

## COMMUNITY ECOLOGY I

Abstracts

### EFFECTS OF FOREST THINNING REGIMES ON UNDERSTORY VEGETATION

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Bryophytes and lichens dominate the ground layer in conifer-dominated forests. The dominant lichens, *Cladonia mitis* and *C. rangiferina*, form a mosaic of extensive patches intermixed with the feather mosses *Pleurozium schreberi* and *Hylocomium splendens*. We studied lichen/moss responses to canopy opening 7 years post-thinning. Our questions were posed around determining the responses to canopy opening of 1) vegetation, 2) diversity, 3) diaspores, and 4) establishment. Conclusions are that canopy opening has effected ground layer vegetation, but has had little effect on overall species richness. Both lichen and moss diaspores are abundant. Moss vegetation has decreased, yet lichens have not yet recolonized the resulting non-vegetated space. We conclude that lichens are generalists and with time are able to establish under a variety of environmental conditions, however they are inhibited by pre-existing substrates. Feather mosses are specialists and they are limited by environmental conditions inhibiting their establishment, except in local areas where pre-existing substrates and canopy conditions have precluded lichen establishment.

Keywords:

### HONEY, WHAT'S FOR DINNER? AN EXPLORATION OF THE EFFECTS OF GARDEN PLANTS ON THE POLLINATION AND REPRODUCTIVE SUCCESS OF NATIVE WILDFLOWERS

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A better understanding of human influences on natural systems is vital to conservation endeavors in urban and suburban regions. Urban gardening with cultivated plant species is very common, and usually thought to be beneficial to native pollinators. However, these cultivated plants could either compete with or facilitate native plant species. In this study, we examined how pollination and reproductive success of a native plant species (Purple Coneflower, *Echinacea purpurea*) is affected by the presence of a cultivated showy, fragrant garden species (Butterfly Bush, *Buddleia davidii*). Three possible relationships are: facilitation, the garden plants attract pollinators and native plants benefit from overflow; competition, pollinators are limited and the garden plant is preferentially visited; or no effect. We manipulated two experimental factors, density of native plant (single vs. four) and presence of garden plant (present vs. absent) to give us four treatment combinations; we replicated each treatment 5 times for a total of 20 experimental plots. Pollinator visitations were recorded for twenty minute periods at least three times at each plot during the months of June, July, and August. We also examined seed set of *Echinacea purpurea* to

determine differences in reproduction between treatments. Our preliminary results suggest that both density of flowers and the presence of *Buddleia davidii* affect pollinator behavior and *Echinacea purpurea* seed viability. High density plots were visited by more pollinators overall and the presence of *Buddleia davidii* attracted more butterfly visitors to plots. In addition, there was a trend toward a lower proportion of viable *Echinacea purpurea* seeds per inflorescence in the presence of *Buddleia davidii*.

Keywords: *Echinacea*, plant-pollinator interactions, urbanization, pollinators

## THE EFFECTS OF EXOTIC *ERODIUM CICUTARIUM* ON AN ARID ECOSYSTEM

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One concern about exotic species is that they can negatively affect native species and alter ecosystem function. *Erodium cicutarium* was introduced to the United States more than 300 years ago and is found throughout western North America, but little is known about how it affects native plant communities. To examine the effect of *E. cicutarium* on native annual plants, we first examined patterns of abundance of *E. cicutarium* and native annuals at 2 spatial scales 1) on 24 – 0.5 ha experimental plots and 2) on 0.5m<sup>2</sup> quadrat communities. We found significant negative correlations between the abundance of *E. cicutarium* and natives at both scales, suggesting a competitive interaction. To study this further, we conducted a field experiment in southeastern Arizona that consisted of 40 – 0.25m<sup>2</sup> quadrats from which *E. cicutarium* was removed and 40 control quadrats. We found that *E. cicutarium* removal quadrats contained significantly higher richness of annual plants but the experimental quadrats did not differ in abundance of natives. However, control plots contained significantly higher abundance due to the presence of *E. cicutarium*. Thus while *E. cicutarium* appears to suppress the diversity of natives, it increases community productivity.

Keywords: *Exotic*, *Richness*, *Productivity*

## FOOD WEB DYNAMICS OF THE INQUILINE COMMUNITY IN THE NORTHERN PITCHER PLANT, *SARRACENIA PURPUREA*: THE EFFECT OF LATITUDE.

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Ecologists have tried to quantify the strengths and relative importance of resource (bottom-up) and predator (top-down) effects in food webs. The aquatic food web found within the leaves of the northern pitcher plant, *Sarracenia purpurea*, is a model system well suited to asking questions about the factors controlling food web structure and dynamics. A number of aquatic organisms coexist in a food web fueled by invertebrates drowned in the pitfall trap of the pitcher plant. In the summer and fall of 2004, I conducted two 4x4 factorial press experiments using pitcher plant communities, one in the upper peninsula of Michigan (MI) and the other in the Apalachicola National Forest, Florida (FL). Treatments included 4 levels of resource input and top-predator density. Though these experiments were conducted over 1000 miles apart (1830 km), at quite different temperatures (average daily mean temperature C: MI 14.6, FL 24.7) and in different ecosystems (MI: ombrotrophic bog, FL: longleaf pine savanna), the community wide effects of top-down and bottom-up forces were remarkably similar. Both bottom-up and top-down

treatments had significant effects on some populations within the inquiline food web, and produced similar trends at both sites. For example, resource addition had positive effects on bacteria density in both MI and FL ( $p < 0.0001$ ). Top-predator density had a negative effect on protozoa biomass and richness as well as rotifer abundance at both sites ( $p < 0.05$ ). Clearly, both top-down and bottom-up effects are important in this food web at both locations. The main difference between the two experiments is that top-predator density had a negative effect on bacteria populations in FL ( $p = 0.02$ ), but not in MI ( $p = 0.54$ ). One explanation is that the top-predator is more omnivorous at higher temperatures in FL, or that bacteria densities are lower in FL than in MI and are therefore more susceptible to top-down control.

Keywords: *top-down, bottom-up, food-web, pitcher plant*

## A COMPARISON OF BEE COMMUNITY COMPOSITION IN NATURAL AND LOGGED CLEARINGS ON HORSE MOUNTAIN, TRINITY COUNTY, CA

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Disturbance can have substantial community-level effects. Bee communities are dependent on both floral resources and nesting substrate availability for suitable habitat. Changes in either habitat parameter, through disturbance, can greatly impact nearby bee communities. Because bees provide a valuable ecological service as pollinators of the surrounding plant community, understanding the effects of logging on bee community composition can be useful in conservation and restoration of natural habitats. I compared bee community composition in three logged and three natural clearings. I documented plant community composition and relative species cover at each site using line-intercept transects. I also recorded flowering individuals and calculated floral richness and relative cover at each site. There was no significant difference in bee species richness, abundance or evenness between the two treatments. Bee community diversity between treatments was marginally significant ( $p = 0.04$ ), possibly due to additive effects of both species richness and evenness. Bee abundance was significantly correlated with relative floral cover and plant species richness ( $p = 0.039$  and  $0.0337$ , respectively). Plant species richness and bee community diversity were also significantly correlated ( $p = 0.043$ ), but all of these correlations had low  $R^2$  values. Logging therefore did not appear to have a significant impact on bee community composition, but other factors such as plant community composition, slope or aspect may be important.

Keywords: *bee community, logging*