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DEER FORAGE INCREASED BY THINNINGS IN A LOUISIANA LOBLOLLY PINE PLANTATION

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This paper relates how understory vegetation, especially browse important to deer, was increased by different intensities of thinning in a loblolly pine (*Pinus taeda*) plantation in central Louisiana. Similar plantations exist or are being established on millions of acres in the South and will comprise a large portion of the region's future deer range. The findings reported here may also apply to a substantial additional acreage being direct-seeded to pine.

CHARACTERISTICS OF THE STUDY PLANTATION

Loblolly seedlings had been planted in 1928 at an 8- by 8-foot spacing. The area is relatively flat, but surface water usually drains promptly. Soils are fine sandy loams with moderately good internal drainage. The site index for loblolly pine ranges from 85 to 95 feet, which is above average for the uplands of central Louisiana. Fire has been excluded and grazing by cattle and deer has been very light.

In 1948, and again in 1953, randomized plots within the plantation were thinned to three intensities—to residual basal areas of approximately 100, 85, and 70 square feet of pine per acre. On an additional set of plots, initial thinning to 85 square feet was deferred until 1953, when the trees were 25 years old. Each thinning treatment was replicated four times on 0.4-acre plots; only pines were removed. By 1957, pines formed the dominant and more continuous canopy, hardwoods and tall shrubs the lower and less distinct canopy.

Hardwood stocking was inversely related to pine density (Table 1). The interspersion of hardwoods over 1.5 inches d.b.h. decreased the variation in the total basal area between pine-thinning treatments and hampered the establishment and growth of understory vegetation.

Sweetgum (*Liquidambar styraciflua*) was the predominant hardwood tree species, comprising 71 percent of the total stems. Blackgum (*Nyssa sylvatica*) was next in importance, averaging 12 percent of the stems. Less prevalent trees and large shrubs included southern red oak (*Quercus falcata*), water oak (*Quercus nigra*), red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*), tree huckleberry (*Vaccinium arboreum*), and haws (*Crataegus* spp.).

Litter was composed mainly of pine straw. Its depth varied inversely with thinning intensity, from 1.1 inches under heavy thinning to 1.6 under light thinning.

