

Forage Production on Sprayed and Burned Areas In the Missouri Ozarks

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Some partially wooded areas in the Missouri Ozarks are better suited to producing herbaceous vegetation than timber. One of the biggest deterrents to maximum herbage production on such land is brush crowding out the grass. The problem has been to find ways to control the undesirable hardwood. Burning the woods in the spring has been the traditional way to solve this problem. However, it has been demonstrated that the new chemical plant killers do a more effective job. (Elwell et al., 1950; Elwell et al., 1954; Martin et al., 1954; Silker and Darrow, 1956; Koshi et al., 1954).

An opportunity arose in 1952 to evaluate the effect of both a typical spring burn and herbicides on herbage yield and composition when an accidental fire burned over part of a study area where herbicides were to be tested to control unwanted hardwoods.

The study was made in Dent County, about 10 miles east of Salem, Missouri, on rolling land

with moderate slopes. The soil is a Clarksville stony loam with a surface that consists mainly of cherty stones covered by a light leaf litter.

Forest cover in the area is primarily blackjack (*Quercus marilandica*) and post oak (*Q. Stellata*) with some black oak (*Q. velutina*), hickory (*Carya*), sassafras (*Sassafras albidum*), and other hardwood species. The stand studied consisted almost entirely of sprouts about 6 to 10 feet high. A few sapling, pole-size and larger trees were on the area, and some shrubs such as sumac (*Rhus*) and blueberry (*Vaccinium*) occurred in the understory. Herbaceous vegetation consisted mostly of unpalatable species such as goatsrue (*Teiphrosia virginiana*). Little bluestem (*Andropogon scoparius*), the predominant grass in the study area, was rather uniformly distributed, although the plants were in general spindly and of low vigor.

Periodic burning and grazing had long been common in this

area except for several years just before the start of the study. The fire which occurred on May 11, 1955, burned an area of about 20 acres.

The herbicide was Estron 2,4,5-T applied in early June at a rate of 4 pounds acid per hundred gallons of an oil-water emulsion. It was sprayed on the smaller trees with hand equipment until the foliage was dripping. The larger trees on the study area had been girdled in June 1952.

Nine rod-square plots were randomly selected on each of the sprayed, burned, and control areas. Herbage yield (clipping to a height of 1 inch) and composition measurements were made on 4 randomly located 2.4 square-foot quadrats in each rod-square plot. Estimates of tree cover were based on 40 observations on each rod-square plot and used as a measure of hardwood competition.

Results and Discussion

Sprayed areas produced more herbage of quality than either spring burned or control areas. Spring burning in fact did not significantly increase total yield at all. Five years after treatment with 2,4,5-T, total herbage yield on sprayed areas was about 4.5 times greater than on burned areas and about 5.5 times greater than on control areas (Figure 1). Little bluestem and other perennial grasses accounted for prac-



FIGURE 1. A, plot sprayed in 1952 with 2,4,5-T. Average yield of sprayed plots in 1957 was 1210 pounds per acre (oven-dry). Predominant species was little bluestem. B, plot burned in 1952. Average yield of burned plots in 1957 was 270 pounds per acre (oven-dry). Predominant herbaceous species was goatsrue. Photographed summer of 1957.

tically all of the increased yield on sprayed areas (Table 1). There was no significant difference in yield of forbs on sprayed, burned, or control areas.

The average yield of little bluestem was about 800 pounds per acre on sprayed areas, and only 70 and 50 pounds per acre on burned and control areas, respectively. This species increased so greatly on sprayed areas because of the great reduction in hardwood competition.

Little bluestem occurred in all sprayed plots and only about 80 percent of burned and control plots. It contributed about 65 percent of the total herbage yield on sprayed areas, and only about 25 percent of the total yield on burned and control areas.

Two other very palatable native grasses—Indiangrass (*sorghastrum nutans*) and switchgrass (*Panicum virgatum*)—yielded about 100 pounds per acre on the sprayed areas and nothing on burned or control areas.

One unpalatable legume—goatsrue—yielded more than all other forbs combined. There was no significant difference in yield of goatsrue among sprayed, burned, and control areas. However, this legume contributed only about 10 percent of the total herbage yield from sprayed areas, whereas it made up more than half the total yield from burned and control areas.

Only about 12 percent of the total yield on sprayed areas was made up of unpalatable plants, whereas about 65 percent of the

total yield from burned and control areas consisted of unpalatable plants. Therefore, not only was total yield greater from sprayed areas, but quality of the forage was better.

From this study, then, it would appear that spraying wooded range with herbicides will result in a more complete and permanent release of herbaceous vegetation than can be obtained by spring burning.

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Table 1. Yield of herbage in 1957.

Treatment	Little bluestem	Other perennial Grasses	Goatsrue	Other forbs	Total
(Pounds per acre, oven-dry)					
Herbicide	800	180	120	110	1,210
Burn	70	5	135	60	270
Control	50	10	120	40	220

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