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Twig Girdler, *Oncideres Cingulata* (Say), Attacks Terminals of Plantation-managed Pecans

H. E. Kennedy, Jr., J. D. Solomon, and R. M. Krinard

SUMMARY

Sweet pecan, a prized species for use in fine furniture and paneling, is subject to branch and terminal damage by the pecan twig girdler that could cause deformities in the trees. In the young plantation studied, 55 percent of the trees in disked plots and 40 percent in mowed plots were damaged by the twig girdler, but only 19 percent in control plots were damaged. Twig girdlers had easier access to trees in mowed and disked plots because trees were larger, and other woody and herbaceous plants had been reduced or eliminated. Trees were smaller in control plots and had been overtopped by the competing vegetation.

Additional keywords: *Carya illinoensis,* cultural treatment, Sharkey clay, hardwoods, *Oncideres cingulata.*

INTRODUCTION

Sweet pecan (*Carya illinoensis* (Wangenh.) K. Koch) is a prized species for use in fine furniture and paneling. During recent years, it has been commonly called the "black walnut of the South." Many forest managers are expressing greater interest in pecan (Adams 1977, McKnight 1980) for plantation management as a timber species because of its high stumpage value.

In 1979, large numbers of terminals in research plantings of pecan intended for timber production were severed by the twig girdler, *Oncideres cingulata* (Say); notorious for its pruning damage to pecan and other hardwood species (Baker 1972, Bilsing 1916). Previous reports on pecan, however, have dealt largely with twig or branch pruning on orchard or ornamental trees grown for nut production (Gill 1924, Herrick 1904, Payne et al. 1979). This paper reports on terminal and branch damage in young, plantation-grown trees and discusses differences in incidence of attack under three cultural treatments.

METHODS

This study was superimposed on a study originally intended to test the effects of three levels of cultural intensities on survival and growth of six hardwoods on the Delta Experimental Forest near Greenville, Miss. Cultural treatments included disking (clean cultivation), mowing, and control (no treatment). The soil is Sharkey clay, a member of the montmorillonitic, thermic family of Vertic Haplaquepts. Six replications of each cultural treatment included 24 one-year-old seedlings per subplot planted at 3×3 m (10′×10′) spacing. Sweet pecan, one of the species tested, was planted in February 1971. Plots were disked or mowed 3 to 5 times per year through the first 5 years. During years 6 through 9, disking was continued in half the disked plots and half was mowed for weed control. Likewise, mowing was continued in half the mowed plots, while the other half was disked.

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Twig girdler damage was assessed after observations indicated heavy insect attack on terminals and branches of the pecans. Only the pecan plots were used for this study, and results are based on the originally assigned treatments. The following determinations were made for each plot: (1) total height, (2) diameter at breast height (dbh), (3) survival, (4) diameter of terminal or branch at point of girdle, (5) length of terminal or branch from point of girdle to tip, (6) number of trees with terminals attacked, (7) number of trees with branches attacked, (8) total number of girdled branches per tree, (9) number of trees with old girdles and feeding damage. Total tree heights were measured to the nearest 0.03 m (0.1 foot) with a measuring pole and dbh to nearest 0.25 cm (0.1 inch) with calipers. Diameters at the point of girdle were measured to the nearest mm with vernier calipers and lengths of girdled terminals and branches to the nearest cm with a meter stick.

Averages for each variable were calculated and statistical analyses were conducted for a randomized complete block design. Means were compared using Duncan's Multiple Range Test. Arcsin transformations of percentages were made before analyses. Statistical tests were conducted at the 0.05 level of significance.

RESULTS AND DISCUSSION

Average heights, diameters, and survival are shown in table 1. Disking resulted in significantly larger trees and better survival than mowed or control plots. No significant differences occurred between the mowed and control plots.

