

## ABSTRACT OF THE THESIS

### Plant Species Removals and Community Structure of Old- Fields on the New Jersey Piedmont

by EDITH BACH, M.S.

Thesis director: Professor Richard T.T. Forman

Factors effecting the general lack of relationship of plant species abundance to their influence in the plant community were evaluated after experimental manipulations. The manipulations were removal of dominant species from replicated 1 m<sup>2</sup> plots in 3 six-year-old fields at Hutcheson Memorial Forest, New Jersey. An additional treatment removed all uncommon species as a group.

There was a general lack of correlation of abundance of removed species to degree of community or individual species response over one growing season. Response was measured as increase in % cover of species over their levels in control plots. The lack of correlation of the abundance of removed species to their importance in different communities can be attributed to differential reproductive abilities of the remaining species and structure of the plant community.

The vertical structure appears to be important, because where the community had a preponderance of short species on the ground level there was a greater recovery, or response, than where the upper strata predominated. This may indicate the importance of competition for space on the ground level. Results indicate that horizontal distribution of species also plays a role. Removed species with patchy distribution evoked greater responses than those with more scattered distribution. Differential response by species was also dependent on

their ability to reproduce vegetatively. Removed dominants were replaced by other dominants which grow quickly by vegetative reproduction. Where the community was low in these species, recovery was low.

Non-reciprocal responses of species on each other occurred when the removed and remaining species had different abilities to reproduce vegetatively, were in different strata, or had patchy vs. scattered distributions.

Species removal in June caused no significant changes in species richness.