IMPROVING SHORTLEAF PINE SEED PRODUCTION AREAS IN MISSOURI

Robert E. Phares

Until now insufficient information on the effect of stand conditions on seed production has made it difficult to prescribe specific treatments for proposed shortleaf pine seed production stands in Missouri. To get the needed information, the Central States Forest Experiment Station began a study in 1954 to compare seed production of shortleaf pine stands thinned to different densities, by different methods, and with different amounts of understory hardwoods. This study showed that stands selected for seed production should be selectively thinned, leaving 25 to 35 square feet of basal area for the largest and best seed trees in the stands. All competing understory and overstory hardwoods should be removed to increase seed production and to keep the stands open and seed trees accessible.

The thinning treatments were made in 1951, when the trees were about 30 years old. The greatest seed production so far from these stands occurred in 1957. Relations between seed production and stand condition were the same in 1957 as in the poorer seed years.

Seed production in 1957 varied inversely with the residual stand density of pine (Figure 1). The most seed was produced in the stands thinned to 50 square feet of basal area, and the least amount in the unthinned stands. Changes in stand density at the lower levels of stocking produced much greater differences in seed production than changes in stocking at the higher levels. Although the study did not test this, observation of other areas and deduction indicate that the optimum stocking level for maximum seed production per acre is between 25 and 35 square feet of basal area per acre. The greater seed production in thinned stands was due mainly to improved crown development brought about by increased available soil moisture and light to the selected trees. Crown length has increased in the thinned stands but has decreased in the unthinned stands.

Seed production was also influenced by the kind of trees left as a result of the different thinning methods used (Figure 2). Stands thinned selectively and from below produced more than twice as much seed as stands thinned from above, apparently because the larger trees are better seed producers.

Removal of understory hardwoods also significantly increased seed production (Figure 3). In the stands thinned to 70 square feet of basal area, the increase in seed production in 1957 because of hardwood removal amounted to 350 thousand seeds per acre. Even in the unthinned stands the increase amounted to 147 thousand seeds that year. The increase in seed production was attributed mainly to the availability of additional soil moisture for the seed trees.

Although most of the treatments studied influenced seed production, none eliminated annual variations in seed crop size. There were large variations in annual seed production in all stands studied. But, as expected,

differences in annual seed production among treatments were much greater in good seed years than in poor.

There also appeared to be a direct relation between percent of filled seed and total seed production. Stand conditions that favored increased seed production also favored better seed. The relation, however, could not be tested statistically, and further study is necessary before definite conclusions can be drawn.

The following treatments are now being used in establishing seed production areas on national forests in Missouri: The initial cutting in selected stands leaves about 50 square feet of basal area of the better quality trees. As soon as the better seed-producing trees are identified, the poorer seed producers are removed, leaving about 25 to 35 square feet of basal area for trees well spaced throughout the area. Whin the results of other studies become available, more complete guidelines will be prepared for establishing and managing shortleaf pine seed production stands in this area.

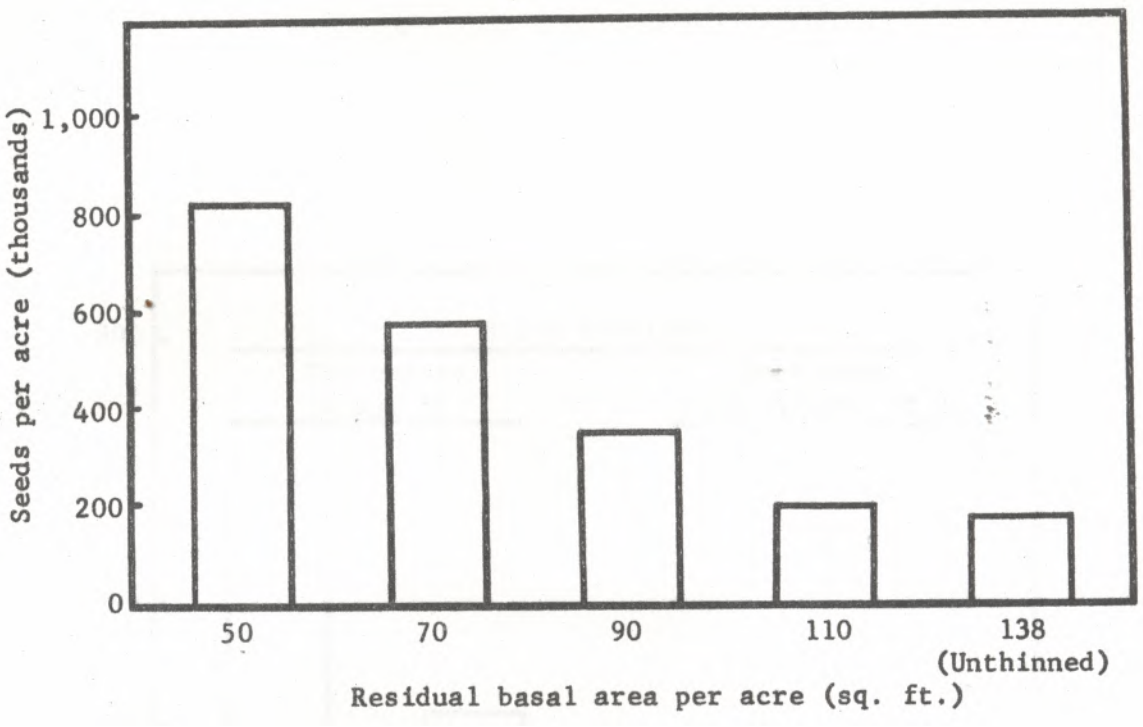

Fig. 1. Seed production in 1957 of shortleaf pine stands thinned to different stand densities.