Fifty-five percent of the trees in disked plots and 40 percent in mowed plots had branches or terminals (fig. 1) girdled in the fall of 1979 (table 1). Only 19 percent of the trees were damaged in control plots, significantly fewer than in the mowed and disked plots. No significant differences appeared in the amount of girdler damage in mowed and disked plots except for mean number of girdled branches. Differences in girdler damage between the control and other treatments probably reflect woody and herbaceous vegetation overtopping the pecan in control plots. No differences in tree size appeared between the control and mowed plots, although competing vegetation in the mowed plots was kept at a low level and vegetation grew unchecked in control plots. In the control plots, most of the pecan had been overtopped by faster growing sprouts of pecan, green ash, and sycamore—apparently making larger pecan sprouts more accessible than the smaller planted pecan. Twig girdlers had easy access to trees in mowed and disked plots with larger trees and reduced or eliminated woody and herbaceous vegetation.

Percentage of trees with girdled terminals ranged from 12.5 percent in control to 21.5 percent in mowed plots (table 1). There were no significant differences by cultural treatment.

Disked plots had significantly higher percentages of old girdles than mowed and control plots. Feeding damage (fig. 2) was significantly higher in the disked and mowed plots than in control plots, probably because of differences in tree size and competing vegetation in the different cultural treatments.

Cultural treatments caused no significant differences in the size of branches and terminals girdled. Diameters ranged from 10.5 mm in disked plots to

Table 1.—*Average heights, dbh, survival, and twig girdler damage on pecan by cultural treatments*

Variable[1]	Control	Mow	Disk
Height—*m* (*ft*)	1.6 (5.4)a	1.7 (5.6)a	2.8 (9.0)b
Diameter—*cm* (*in.*)	1.3 (0.5)a	1.5 (0.6)a	3.1 (1.2)b
Survival—%	57a	59a	84b
Terminals attacked—%	12.5a	21.5a	14.5a
Trees attacked—%	19.0a	39.7b	55.0b
Mean no. branches girdled per plot	4a	11b	24c
Diameter at girdle—*mm* (*in.*)	10.6 (0.4)a	11.4 (0.4)a	10.5 (0.6)a
Length girdled branches—*cm* (*in.*)	64.5 (25.4)a	56.2 (22.1)a	54.1 (21.3)a
Old girdles—%	17.0a	13.8a	38.7b
Feeding damage—%	33.5a	57.3b	68.5b

[1]Within an individual variable, means followed by the same letter are not significantly different at the 0.05 level by Duncan's Multiple Range Test.

H. E. Kennedy, Jr., is Principal Silviculturist, J. D. Solomon is Principal Research Entomologist, and R. M. Krinard is Mensurationist at the Southern Hardwoods Laboratory, maintained at Stoneville, Miss., by the Southern Forest Experiment Station, Forest Service—USDA, in cooperation with the Mississippi Agricultural and Forestry Experiment Station and the Southern Hardwood Forest Research Group.

Figure 1.—*Heavy branch damage from the twig girdler.*

Figure 2.—*Terminal being girdled by a twig girdler.*

11.4 mm in mowed plots (table 1). Lengths ranged from 54.1 cm in disked plots to 67.5 cm in mowed plots.

Twig girdler damage was also noted on some Nuttall oak (*Quercus nuttallii* Palmer) in the plantation. No measurements were made on tree size, but this first report of damage to Nuttall oak by the girdler indicates that Nuttall oak could suffer in years with high twig girdler populations.

CONCLUSIONS

The results of this study show that young pecan trees grown in plantations for timber purposes may be heavily damaged by twig girdlers, especially when plantations are kept free of competing vegetation. Injury by this insect is characterized by girdling and usually complete or nearly complete severing of the terminal or branch. Terminal damage is potentially more serious than injury to branches because of forks and crooks resulting from girdling. Affected trees show reduced timber quality and loss of height growth. This study reports most of the growth for the previous 2 years lost when a terminal was girdled. Loss of girdled branches is less serious but may reduce growth when serious pruning occurs.

Stem girdling occurs in late summer and fall—beginning in August, peaking in September, and ending about the time of the first frost. Forest managers growing pecans should check their young plantations annually in early fall for damage. In plantations isolated from infested natural stands, some control can be obtained by destroying the girdled stems containing eggs and larvae. If increased twig girdler populations cause serious damage, registered insecticides may be used to control infestation.

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