

# AGRICULTURAL GUIDE

Published by the University of Missouri-Columbia Extension Division

Insect control  
in alfalfa

APR 20 1984

## The potato leafhopper in alfalfa

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The potato leafhopper is often a serious pest of alfalfa grown in Missouri. These insects are small and frequently escape detection by growers until serious damage has occurred. Moreover, the early symptoms of feeding are subtle and often go unnoticed. If not detected in the early stages, yellowing of leaves may be the first indication of a problem. The nutritional value of alfalfa, as well as yield and stand vigor, can be reduced by the feeding of this insect pest.

### Description and life history

Potato leafhoppers are small, green, wedge-shaped insects about  $\frac{1}{8}$  inch long (See picture sheet no. 8). Both the adults and nymphs can move quickly in any direction; however, only the adults have wings and can fly when disturbed. The nymphs are similar in appearance to the adults, except they are wingless and usually yellow (Figure 1).

Because it is killed by cold temperatures, the potato leafhopper does not overwinter in Missouri. Instead, they are carried northward by spring winds from the Gulf States where they live year round (Figure 2). Usually, they first appear in Missouri in April, but populations don't grow to economic levels until June or July. The first cutting usually escapes injury, but later cuttings are frequently damaged. Once established in Missouri, the potato leafhopper can remain troublesome into the month of September.

Eggs are laid in the stems and larger leaf veins and hatch in about one week. In the summer, development from egg to adult requires about three weeks. Several overlapping generations occur each year.

Although the potato leafhopper is a serious alfalfa pest, it has a very wide host range and frequently attacks a number of

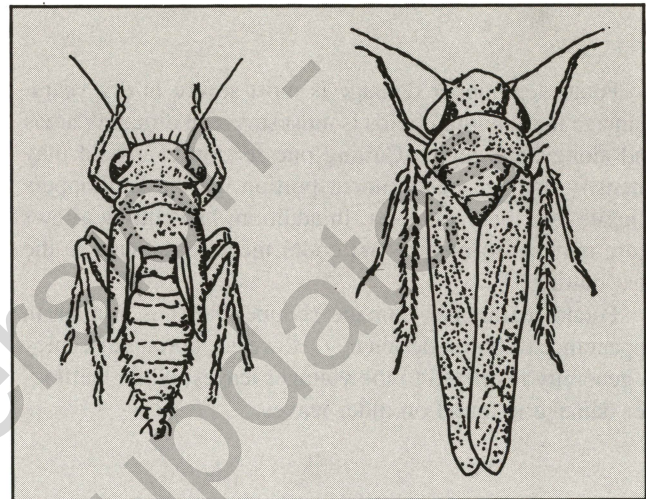


Figure 1. Potato leafhopper nymph and adult.

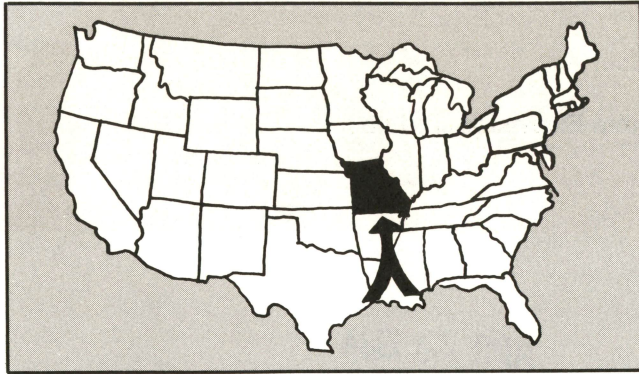
other crops, such as clover, birdsfoot trefoil, beans, potatoes, and soybeans.

### Damage

Potato leafhoppers are capable of damaging alfalfa in several ways, some which are hard to detect. Leafhoppers have piercing-sucking mouthparts to remove plant juices. The nymphs are the most damaging to the plant. Feeding damage is characterized by a wedge-shaped yellow area formed on the leaf tips known as *hopper-burn*. Eventually, the whole leaf turns yellow, and heavily infested alfalfa fields may look yellow.

This feeding results in reduced plant growth and stand vigor and can influence yield the following season. New stands of alfalfa can be destroyed by extensive feeding. The establishment of vigorous stands requires protection from this damage.

Less obvious is the resulting effect on hay quality. As the potato leafhopper feeds, it injects a toxin into the leaf that results in reduced protein and carotene production in the plant from reduced fluid movement. Thus, the nutritional value of the hay as feed for livestock is reduced.



**Figure 2. Potato leafhoppers migrate north each spring from the Gulf Coast States.**

Potato leafhopper damage is most severe in dry years. Damage in individual fields is most severe in droughty areas and along field edges. Cutting one section of a field may intensify damage in the uncut portion, as the leafhoppers migrate into the uncut area. In addition, late cutting allows more nymphs to mature and could increase damage to the next cutting.

Potato leafhopper damage (hopper-burn) is similar in appearance to boron deficiency. However, boron deficiency is generally restricted to the younger leaves, while leafhopper damage is found on older leaves.

## Scouting

The small size and mobility of potato leafhoppers make them a difficult pest for alfalfa growers to detect. The only accurate means of evaluating leafhopper populations in the field involves the use of a 15-inch sweep net. These nets can be purchased from:

Bio Quip East  
1115 Rollins Road  
Baltimore, MD 21228

or

Ward's Nat. Sci. Estab.  
3000 Ridge Rd. East  
Rochester, NY 14622

or

Aztec Biologicals  
311 Bernadette Dr.  
Columbia, MO 65201.

