Minnesota Forestry Research Notes

No. 210
October 15, 1969

OCCURRENCE AND DISTRIBUTION OF PINE REPRODUCTION IN ITASCA STATE PARK, MINNESOTA

Vilis Kurmis and Henry L. Hansen[1]

This is the second report dealing with the advance reproduction in Itasca State Park. The general patterns of advance reproduction in upland forest communities were discussed in the preceding report (Kurmis and Hansen, 1969). This report focuses attention on pine reproduction and analyzes the relationships to motherstands and forest types using the synecological coordinate method (Bakuzis, 1959).

Pine reproduction is emphasized because of the management problems related to securing pine continuity in the park. Red pine (*Pinus resinosa* Ait.) and white pine (*Pinus strobus* L.) stands were an important component of the pre-settlement forest, and they are of great aesthetic value. However, attrition in old growth red pine and white pine stands is high. Such stands are predominantly 140 to 160 and 200 to 250 years old, and jack pine (*Pinus banksiana* Lamb.) stands are from 70 to 90 years old. Young pine stands are almost absent.

Distribution Patterns of Mature Pine. Figure 1 compares distribution of the three native pines by basal area. Reproduction by age groups is also shown in relationship to mothertrees, local forest types, and moisture-nutrient gradients. The diagrams in Figure 1 clearly reflect the concentration of jack pine trees on dry, nutrient-poor sites and red pine on dry to mesic, intermediate nutrient sites. White pine is more evenly distributed over the upland forest complex, mainly as an admixture species in a variety of forest stands. The basal areas of pines are shown in relationship to total stand basal area by forest types in Figure 2-1.

White Pine Reproduction. The distribution pattern of white pine reproduction shows its superior competitive ability (Figure 1). Young white pine seedlings are able to withstand competition for some time even in jack pine-red pine-liverleaf, red pine-sweet cicely, and aspen-birch-oak-arrow wood types with high shrub densities (Figures 1, 2-2, and 2-3). However, the persistence of white pine seedlings is limited. Seedlings older than 10 years show a bi-modal distribution being present on dry, nutrient-poor sites, mainly in the jack pine-bearberry type, and on mesic, nutrient-rich sites in the maple-basswood-leatherwood type (Figure 1). Reproduction older than two years reaches its peak in the jack pine-bearberry type with about 1,500 seedlings per acre followed by maple-basswood-leatherwood type with about 400 seedlings per acre (Figure 2-3).

[1] Research Associate and Professor, respectively, School of Forestry, University of Minnesota.

Published by the School of Forestry, University of Minnesota, St. Paul, Minnesota 55101, cooperating with the Division of Forestry, Minnesota Conservation Department, and Forest Industries of Minnesota

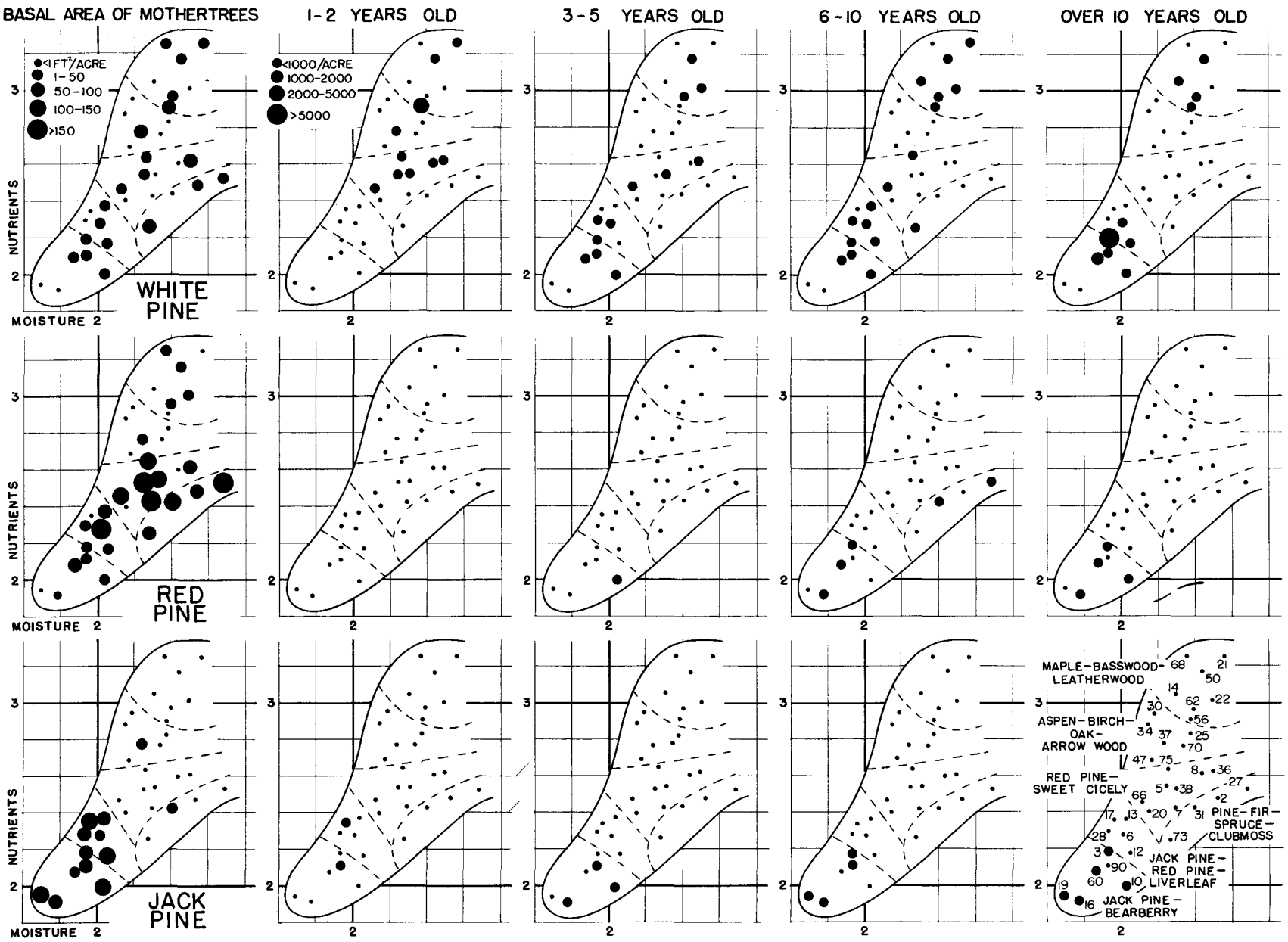

Figure 1. Distribution of basal areas of white pine, red pine, and jack pine and their reproduction by age groups and local forest types in the moisture-nutrient coordinates (edaphic field) of upland forests in Itasca State Park, Minnesota.