly, grassland rodents consume a broader diet and experience intra-annual dietary shifts compared with woodland species. Conversion to woodlands significantly narrows niche breadth of vertebrate consumers with woodland species relying on tree resources. Our analyses suggest that fire suppression, shrubification, and community turnover leads to a novel, narrow, and stable dietary niche by small mammals, possibly reinforcing persistence and spread of woodlands within historic prairies.