

# EARLY WARNING SYSTEM FOR ALFALFA WEEVIL MANAGEMENT

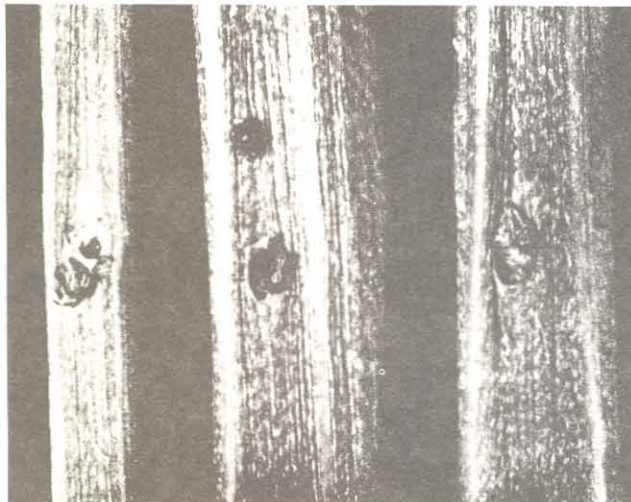
*(Replaces Factsheet "Extended Early Warning System for Alfalfa Weevil Management," March 1981)*

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The alfalfa weevil is the most destructive pest of alfalfa in North America. It was first discovered in southwestern Ontario in 1967, and by 1971 it had spread throughout the southern half of the province. Populations increased steadily through 1977 but have since declined owing to parasite activity and a disease that kills the feeding larvae. However, sporadic outbreaks still occur, and farmers should check their fields carefully each year to detect threatening infestations.

## DAMAGE TO ALFALFA

The larvae (grubs) cause most of the damage. At egg-laying, the female weevil chews a small hole (oviposition puncture, Figure 1) in the stem and deposits a cluster of about 10 yellowish to brown eggs inside. The young larvae hatch from these eggs and crawl to the tips of alfalfa where they feed on the developing leaf and flower buds. As they mature, the larvae attack the leaves and, in heavy infestations, shred the leaves so badly that the field takes on a greyish-white or frosted appearance. Because 70% of the alfalfa protein is in the leaves, a damaged crop has a much lower feed value.



**Figure 1.** Oviposition punctures of the alfalfa weevil female.

Experience in Ontario has shown that the peak of larval attack often coincides with the late bud stage of the first crop. When this occurs, the field should be cut immediately to destroy the larvae and eliminate feeding damage. This is also the best time to cut the crop for maximum yield of protein. However, in 1985 the pest developed faster than the crop, and owing to lack of bulk the alfalfa cannot be cut early enough to prevent serious feeding damage. In this case, chemical treatment may be necessary.

Time of cutting the first crop is dependent upon the weather and other factors such as soil conditions, stand quality, and slope exposure. Some of these factors also govern development of the pest. Each alfalfa grower should check his fields and decide what action is necessary to protect the crop.

Recent studies at the Ottawa Research Station have led to development of an early warning system that will provide growers in Ontario with up to 10 days lead time in making management decisions. The procedure is to take alfalfa stems from the field at 3 or 4-day intervals and count the number of oviposition punctures in a sequence of 3-stem bouquets.

## SAMPLING METHODS

### What is sample

A bouquet of three alfalfa stems cut off near ground level (Figure 2).

### When to sample

check alfalfa fields weekly during May and early June, taking the first sample when the crop is 10 to 12 inches high.

### How to sample

Visually divide the field into quarters and collect bouquets at random by walking through each quarter in a diagonal path (Figure 3). Collect 40 bouquets (10 per quarter) at evenly spaced intervals and place these in paper or plastic bags, 10 bouquets to a bag. It is preferable, but not essential, to keep the bouquets separate.



Figure 2. Sampling unit of three alfalfa stems.

