SOME SOIL CHARACTERS INFLUENCING THE DISTRIBUTION OF FOREST TYPES AND RATE OF GROWTH OF TREES IN ARKANSAS

An Abstract

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A. Soil-topographic features influencing the distribution of forest types.

Site features influencing the distribution of forest types in the coastal plain region of the state, in order of their importance, are as follows: (a) Degree of slope, as affecting run-off, drainage, liability and duration of submergence, and (b) the depth, and sand-silt-colloid content of the A horizon of the soil. In the mountainous areas of the state; (a) direction of slope and resulting exposure, and (b) soil profile characters as above, are most important in determining forest type occurrence and distribution.

The relationship of these features, as embodied in phases of specific soils series types, to forest type occurrence, is shown in outline in the original article.

B. Soil-topographic features influencing the rate of growth of trees.

Conclusions, based on a study of the rate of growth of short-leaf pine and loblolly pine, as related to soil characteristics, are as follows: The best pine sites (site indices 90-110) are the soils of small stream valleys in the coastal plain region. These soils are immature, loose, with deep silty or sandy loam A horizon; surface and subsoil drainage are fair. Also included in this superior site group are flat, or rolling, loessial soils with loose, deep, sandy or silty A horizon; surface and subsoil drainage fair.

Sites of intermediate quality (site indices 70-90) are: (a) Rolling, sandy loams of the coastal plain region. The A horizon of such soils is around 20 inches deep, usually sandy or sandy-clay loam, and the B horizon is friable or plastic clay. Such soils have good surface drainage and fair to good subsoil drainage. (b) Flat soils of the coastal plain region. The A horizon of such soils is around 22 inches in depth and has high silt content; the B horizon is relatively high in colloidal material. Such soils have rather poor surface and subsoil drainage.

The poorest pine sites (site indices 35-60) are as follows: (a) Soils of the coastal plain region with shallow A horizon and impervious B horizon. (b) Sloping and/or stony, gravelly mountain soils, the A horizon sandy, stony loam around 17 inches in depth, the sandy clay B horizon usually stony and fairly permeable. (c) Hilly, loessial soils with shallow A horizon and tight, hard B horizon, as of Crowley's Ridge.

Soil features determining the amount of available water seem to be more influential than any others in determining the rate of growth of pine. These factors are: (a) degree of slope and its effect on drainage, (b) exposure, as affecting surface losses, and (c) the depth, or spatial relationship and physical structure of the soil horizons, particularly the A horizon.

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