THE USE OF SOIL-SITE FACTORS IN PREDICTING TIMBER YIELDS

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The work of the Soil Conservation Service is directed primarily toward assisting farmers in planning for good land use. When the woodland, for example, lies on steep erodible slopes, our farm planners encourage the owner or occupier to consider his trees as the only crop that may safely and permanently occupy the land.

The farm planner therefore is, in a large sense, a salesman. He is selling the proper crop to fit the capabilities of the land. His previous technical training, like that of any other salesman, is secondary to his natural ability to convince farmers that a conservation program is worth what it costs. The agronomists and the soils scientists have furnished the planner with information as to what yields can be expected from various field crops and grasses on specific soils, but because of the meager information available from research and experience, the foresters have been unable to give much assistance in predicting the growth of woodland.

A man who introduces the idea of woodland cropping must be prepared to answer the inevitable question, “How much will my woods produce?” In such a typical circumstance, all the farm planner could do, if he did anything, was to consult a forester, who in turn spent a couple of days or more cruising, taking borings, and making computations on a relatively small patch of farm woods. The forester eventually got an answer but not until he, as a rule, had made the whole forest cropping idea so mysterious and confusing that, not only the planner, but the farmer reasoned that this timber production business was something that required a forestry school education. All of which was not helpful in getting timber cropping applied. It explains the necessity of devising a less cumbersome and more easily applied method of arriving at the productive capacity of farm woodland.

The purposes of this paper are to present (a) the steps in the development of a hypothesis which states that an evaluation of the yield of a specific timber type can be tabulated with reference to the soil-site conditions occurring within the forest type, which will permit a man with only a very elementary knowledge of soils and forestry to determine the approximate current production of oak woodlots in the agricultural region of the upper Mississippi Valley.

FACTORS INFLUENCING VOLUME OF TIMBER

First consideration should be given to the important factors that influence the volume of growth of trees of a given species than are the physical factors. In attempting to segregate various soil types into groups having about the same productive capacity, the writer has proceeded on the theory that the relative proportions of chemical elements in soils under natural forests do not materially affect yields within the same type, provided the features that have influenced the development of the soils are taken into consideration. Thus far we have no evidence to disprove this theory, hence the soils upon which oak occurs as a predominating species in the Upper Mississippi Valley have been broken into eight groups, the separation based primarily on the factors that influence the availability of moisture to the tree roots.

There are three groups of loams. Most productive are those soils that have deep previous A and B horizons and with the impervious parent material below a point where root growth is adversely affected. As the A and B horizons become shallow, or the B horizon becomes more compact and impervious, the groups show declining productive capacity. If the yield of pine were under consideration, the sand types of soils would require a more detailed breakdown than we have proposed for oak.

SOIL

There is not much question that the medium in which the roots of a plant live is the most important single factor influencing its growth. Auten (1), Turner (6), and Lunt (3) have indicated that the physical soil factors are more important in growth of trees of a given species than are the chemical factors. In attempting to segregate various soil types into groups having about the same productive capacity, the writer has proceeded on the theory that the relative proportions of chemical elements in soils under natural forests do not materially affect yields within the same type, provided the features that have influenced the development of the soils are taken into consideration. Thus far we have no evidence to disprove this theory, hence the soils upon which oak occurs as a predominating species in the Upper Mississippi Valley have been broken into eight groups, the separation based primarily on the factors that influence the availability of moisture to the tree roots.

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