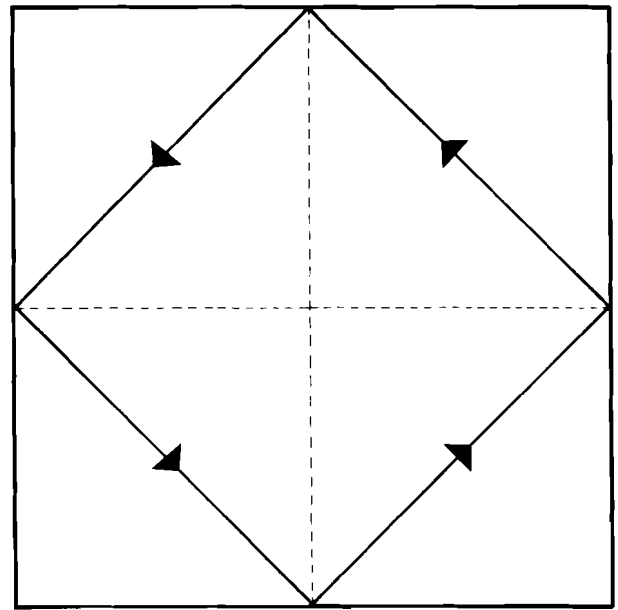


Figure 3. Sampling pattern.