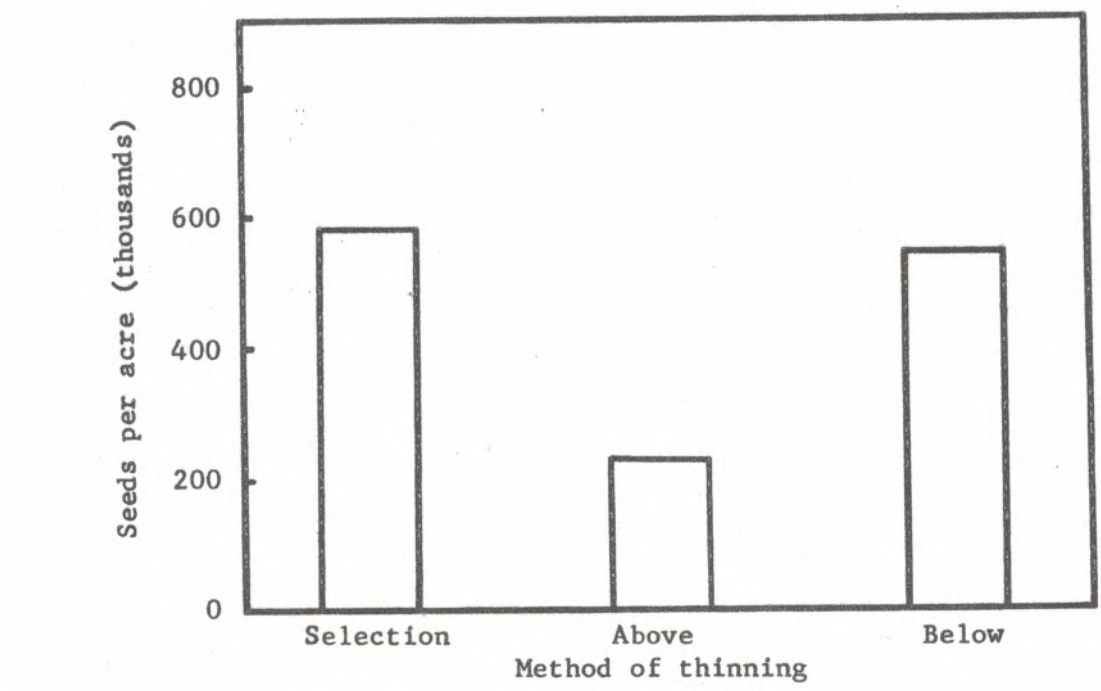

Fig. 2. Seed production in 1957 of shortleaf pine stands thinned to 70 square feet of basal area by different methods.

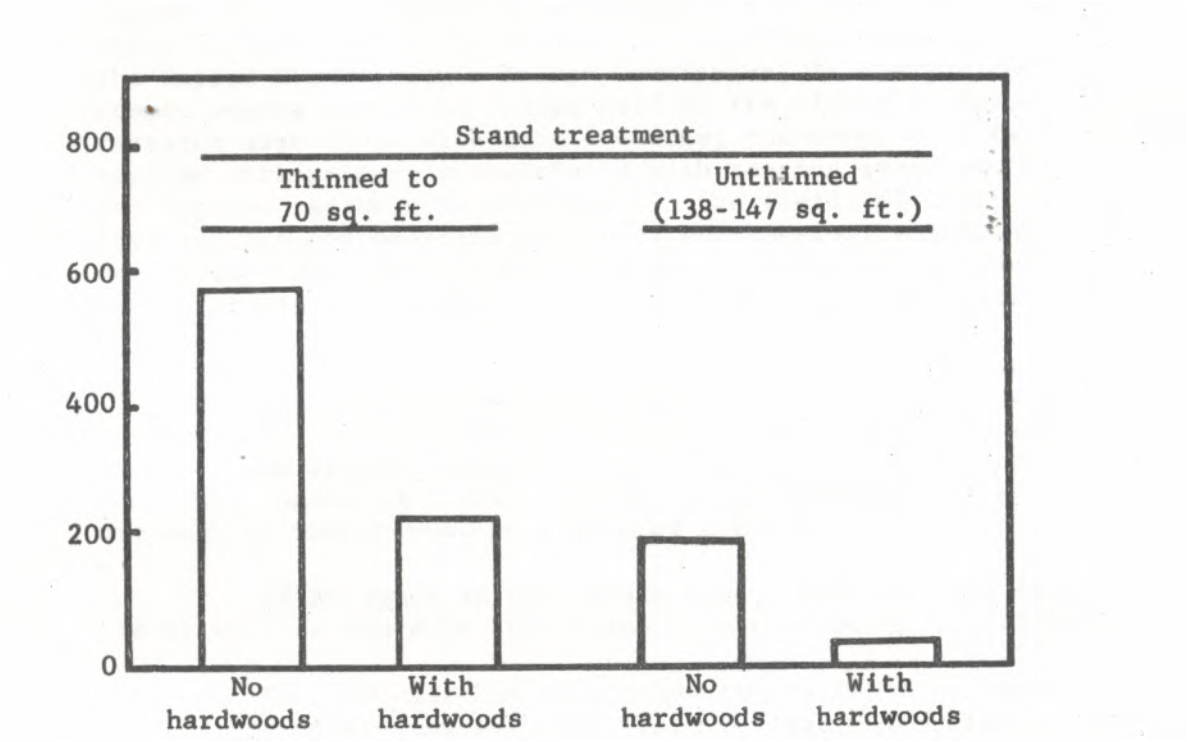

Fig. 3. Seed production in 1957 of thinned and unthinned shortleaf pine stands with and without understory hardwoods.