

Nutrient Network Seed-removal Project Update

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Introduction/Overview:

Granivores have the ability to alter plant community dynamics, but little is known about how granivores respond to changes in plant production (e.g. increased seed output in fertilized plots). For example, granivores might constrain plant recruitment in low-productivity sites where plants produce fewer seeds, but be incapable of affecting plant recruitment in fertilized sites where seed production is high. Alternatively, mobile granivores might forage more extensively in areas of high seed production, leading to no net effect of fertilization on plant recruitment.

The goal of this study is to assay the activities of local granivores by measuring seed removal rates. Because each NutNet site has a slightly different visitation schedule and seasonal influence, there are multiple levels of participation. All levels of participation utilize a standard species for removal (oats); these seeds are made non-viable by heating them for 15 minutes at 150 C (we have tested seeds at 50, 100, 150, and 175).

Participation:

- Eight sites have conducted seed-removal trials and submitted data thus far
 - 2,540 seed removal observations conducted
 - Data from three additional sites will be added to database at the end of the month, adding another 1,000 observations
- In addition to the base level of participation, several sites have conducted removals with additional species to address site-specific questions
- An additional 4 sites have expressed interest in conducting trials in the upcoming field season

Preliminary Results:

Using binomial GLM that includes site, block, and treatment effects to examine data for short-term seed removal (2-3 days of seed exposure):

- Highly significant differences in removal by site
 - Mean proportion of seeds removed ranging from 0.03 at the lowest-removal site to 0.67 at the highest-removal sites
- Across all sites, the effect of nitrogen addition is significant
 - Removal rates on N addition plots were higher (mean proportion removed = 0.35 on N addition plots, mean = 0.25 on plots without N)
- Site-specific patterns for exclosure effects suggests that different consumers are important at different sites

Future plans:

- Continue collecting data at participating sites and other sites interested in joining the effort
- Combine seed-removal data with local site data to examine large-scale correlates of consumer activity (e.g. precipitation, temperature)
- Combine seed-removal data with vegetation data to examine the relationship between consumer activity, changes in plant community composition, and nutrient/exclosure treatments.