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PRELIMINARY TEST OF PRESCRIBED BURNING FOR CONTROL OF MAPLE LEAF CUTTER (LEPIDOPTERA: INCURVARIIDAE)[1]

G. A. Simmons, J. Mahar, M. K. Kennedy and J. Ball[2]

ABSTRACT

Leaf litter burning in the spring resulted in 87.5% mortality of maple leaf cutter pupae, *Paraclemensia acerifoliella* (Fitch). No apparent damage was observed on sugar maple or beech trees within the burn area.

The maple leaf cutter, *Paraclemensia acerifoliella* (Fitch) is the only member of the family Incurvariidae of economic importance in eastern forests. It is a periodic defoliator of sugar maple, *Acer saccharum* Marsh., red maple, *A. rubrum* L., beech, *Fagus grandifolia* Ehrh., birch, *Betula alleghaniensis* Britton, elm, *Ulmus americana* L. and Hophornbeam, *Ostrya virginiana* (Mill.) K. Koch. The maple leaf cutter is frequently a pest in sugar bushes where reduced sap production reflects loss of photosynthetic surface area. Trees may become severely defoliated, often for several years in succession (Ross, 1958; 1962; Baker, 1972).

Several sources (Herrick, 1922; 1923; Pierson, 1927; Craighead, 1950) have suggested that the maple leaf cutter could be controlled by burning fallen leaves containing pupae either in the fall or early spring. The following describes a pilot test of the effectiveness of leaf litter burning in the spring.

METHODS

The area chosen for study was a 17 acre woodlot 2 miles east of Beulah in Benzie County, Michigan, which had been defoliated for two years by maple leaf cutter. The stand contained sugar maple averaging 16 inches DBH with a few single beech trees scattered throughout.

An area of one square chain (0.1 acre) was selected in the center of the stand for the burning procedure. A fireline was constructed along the perimeter to confine the fire to the test area. The leaf litter was burned prior to spring emergence of adult moths. Twenty-four emergence traps were subsequently placed in the burned area and another 24 traps were randomly placed throughout the remainder of the sugar maple stand. After emergence of adult moths had occurred, each trap was examined for the presence of captured maple leaf cutter moths. A Student's t-test and an estimate of the percentage of mortality were obtained.

RESULTS AND DISCUSSION

Burning is an effective method of treating stands that harbour dense populations of maple leaf cutter (Table 1). Adult emergence within the burned area was significantly lower than in the control area. Pupal mortality approached 90% and was higher than chemical control percentages obtained with Carbaryl (Parker, 1977).

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Table 1. Influence of prescribed burning on maple leaf cutter pupae.

Treatment	Sample Size (Traps)	Emerging Moths ($\bar{x}$ ±S.E.)[a]	Percent Mortality
Prescribed burn	22	3.5±0.9	87.5
Control	24	27.9±4.6	0

[a]Difference significant ($p < 0.001$).

There was no evidence of damage to the trees caused by the fire. According to Johnson[3] (pers. comm.), burning in the spring is not likely to damage large trees due to the succulent vegetation limiting the heat of the fire. Although this stand was free of tree seedlings, Johnson indicated that some seedlings would be scorched if they were present. This would be of no concern, however, in a sugar bush since seedlings and small trees are not encouraged.

These results suggest a large-scale control burn incorporating environmental impact studies would be desirable. Such a study should investigate the impact of fire on natural enemies of leaf cutter, on plants on the forest floor, and on the trees themselves.

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