

SUMMARY

An old field study was conducted on the Piedmont of New Jersey in order to determine the rate and character of early successional convergence of vegetation developing on grassland and bare soil. Data were collected for a number of successive years (seven and nine years for each pair of fields, respectively) on permanent quadrats of these fields which had similar physiographic and soil conditions but different origins (i.e., grassland or bare soil).

The results of this study lend weight to the concept that successions in an area converge to a similar type of vegetation and that the rate of convergence is rapid. Analysis of the data was carried out in three parts. From these the following conclusions were drawn:

1. Using Bray and Curtis' Dissimilarity Index:
 - a. Decreasing dissimilarity values indicated that the fields are approaching each other (converging) through time.
 - b. We might expect them to become essentially alike after 10 to 14 years.
 - c. In all cases, the plowed fields showed the greatest amount of change in comparing the vegetation of the first year field with that of the last year.

2. Using Whittaker's Dominance-Diversity Curves:

- a. Generation of these curves showed increasing diversity in both types of fields through time, as the curves approached the sigmoid shape.
- b. High dominance concentration by a single species was evident in the first one or two years of succession, followed by a sharing of dominance by several species in the succeeding years.
- c. Species Richness (the total number of species per field), which was usually greater in the plowed fields, increased with the increasing age of the fields and converged.
- d. Comparison of the plowed field and hay field curves to each other showed increasing similarity of curve shape through time.

3. Using Shannon-Wiener Diversity Index:

- a. The trend toward greater diversity with increasing field age was substantiated by this Index, but diversity decreased in the mature forest stand.
- b. The plowed fields generally had the greater diversity.
- c. The diversity values are explained best by Evenness in these fields rather than by Species Richness.
- d. The hay fields showed the greatest amount of change in diversity. This change was caused by deterioration of the hay fields six to seven years after the last plowing, and resulted in evenness (the multiplication and even distribution of those species already

present) in the fields. Apparently the high dominance concentration of Dactylis glomerata, during the first six to seven years of succession, plays an important part in the development of vegetation on hay fields.

- e. The increasing similarity of the hay and plowed fields was shown in the convergence of the diversity values in the seventh to ninth years of succession.