

1986 values, and overall stem counts increased 59 percent. Similar increases were seen in all size classes when comparing 1986 to 1988 values. Specifically, there was a 223 percent increase in the less than 5.08-cm size class, a 15 percent increase in the 5.08- to 15.24-cm size class, a 28 percent increase in the 15.24- to 30.48-cm class, and a 143 percent increase in the greater than 30.48-cm class.

Results show that two burns done at different times of the year (October 1986 and April 1988) and within eighteen months of each other do not offer a reasonable method for controlling this plant. Stem counts were higher in 1987 than 1986, and higher in 1988 than 1987. Controlled burning appears to keep this plant from flowering and setting seed, but its ability to resprout after being top-killed is not diminished.

EXPERIMENTAL USE OF HERBICIDES TO CONTROL BLACK LOCUST (*ROBINIA PSEUDOACACIA* L.) POPULATIONS

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Little Bluestem Prairie Nature Preserve (2.4 ha), near Terre Haute, is the only known virgin sand prairie remaining in Indiana. Aggressive woody invasion by the non-native black locust (*Robinia pseudoacacia* L.) threatens the survival of prairie vegetation in the northern part of this tract. Continuing efforts to control black locust invasion by using herbicides in different treatments and combinations was the subject of this study.

Several years ago, Little Bluestem Prairie was gridded into 25 x 25 m plots. The northern portion of the study area was further divided into thirty-two plots, each 5 x 5 m (randomly chosen for this study: fourteen treated and eighteen control),

which contained a large number of young black locust stems. A 5 x 5 m buffer zone was maintained between each of the study plots to help prevent leaching of herbicides from one study plot to another.

On September 15, 1988, three different herbicides were used for this study: Garlon 4 (Triclopyr), Tordon RTU (Picloram), and Roundup (Glyphosate). Applications were made at 100 percent concentration for Garlon 4 and Roundup; Tordon RTU was applied at 75 percent concentration. Each was applied to the black locust by one or more of the following methods:

- (1) Stem application by frilling the bark and applying to the exposed cambium (all three herbicides).
- (2) Stump application by applying to cut stumps (all three herbicides).
- (3) Stem application by spraying directly on the basal stem (Garlon 4).
- (4) Combination of herbicides at full concentration—foliar application (Tordon RTU and Roundup) and frill application (Garlon 4).

Data were collected every two to three days for three weeks after application, until the time of the first hard frost of the season. Preliminary data were collected by making subjective observations of the plot as a whole and estimating the percentage of stems affected within the plot. Criteria used for the uncut stems were brown leaves and the loss of leaves, while resprouting was used for the stumps. Color photographs were also taken from selected photo-points for future reference.

Additionally, data were collected from three affected buffer zones within a 2-m zone of the perimeters of the herbicide-treated plots. The number of affected and unaffected stems was determined. Also, the distance from each affected stem within the buffer zone to the nearest treated stem was measured.

Stems treated with Roundup herbicide using the frilling method of application

were the first to be affected. Five days after treatment, these stems had lost approximately two-thirds of their leaves. These stems also showed the highest total leaf fall by the end of the fall study period.

Stems treated with a combination of two herbicides also showed early signs of effectiveness. Those plants treated with the Garlon 4 frill and Roundup foliar method lost about one-third of their leaves within one week of application.

The total effect of this herbicide study on black locust cannot be determined until the end of the 1989 growth season. We hope that our continuing study will produce effective herbicide control methods for black locust.

STATE REPORTS

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ARKANSAS

Acquisition Projects

During the past year the Arkansas Natural Heritage Commission (ANHC) completed acquisition of three natural areas and added land to a fourth: Moro Bottoms, a 173-acre tract of the best remaining lowland oak-sweetgum forest in the state (a cooperative project with the Arkansas Nature Conservancy); Flanagan Prairie, the highest quality prairie remnant in western Arkansas; Pine City Natural Area, a lowland pine forest that supports red-cockaded woodpeckers, a federal endangered species; and Hell Creek Cave Addition, a 40-acre area that extends protection to the only known site