

ALFALFA INSECTS

AG-FO-3516
1988

UNIVERSITY OF MINNESOTA
DOCUMENTS

NOV 17 1988

ST. PAUL CAMPUS
LIBRARIES

ENTOMOLOGY PENNY IVES

GOALS OF SAMPLING:

- (1) Correct identification of pest and beneficial insects in alfalfa.
- (2) Accurate and timely assessment of insect populations and damage, for comparison with economic or action thresholds.

Both (1) and (2) are needed to make appropriate pest management decisions.

For aid in identifying alfalfa insects and damage symptoms see AG-FS-0571 *Common Forage Legume Insects* (color photographs), AG-FS-0582 *Some Important Chewing Insect Pests of Alfalfa* (line drawings with a key), AG-FO-2986 *Forage Insect Pest Management* (descriptions), or contact the Minnesota Extension Service (M.E.S.).

Current economic or action thresholds are available at M.E.S. County Offices or see AG-FO-2986 *Forage Insect Pest Management*, or AG-BU-0500 *Insecticide Suggestions to Control Insect Pests of Field Crops*.

Early Detection—Insect mortality can result from starvation, desiccation and exposure (conditions which often occur when the crop is cut), as well as from predators, parasites, disease and insecticide applications. Most insects are more vulnerable to all of these factors when they are young. The lowest labeled rates of insecticides can often provide effective control when treating young (immature) insects. Hence early detection is advantageous. Nevertheless, control action is still appropriate only when yield and quality savings justify control costs.

SAMPLING INTERVALS

For production of high yielding, high quality alfalfa, the crop should be checked weekly. In cooler weather the days between sampling can be increased. In hot weather, however, the sampling intervals should be decreased (insects develop, feed and reproduce faster under warmer conditions). Shorter sampling intervals are also necessary as insect populations and/or damage approach economic levels. The scouting schedule on page 4 shows when to focus sampling on particular insect pests.

SAMPLING METHODS

Three methods of sampling are recommended in Minnesota for scouting alfalfa insects: 1) Sweep net sampling, 2) Stem sampling, and 3) Ground area sampling (e.g. square foot, yard, meter, etc).

Samples from several different locations in a field are necessary. This ensures that insect populations sampled are representative of insects in the field as a whole. Five locations are usually advised, but more may be necessary in fields with a wide range of diversity in soil type, crop maturity, slope, etc. Choose sampling locations in proportion to the relative area in the field of each condition.

Sweep Net Sampling—This is currently the most convenient method of estimating many of the pest and beneficial insect populations in alfalfa. It is not highly accurate; however, it is sufficient and cost effective for most above ground insect pests of Minnesota alfalfa. Sweep net sampling is *not*

recommended for determining alfalfa weevil, cutworm, armyworm, grasshopper, and aphid populations.

A 15" diameter heavy duty sweep net is required if results are to be comparable with the thresholds provided. For information on where to obtain a sweep net, contact your M.E.S. county agent. In Minnesota, threshold data is expressed in number per pendulum sweep. In this method the net is swung from side to side on a more-or-less vertical axis sweeping down into the alfalfa first in one direction and then the other (2 sweeps). It is important to have the net as low to the ground as practical and to walk briskly when sampling. 180 degree sweeps, which are more horizontal and wider, are used by some workers, but most thresholds used in the mid-west are based on pendulum sweeps.

After 10 or 20 pendulum sweeps, quickly shake the net contents to the bottom of the bag. Grasp the net bag firmly above the sample to prevent escape. The sample may then be emptied into a plastic bag for later identification and counting, or counted in the field. Insects can also be counted in the net. For this the insects are allowed to escape very slowly through a small hole, and identified and counted.

It is useful to carry small vials to collect insects requiring further identification.

Stem Sampling—This is used for monitoring tip injury in alfalfa, and obtaining more accurate estimates of pea aphid abundance than possible from sweep samples. The only tool needed for this method is a carton or bucket in which to put the stems, or a tray onto which to shake the aphids.

Ground Area Sampling—Grasshoppers need to be estimated as the number per square yard; cutworms, armyworms and post-harvest alfalfa weevils as the number per square foot. A sampling frame 1 foot square, made of heavy wire, plastic or wood, and painted a bright color to reduce the likelihood of loss, is useful for square foot sampling of insects as well as for measuring alfalfa stand density.

Weather affects sampling efficacy—Do not take sweep samples when the alfalfa is wet, or under extremely windy conditions; the results will be meaningless. Sampling in still air is preferable to sampling in a light breeze, but is not possible often. Wind has been shown to reduce the efficiency of sweep-sampling adult potato leafhoppers (PLH); see PLH section for details. Sampling in winds of more than 10 mph is not advised.

Insects are more active, and hence more visible and catchable, in warm weather. Cool conditions reduce the efficiency of sweep sampling adult PLH (see PLH section for details). Other insects are similarly affected (to differing degrees); consider this when interpreting numbers caught.

POTATO LEAFHOPPER (PLH)

When—Second and third cuttings should be monitored, particularly young regrowth. Monitoring for PLH may be concluded 7-10 days before harvest, since PLH cause little injury to the more mature growth. First cutting of spring planted seedling alfalfa should be checked closely for PLH.