Sweep samples can be taken at any time, if the foliage is not wet. Effective assessment of leafhopper populations requires a series of 20 sweeps. Start with the net to one side, and sweep it through the foliage around in front of you to your other side. Do this while walking briskly, so each of the 20 sweeps covers a different area.

Upon completing a set of 20 sweeps, quickly swing the net back and forth in the air to force the insects into the bottom of the bag. Grasp the bag and close it quickly about 6

**Table 1. Potato leafhopper insecticide recommendation chart.**

Insecticide	Formulation	Actual rate of insecticide per acre	Rate of formulation per acre	Required preharvest interval (days)
<i>carbaryl</i> <sup>2</sup> ( <i>Sevin</i> )	50%WP	1 lb.	2 lbs.	0
	80%WP	1 lb.	1¼ lb.	0
<i>dimethoate</i> <sup>3</sup> ( <i>Cygon, De-Fend, Rebelate</i> )	43%EC	¼ to ½ lb.	½ to 1 pt.	10
<i>methoxychlor</i>	25%EC	1 lb.	2 qts.	7
	50%WP	1 lb.	2 lbs.	7
<i>methidathion</i> <sup>2</sup> (RU) <sup>1</sup> ( <i>Supracide</i> )	2E	½ to 1 lb.	2 to 4 pts.	21
<i>carbofuran</i> (RU) <sup>1,2</sup> ( <i>Furadan</i> )	4F	½ lb.	1 pt.	14
		1 lb.	2 pts.	28
<i>methyl parathion</i> (RU) <sup>1,3</sup>	25%EC	½ lb.	2 pts.	15
	45%EC	½ lb.	1 pt.	15
<i>Penncap M</i> (RU) <sup>1,3</sup> ( <i>encapsulated methyl parathion</i> )	encap. 2 lbs.	½ lb.	2 pts.	15
<i>chlorpyrifos</i> ( <i>Losban</i> )	4E	½ lb.	1 pt.	14
		1 lb.	2 pts.	21

<sup>1</sup>Any insecticide followed by RU (Restricted Use) means that all or some uses of this product have been restricted by the EPA. Any applicator must be certified and licensed before purchasing restricted use products.

<sup>2</sup>Highly toxic to bees exposed to direct treatment, residues on crops or blooming weeds.

<sup>3</sup>Highly toxic to bees; apply after dark or early morning.

inches from the bottom. Count the number of potato leafhoppers in the bag for each set of sweeps.

The number of leafhoppers that justifies treatment varies with the alfalfa height. Generally, if samples average one or more leafhoppers per sweep (20 per 20 sweeps), and the alfalfa is 6 to 12 inches high, then treatment is justified. If alfalfa is less than 6 inches tall (immediately after cutting), then treatment is justified if leafhoppers average one per two sweeps (10 per 20 sweeps). For best results, fields should be evaluated for potato leafhoppers four to five days after harvest when the alfalfa is beginning regrowth and when maximum benefit can be achieved by spraying. You can avoid treatment for potato leafhoppers on taller alfalfa by early cutting; however, it will probably be necessary to spray stubble for vigorous regrowth. The crop must be treated before symptoms of damage show. Once fluid passages are blocked, plants are slow to recover.

## Control

Alfalfa fields with effective leafhopper management exhibit not only increased growth, vigorous regrowth and recovery but also result in improved winter hardiness and better yields the following season. Equally important is the improved quality of the hay. For growers interested in high quality hay for sale or use in dairy or livestock operations, this is especially important.

For control, use any of the materials listed in Table 1. Be sure to read and follow all label directions and restrictions. Because of the short residual activity of many of the compounds and the rapid regrowth of alfalfa, an insecticide will protect only the cutting to which it was applied. Remember that leafhoppers continuously migrate into fields.

## How to spray

Calibrate the sprayer to apply sufficient gallonage and at a speed to give complete coverage of all foliage. Then, add the per-acre dosage of any of the insecticides listed in the recommendation chart. Normally, 12 to 15 gallons of spray are required per acre of alfalfa 8 to 12 inches high. Use from 15 to 20 gallons when growth is rank and dense. For stubble

spray following removal of the first cutting, 10 to 12 gallons per acre are sufficient to give complete coverage.

Aerial application requires the same dosages as listed for ground equipment. Apply the aerial spray in at least 2 gallons of water per acre when used early in the growing season or on the stubble. Increase the gallonage for applications made when the alfalfa is rank and dense.

## Precautions

**Do not** apply dimethoate during the bloom period and not more than one application per year. **Do not** apply carbofuran more than once per cutting, and apply only to pure stands of alfalfa. **Do not** allow workers without protective clothing to re-enter methyl parathion treated fields for 48 hours.

**Pesticide use.** Always handle insecticides with caution. Read, understand, and follow the directions on the label concerning use and safety measures. Wear the protective clothing and devices suggested on the label. Avoid breathing vapors, dust, or contact with the skin. If the insecticide concentrate contacts or contaminates the skin, wash the affected area with soap and plenty of water immediately, and change clothing.

Store insecticides in their original container with legible label securely attached. The storage area should be dry and locked at all times when not actually in use.

Promptly and properly dispose of empty containers as directed on the label. Triple rinse all containers before disposal. Burn combustible containers, but don't stand in the smoke or breathe fumes from the fire. Crush containers that will not burn, and bury them under 18 to 24 inches of soil in an area where drainage will not contaminate surrounding crops, water or wildlife habitat.

Missouri insect control recommendations are revised annually and are subject to possible changes during the growing season. Therefore, this guide is intended for use during the **1984** season only.

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