

SUMMARY

The successional pattern on upland sites on the Triassic shales of the Piedmont Plateau in New Jersey has been studied, and the following are its salient features:

1. Vegetation

a) Fields abandoned for one year contain the subsequent herbaceous dominants in insignificant amounts, but the erstwhile dominants are Ambrosia artemisiifolia and Oenothera parviflora.

b) By the second year of abandonment, Solidago nemoralis assumes dominance and remains important for approximately fifteen years, when S. juncea supercedes it and becomes the dominant of 60-year old fields.

c) Aster ericoides increases to dominancy by the fifth year and may maintain high coverage for approximately twenty more years.

d) Andropogon scoparius (with some A. virginicus) assumes dominancy by the fifteenth year and remains important for more than forty-five years.

e) Juniperus virginiana invades young fields within the first few years and becomes the dominant arborescent

species for over sixty years.

f) Most of the arborescent species of the oak-hickory forest enter the succession before the red cedar is mature. Oaks and hickories are well established and are in the understory by the sixtieth year of abandonment.

g) The two dominant shrubs of the succession are Rubus flagellaris and Rhus radicans, the former demonstrating maximum coverage in fields abandoned for approximately twenty-five years, the latter at approximately sixty years, the oldest abandoned field studied.

h) As succession progresses, the number of annuals and non-indigenous species decreases while the number of those species whose fruits and seeds are disseminated epizoically or endozoically is increased.

2. Soils

There appears to be a lack of decisive correlation between any of the investigated physical and chemical properties of the soil and the age of abandonment of the fields. Discrepancies appeared to be due to the slight but important textural differences between the soils. It may be demonstrated that the organic matter content, moisture-holding capacity, total exchange capacity, conductivity and nitrate content may increase slightly towards the oak-hickory forest, but this cannot be demon-

strated in fields of varying textural qualities. This situation could only be ascertained if a single field were investigated periodically over a protracted period of time.

3. Roots

Depth of penetration of the roots increases with the age of abandonment. The greatest density of roots is noted in the upper 15 cm. of the soil in every stage. The smallest roots are encountered in the upper horizons, the larger ones in the lower horizons. There is no evidence in the comparative root systems of the earlier and later arborescent dominants to indicate their differential competitive ability.

4. Causation

Causation of succession is to be sought in a study of the life-cycles and tolerances of the various species. Among the factors most important in determining the successional pattern are shading and its attendant effects.