Stoichiometric affects on plant community demography

Nutrient supply, as well as the relative ratios of nutrients (stoichiometry), have huge impacts on plant growth and community composition by altering which species groups dominate in a community (Klausmeier et al. 2004; Silvertown et al. 2006; Harpole & Tilman 2007). Fertilization tends to decrease species richness (Suding et al. 2005). This loss of species can in turn affect community stability (Tilman & Downing 1994) and ecosystem functioning (Naeem & Li 1997; Hooper et al. 2005). It is well known that fertilizing plants increases biomass but how specific nutrients affect plant allocation to reproduction and vegetative growth is less well understood. Because plants use resources differentially for specific tissues, altered stoichiometric ratios can also influence how and where plants assimilate their resources (Gusewell 2004). High N:P ratios encourage an increase in vegetative growth, but lower seed weights and germination abilities (Vergeer et al. 2003). Seeds tend to have higher concentrations of N and P, but lower N:P ratios than vegetative parts of plants (Fenner 1986). Thus indicating the important role of phosphorus and phosphorus limitation in reproduction. Reproductive limitation due to stoichiometric imbalance could have important implications for the demography of plant species. If lower N:P ratios support production of greater numbers of higher quality seeds, increasing N relative to P (i.e., N-deposition) could strongly bias a community toward vegetative growth. *My aim is to quantify the effects of nutrient ratios on vital demographic rates of plant species*. To do this, I will test the following hypotheses. (1) In an increased nutrient environment, high N:P ratios will promote vegetative growth, while low N:P ratios will promote reproductive growth. This information will allow me to gain insight into the mechanism by which plant species alter allocation to reproduction in response to altered stoichiometric ratios. I predict that effects of N:P ratios will also be seen at the community level. (2) In high N:P treatments, communities will have greater representation of adults and vegetative-strategy species, as characterized under ambient conditions, whereas in low N:P treatments, communities will have a higher proportion of younger age classes (i.e., seedlings and seeds) and reproductive-strategy species. Control plots (ambient nutrient conditions) will be used to quantify the growth strategies of species (i.e., their relative allocation to vegetative versus reproductive growth).

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