How—Two ten-sweep or one twenty-sweep sample(s) should be taken at each of 5 locations that taken together represent the range of conditions in the field. In very early regrowth, in which it is difficult to standardize sweeping efficiency, two twenty-sweep samples per site will give a more representative sample.

Weather—Cool conditions reduce the efficiency of sampling adult PLH; at 59° F the catch is 56% of that at 77° F. The table below shows the effect of wind on the efficiency of sweep-sampling adult PLH. 180 degree sweeps are much more severely affected by wind. Use pendulum sweeps, and do not sweep-sample when winds are over 10 mph. When sampling in a light wind a small, hand-held anemometer will enable you to adjust catch figures upward according to windspeed.

EFFECT OF WIND ON EFFICIENCY OF SWEEPNET SAMPLING POTATO LEAFHOPPERS
(from Cherry, Wood & Ruesink, Illinois)

Wind speed (mph)	% Catch by	
	Pendulum sweeps	180 degree sweeps
0	100	100
5	66	41
10	43	16
15	29	7 Avoid sampling

What to count—Sweep sampling does not sample potato leafhopper nymphs as effectively as adults, but as yet there is no other method convenient enough for commercial use. When examining the sweepnet contents, open the bag carefully since many of the adult leafhoppers will readily escape. Total the numbers of both adults and nymphs to determine an average figure of leafhoppers/sweep. Use total leafhoppers to compare with thresholds.

ALFALFA WEEVIL

When—Alfalfa needs to be checked for weevils both pre-harvest on first (and sometimes second) crop, and post-harvest, on the stubble after the first cut. The earliest larvae tend to be found on south facing slopes, as early as May 1 in years with an early spring. Generally larvae are rare or absent by the time of second cut.

How—A variety of methods are used in different parts of the U.S. to determine whether economically damaging levels of alfalfa weevil are present. The Illinois method, which measures and integrates crop growth stage, intensity of weevil infestation, and progress of the infestation, is the most accurate, but has not yet been calibrated for Minnesota conditions.

Meanwhile, monitoring tip injury is recommended as the pre-harvest method. This method is relatively simple to do and appears to be adequate for management purposes. It provides a good rule of thumb estimate for the pre-harvest damage potential of alfalfa weevil.

Fifty to 100 alfalfa stems, (10 to 20 randomly selected from each of 5 locations) are collected and examined for whether they show pinhole—or more severe—feeding damage in the rapidly growing tip leaves and leafbuds.

The number of stems with recent tip injury is divided by the total stems collected, converted to a percent, and compared with the threshold. Do not confuse percent of tips showing feeding damage with percent of stems defoliated.

Post-harvest, it is necessary to monitor regrowth delay and stubble infestation. After the hay has been picked up, the stubble and early regrowth in 20, one square foot samples (4 randomly chosen from each of 5 locations) is searched. As harvesting often concentrates weevil larvae in the windrow areas of the field it may be useful to sample first (or only) from windrows. When regrowth after harvest is sufficiently long to make square-foot counts too difficult, revert to monitoring tip injury.

PEA APHID

When—Generally it is not necessary to monitor or control pea aphids earlier than 2-3 weeks before alfalfa harvest. Aphids are usually kept relatively scarce by natural enemies. Locally higher densities are generally rapidly and effectively reduced by predators, parasites and (especially in warm, humid conditions) disease. If aphids are extremely abundant on seedling alfalfa or early regrowth, however, control may be necessary.

Alfalfa can tolerate fairly high pea aphid popula-

tions. Stem counts need not be taken until about 1/4 cup of aphids are found per 20 sweep sample.

How—The simplest and most accurate method of taking actual counts of pea aphids is to estimate numbers per stem. This is somewhat similar to stem sampling for monitoring tip injury due to alfalfa weevil. Six to 10 stems randomly selected from each of 5 field locations are shaken in a carton or over a tray and the average number of aphids/stem calculated. The stems must be very carefully cut and handled since pea aphids readily fall from the plant when disturbed.

SCHEDULE FOR INSECT SCOUTING IN ALFALFA

Spring growth

Estimate percentage of terminals injured by alfalfa weevil and check for live larvae.

Sweep net sample for pea aphid. If abundant, stem sample.

Observe if unusual numbers of spittlebug nymphs, plant bugs, grasshoppers, cutworms or other occasional pests are present.

Second growth

Check stubble to see if alfalfa weevil larvae are feeding on and retarding growth.

Sweep net sample for potato leafhopper, particularly on younger regrowth.

Stem sample for pea aphid 2 weeks prior to harvest if large numbers are detected in sweep net samples.

Observe if unusual numbers of cutworms, plant bugs, grasshoppers or other occasional pests are present.

Third growth

Sweep net sample for potato leafhopper, particularly on younger regrowth.

Stem sample for pea aphid 2 weeks prior to harvest if large numbers are detected in sweep net samples. Observe if unusual numbers of cutworms, plant bugs, grasshoppers, or other pests are present.

Fourth growth (if applicable)

Sweep net sample for potato leafhopper, particularly on younger regrowth.

Stem sample for pea aphid if large numbers are detected in sweep net samples and alfalfa is drought stressed.

Observe if alfalfa weevil adults or larvae are present, or unusual numbers of cutworms, plant bugs, grasshoppers, or other pests.

Newly seeded alfalfa

Intensify all surveys since seedling stands are more susceptible to injury than established stands.