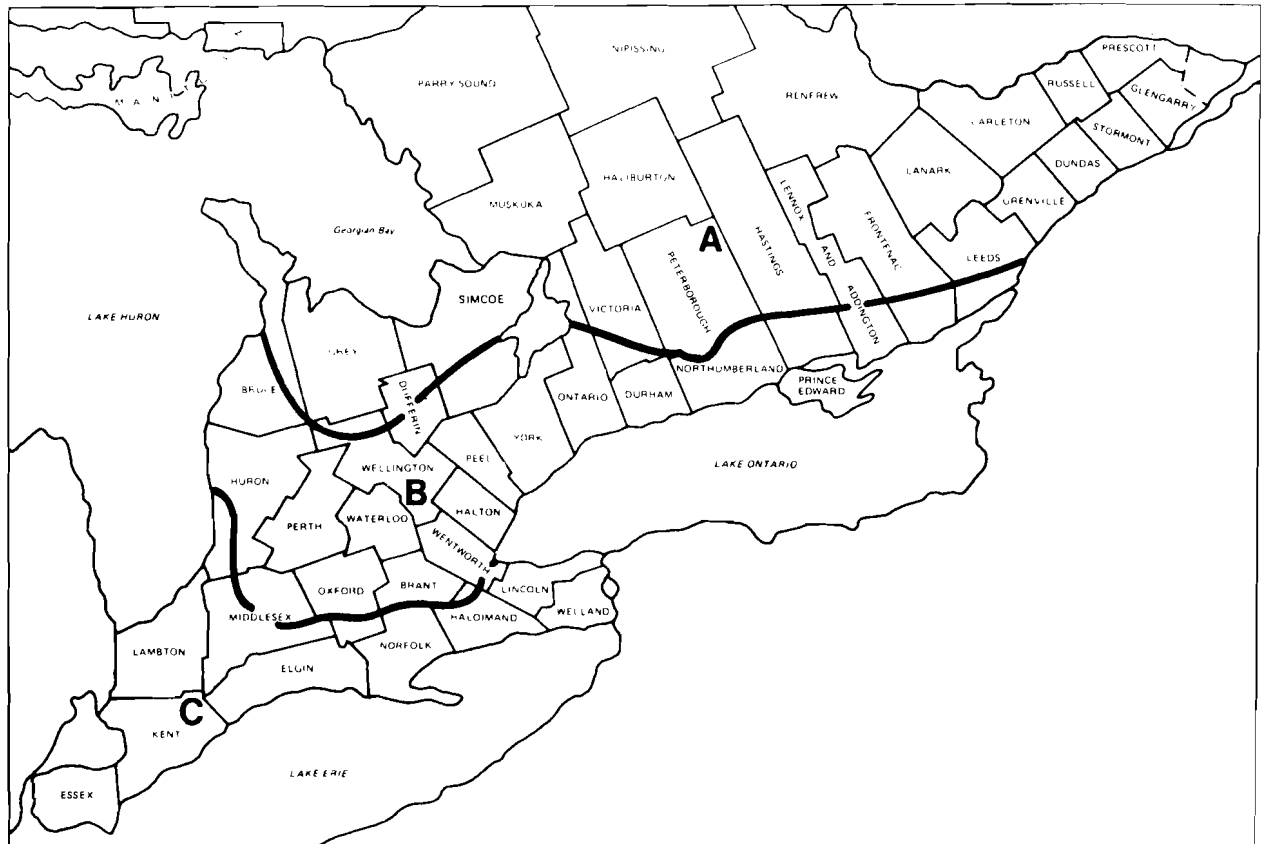


Figure 4. Map of southern Ontario zoned according to the proportion of alfalfa weevil eggs laid in the litter during early spring. See appropriate sampling table.

### Examining the stems

Remove stems (in sets of three) and count the number of oviposition punctures under a hand lens or magnifier. Examine 12 such bouquets, taking successive bouquets from different bags. Enter the total number of punctures in the sampling table for your geographic zone as indicated in Figure 4. If the running total lies between the two limits, examine more bouquets. Add to previous total and recheck after every bouquet is examined. Continue this process until a decision has been reached, that is, when the running total reaches either of the 2 limits. If it equals or exceeds the upper limit, the infestation is serious enough to require treatment. If it equals or falls beneath the lower limit, it is not.

### ACTION

**Treatment** Cut the crop within 10 days. If other work is more urgent, or if crop volume is not sufficient for cutting by that time, spray with a pesticide.

**No treatment** No action is required at this time. Continue to sample twice weekly.

**Note** If larval populations are heavy at the time of cutting, continued feeding may retard the regrowth. When this occurs, spray stubble with a pesticide. Recommendations for chemical control of the alfalfa weevil are continued in Ontario Ministry of Agriculture and Food Publication 296, *Field Crop Recommendations*.

### SAMPLING TABLES

Sampling tables for the three geographic zones are shown below. These reflect regional variation in the proportion of weevil eggs laid in the ground litter (and thus not recorded) in early spring before alfalfa growth begins. Note that southerly slopes in Zone B are regarded as Zone C owing to earlier activity of weevil in such locations.

#### SAMPLING TABLE for Zone A

NUMBER OF PUNCTURES			
Total numbers of bouquets	Running total	Lower limit	Upper limit
12	_____	4	16
14	_____	6	18
16	_____	7	20
18	_____	9	21
20	_____	11	23
22	_____	12	25
24	_____	14	26
26	_____	16	28
28	_____	17	30
30	_____	19	31
32	_____	21	33
34	_____	22	35
36	_____	24	36
38	_____	26	38
40	_____	27	40

*If a decision has not been reached by the time all 40 bouquets have been examined, accept a 'treatment' decision if 34 or more punctures have been recorded, and a 'no treatment' decision if there have been 33 or less.*

#### SAMPLING TABLE for Zone B

NUMBER OF PUNCTURES			
Total numbers of bouquets	Running total	Lower limit	Upper limit
12	_____	1	14
14	_____	2	15
16	_____	3	16
18	_____	4	17
20	_____	5	18
22	_____	7	20
24	_____	8	21
26	_____	9	22
28	_____	10	23
30	_____	11	24
32	_____	13	26
34	_____	14	27
36	_____	15	28
38	_____	16	29
40	_____	17	30

*If a decision has not been reached by the time all 40 bouquets have been examined, accept a 'treatment' decision if 24 or more punctures have been recorded, and a 'no treatment' decision if there have been 23 or less.*

#### SAMPLING TABLE for Zone C and Southerly Slopes in Zone B

NUMBER OF PUNCTURES			
Total numbers of bouquets	Running total	Lower limit	Upper limit
12	_____	0	11
14	_____	1	12
16	_____	2	13
18	_____	3	14
20	_____	4	15
22	_____	5	16
24	_____	6	17
26	_____	7	18
28	_____	8	19
30	_____	9	20
32	_____	10	21
34	_____	11	22
36	_____	12	23
38	_____	13	24
40	_____	14	25

*If a decision has not been reached by the time all 40 bouquets have been examined, accept a 'treatment' decision if 20 or more punctures have been recorded, and a 'no treatment' decision if there have been 19 or less.*