

## LTER 2006 All Scientists Meeting – Working Group Report

**Title:** Effect of Nitrogen-Fixing Plants on Diversity and Species Interactions

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**Abstract:** The mechanisms influencing species coexistence are poorly understood for most ecosystems. Plants with nitrogen-fixing symbionts increase inputs of nitrogen (N) to ecosystems. These plants have been shown to increase soil fertility and to increase tissue N and photosynthetic rates in neighboring plants. However, it is unknown (1) whether N-fixing plants promote increased community diversity by facilitating the coexistence of neighboring plants competing for N or (2) whether N-fixing plants generally influence community structure by favoring certain functional groups or species traits. This working group will explore general patterns of influence by N-fixing plants on plant community structure. It also will build upon previous LTER working groups and publications addressing the effects of increased resource availability on primary productivity, species invasions, and biodiversity. The goals of this working group are to: a) discuss conceptual models of multi-species plant competition in the presence of N-fixing plants; b) share information about the influence of N-fixing plants on plant biodiversity and community structure; c) identify and compile datasets that can be used for meta-analysis or modeling; and d) pursue a cross-site comparative manuscript summarizing findings of the working group.

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<i>27 participants</i>	<i>12 LTER sites/19 research entities</i>	

The working group focused on the following questions:

1. Do N-fixing plants promote increased diversity in plant communities?
2. Does the relative abundance of N-fixing plants affect the relative abundance of other functional groups (e.g., do N-fixing plants increase the relative abundance of weaker N competitors compared to dominant N competitors)?

The session started with a presentation by Joe Fargione, Tali Lee, and Sarah Emery that provided an overview addressing working group focus questions. Data shown in the presentation came from Cedar Creek Natural History Area, Sevilleta, Kellogg Biological Station, and Niwot Ridge. The presentation and follow-up discussion identified several analyses that could be conducted by synthesizing data from numerous LTER sites. These analyses included the following:

1. Effects of legume diversity and relative abundance on non-legume diversity and relative abundance within assembled communities (*manuscript in preparation*)
2. Effects of legume diversity and relative abundance on non-legume diversity and relative abundance in natural communities (i.e., within control plots of N fertilization experiments)
3. Temporal and spatial trends in legume diversity, biomass, and relative abundance in successional communities (e.g., CDR, KBS, Mount St. Helens, Yellowstone)
4. Effects of legumes on non-leguminous plants in successional communities
5. Effects of major environmental drivers (e.g., gradients of precipitation, soil P, light) on N-fixer diversity and relative abundance
6. Do the effects of legumes differ by form (forbs vs. woody species) or origination (native vs. non-native)?

Working group participants voiced interest in convening again to conduct all or a subset of these analyses and to write manuscripts. Working group organizers agreed to submit a proposal to the LTER Network to facilitate these efforts.