PLANTATION SPACING AND SITE CONDITIONS

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Most Wisconsin plantations have been established at a spacing varying from 4 by 4 to 6 by 6 feet. Usually the choice of the spacing was entirely arbitrary. Largely because guidelines did not exist, consideration was not given to tree species, age of planting stock, or site conditions. However, during recent years, many plantations have reached pole size, and the performance of differently spaced trees can be appraised. The results of some observations have brought a strong reaction against dense plantations and suggestions for wider spacing. Such recommendations may be well justified under certain, but hardly all, conditions. The spacing does not influence the growth of trees alone; it also affects several other important aspects, such as forest protection, genetic quality of the growing stock, and soil conservation. The following list consists of advantages and disadvantages of plantations established at wide spacings, especially those exceeding 6 by 6 feet.

Advantages of wide spacing of plantations

1. Establishment of plantations costs less.

2. Trees are likely to attain larger diameters and become merchantable at a younger age.

3. On weed-free soils of low productivity, stands may not be affected by acute shortages of water and nutrients for a longer period; thus, unprofitable thinning may be avoided.

4. Trees bear seed at an earlier age, with resulting acceleration of natural regeneration of the stand.

5. Certain aspects of forest management and utilization are simplified.

6. The growth of herbaceous and fruit-bearing plants may provide more food for man and wildlife.

Disadvantages of wide spacing of plantations:

1. The period of acute fire hazard is extended because of the delayed suppression of weed vegetation, which during the dormant season provide's highly inflammable material.

2. Tree growth may be considerably reduced by prolonged competition of weeds.

3. The efficiency of younger plantations exposed to moderate runoff and controlled soil erosion is decreased because less rainfall is intercepted by crowns.

4. The improvement of soil fertility is less because the soil is deprived of fertilization by the nutrient-enriched foliage of naturally or artificially thinned out subdominant trees.

5. Conditions favorable for certain parasite vectors and parasitic insects are extended.

6. The timber and pulpwood produced have a lower value because of a higher proportion of branches and knots and an increased content of organo- soluble s.

7. Open stands are much more likely to suffer a deterioration of site conditions and a depression in their rate of growth due to adverse influences of wind, rise of phreatic water, accumulation of vadose water, compaction of surface soil by raindrop impact, and browsing.

8. The genetic quality of the growing stock is lowered by reduced natural selection.

This review suggests that the choice of tree spacing requires careful consideration of the nature of the soil, composition and density of competing vegetation, and a number of other ecological factors. The recent trend to reject narrow 4- by 4-foot spacing in planting such trees as jack and red pine may be entirely justified if the plantation is to be established on a soil with a low waterholding capacity, a low supply of nutrients, and a sparse growth of weeds. In contrast, experience in Wisconsin has indicated that close spacing is nearly imperative on podzolized soils with a dense cover of blueberries and other heath plants. According to our observations, the open, so-called "pineapple plantations" lose two-thirds of their increment because of severe weed competition (1). Thus, depending on conditions, establishment of a jungle like plantation may be just as fallacious as that of an orchardlike stand. In most cases, the spacing of pine and spruce plantations in central Europe does not exceed 1.5 meter, and sometimes it is as narrow as about 2 feet (2).

The problem of tree spacing can hardly be solved by a few trials conducted by central research institutions;' widely representative observations by many forest managers are needed. Very little effort or expense is involved in establishing, during the regular tree planting, a few extra plots on important soils of a management unit. Observation of these plots should provide a much more reliable answer than generalized recommendations.

Literature Cited

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