

ABSTRACT OF THE THESIS

Environmental Patch Size in a

First Year Plant Community

by HOWARD DeCOU WILDMAN, M.S.

Thesis director: Professor Richard T. T. Forman

The effect of environmental patch size on a plant community was investigated in a first year field on the New Jersey Piedmont. The size of sand and loam patches in checkerboard designs was varied between plots from 10 cm to 75 cm on an edge. Above ground biomass of individual species was determined at the end of the growing season. The responses of the individual species to the patch size gradient were categorized according to the position of their maximum productivity along a gradient from loam to sand soil. Of the ten major species, the four species most clearly adapted to the loam increased in productivity and dominance with larger patch sizes. Four species, which appeared to be best adapted for a soil type between loam and a mixture of loam and sand, decreased in productivity with increasing patch size, as did one species best adapted for the intermediate soil type. None of the major species was more productive over the sand than over the loam patches. The major change in community structure along the patch size gradient was a shift in the importance ranking of several of the subdominants while the dominant species maintained its position. The diversity of the community decreased with increasing

patch size, as did the total community productivity. The response of the individual species appears to be dependent on the size of the individual and the probability of the individual being near the edge of the patch.