Rainfall in 1957 totaled 77 inches, about

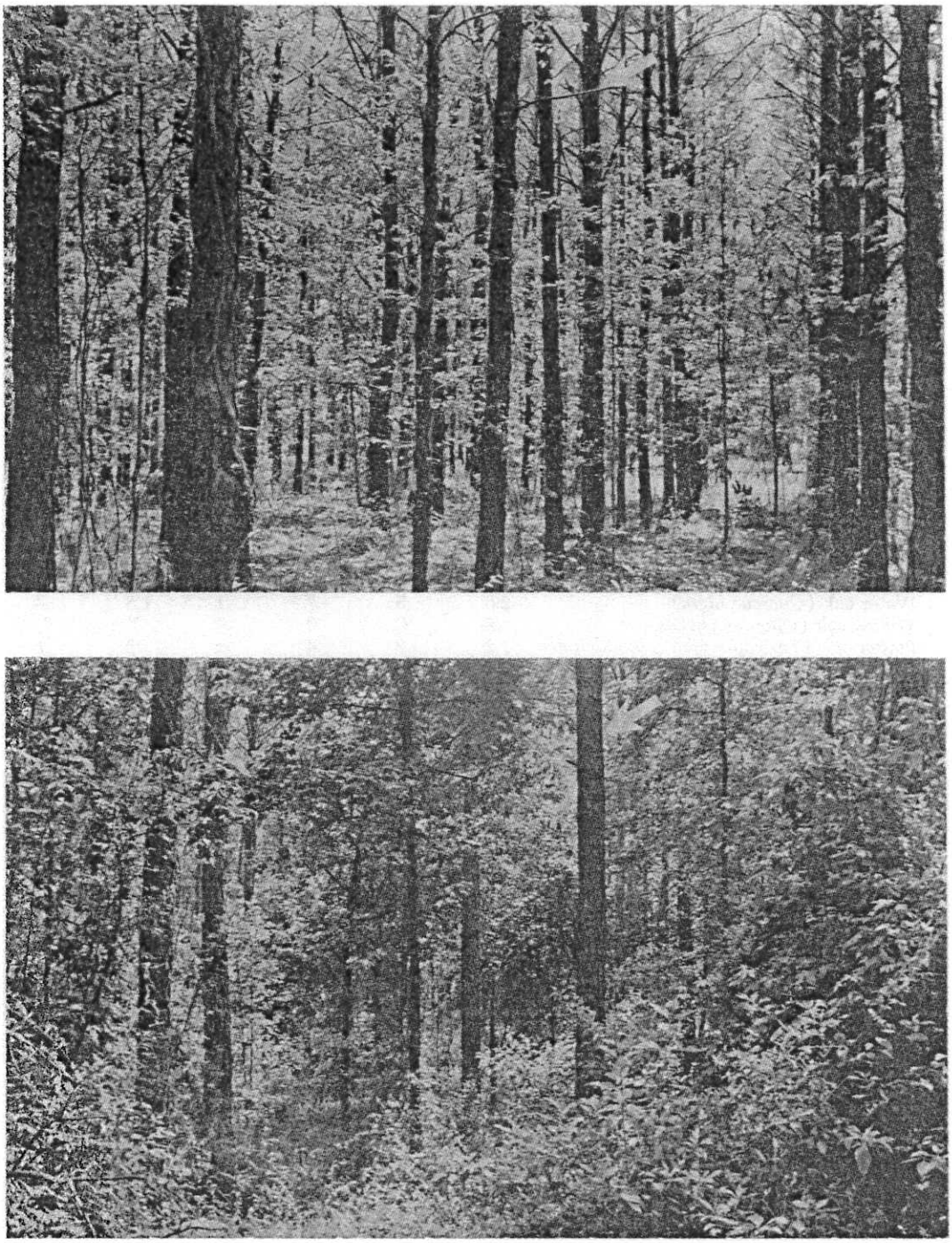


FIG. 1. *Above.* — The study plantation at age 20. Browse plants were scarce in the understory. *Below.* — The same camera point 10 years later. After two heavy thinnings for pulpwood, the plantation was producing 137 pounds of palatable browse per acre.

were the most abundant species of undesirable browse.

Plots in which the first thinning was deferred until age 25 had the same amount of total browse in 1957 as did those thinned moderately at age 20. The proportion of palatable browse to total browse, however, was less under the deferred thinning—54 percent as compared to 63; the palatable species did not gain dominance in the woody understory until about 5 years after initial thinning.

Herbaceous plants yielded less forage than woody species (Table 2). Yields of grass and grasslike plants were 41 pounds per acre on lightly thinned plots and approximately 75 pounds under both medium and heavy thinning. The greater density of shrubs and hardwoods on heavily thinned plots prevented the grass yields from increasing appreciably beyond those under the medium thinning.

Carpet grass (*Axonopus affinis*), arrowfeather threeawn (*Aristida purpurascens*), and several species of uniolas (*Uniola* spp.), bluestems (*Andropogon* spp.), panicums (*Panicum* spp.), and paspalums (*Paspalum* spp.), were the most numerous grasses. Beakrushes (*Rhynchospora* spp.) and sedges (*Carex* spp.) were the principal grasslike plants.

Forb production was low on all plots. Principal species were grassleaf goldaster (*Chrysopsis graminifolia*), sunflowers (*Helianthus angustifolius* and *H. hirsutus*), bonesets (*Eupatorium* spp.), ironweed (*Vernonia texana*), milk pea (*Galactia regularis*), trailing lespedeza (*Lespedeza procumbens*), and skullcap (*Scutellaria* spp.).

PINE THINNING AND CARRYING CAPACITY

Differences in the amount of desirable browse were quite important when related to deer carrying capacity. For example, lightly thinned plots had an average of 57 pounds of desirable browse during the critical winter season. Under an assumed proper-use factor of 40 percent utilization of winter browse, 4.7 pounds of dry matter intake per day (French, *et al.*, 1956), and a diet composed entirely of palatable browse, approximately 75 acres would be necessary to support a 150-pound deer for a year. The heavily thinned plots had 85 pounds of palatable forage per acre in winter; here a minimum of 50 acres would be needed to furnish yearlong range for a 150-pound deer.

An important influence on the deer carrying capacity of pine plantations is the development of hardwoods beneath the pine overstory. When the hardwoods grow beyond the reach of deer, as they will do sooner with heavy pine thinning than with light, forage can be increased by deadening those hardwoods that are of no importance in mast or timber production.

SUMMARY

A loblolly pine plantation in central Louisiana was thinned at age 20 and again at age 25 to residual basal areas of approximately 100, 85, and 70 square feet of pine per acre.

By age 29, stands were generally two-storied, with hardwoods beneath the dominant pines. Stocking of hardwoods was in direct relation to thinning intensity and correspondingly limited the growth of understory vegetation suitable for deer forage. The combined yields of browse, grasses, grasslike plants, and forbs varied from 215 pounds per acre under light thinning to 299 pounds under heavy thinning. Browse palatable to deer ranged from 90 pounds per acre under light thinning to 137 pounds under heavy thinning. Yields of nonpalatable browse were similar under all intensities of thinning. Palatable browse available during the winter averaged 63 percent of the summer's production.

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