ABSTRACT OF THE THESIS

Population and Community Patterns in

Ten Successional Oldfields

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Hutcheson Memorial Forest is a unique resource for the study of oldfield succession for three reasons: (1) Data have been collected for three decades, (2) it has a permanent plot study so that the same areas are sampled each year, and (3) ten oldfields with a variety of characteristics are involved. These oldfields differed in the following characteristics: 1) year of first sampling, 2) past crop history, 3) mode of abandonment (plowed, unplowed), 4) season of abandonment and 5) percent of perimeter shared by forest.

Percent cover was collected in 48 permanent plots in ten oldfields each summer as part of the Buell oldfield succession study at Hutcheson Memorial Forest. Definite life history strategies were seen in the population patterns (mean percent cover over time). This is strong evidence that life history strategies are of primary importance in determining successional patterns.

Profile analysis, a test for parallelism, performed on all patterns determined that approximately 16% of species grew in a parallel manner. Using profile analysis, it was

determined that all the population patterns in each oldfield taken together show an individualistic pattern. Species were present, on average, in 90% of the years sampled and so support the initial floristic hypotheses.

In each of the first five years of succession those oldfields that had the same past crop tended to be more similar in community pattern than the other characteristic groupings of oldfields. This implies that of the five initial conditions of the oldfields, past crop history had the greatest effect in producing the community pattern that followed abandonment. This trend may be due to the persistence of past crops after abandonment, certain assemblages of plants being favored due to changes in the soil environment by a past crop, or certain assemblages of plants growing in association with past crops.