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Michigan State University

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IPM Facts

Doug Landis and Mike Haas, Department of Entomology and Pesticide Research Center

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Managing Potato Leafhoppers In Forage Legumes

Doug Landis & Mike Haas
Department of Entomology
and the Pesticide Research Center
Michigan State University

The potato leafhopper is a serious alfalfa pest in the Midwest and Northeast. Protecting crops from potato leafhopper damage involves utilization of an IPM (Integrated Pest Management) approach, including timely monitoring of fields, biological controls, practices that promote healthy stands, and pesticide applications when justified.

Identification:

Adults: About 1/8-inch long, the adults are elongated with short, bristle-like antennae. They are lime green with translucent, greenish wings which are held at a roof-like angle over the body.

Eggs: The whitish, elongated eggs are about 1/24-inch long. Eggs are inserted in the plant stems and petioles.

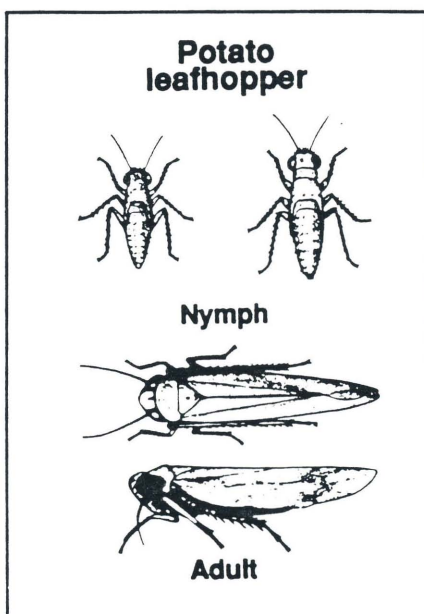
Nymphs: The immature stages (nymphs) resemble the adults, but are wingless. When first hatched the nymphs are approximately 1/32-inch long. Nymphs are pale green and 1/8-inch long when fully grown. The potato leafhopper passes through five nymphal stages before becoming an adult.

Life Cycle:

Potato leafhoppers overwinter in the Gulf states and migrate northward each spring on air currents. They usually arrive in Michigan during May or early June. Migration commonly occurs when a high pressure system east of Michigan and a low pressure system to the west combine to produce sustained flows of air to the north. After arrival, adults locate forage crops for food and a place to lay eggs.

Adult potato leafhoppers readily fly or run sideways when disturbed. Females deposit one to six eggs daily in plant stems, leaf petioles, and leaf veins. The

nymphs hatch in about 10 days. Like adults, they suck sap from leaf veins and run sideways when disturbed. Nymphs molt five times over a period of one to two weeks before maturing into winged adults. There may be several overlapping leafhopper generations per year in Michigan. By late June, leafhopper populations may increase sufficiently to damage hay crops. Leafhoppers will stay in crop fields until killed by fall frosts.



Damage:

The feeding of both immature and adult leafhoppers is damaging to forage crops. Potato leafhoppers inject saliva into plants as they feed, resulting in abnormal cell growth and interference with transport of fluids in the leaves. A visible result of this damage is the characteristic "hopperburn," which starts as a wedge-shaped yellowish pattern on the tips of the leaves. Other symptoms of potato leafhopper damage are stunting of the stems, cupping (curving downward and inward) and curling of the leaves, and retarded development.

Leafhopper feeding damage reduces forage yield and quality in several ways. Damaged plants may be stunted, with heavily infested fields experiencing as much as a 50% yield reduction. Damage also results in substantially lower protein levels. General stand vigor is decreased, leading to slow regrowth following cutting and increased winter kill.

Detection:

Check alfalfa, clover, and trefoil fields for leafhoppers in the latter part of June or shortly after the first cutting, whichever comes first. A heavy duty sweep net should be used to properly sample for potato leafhoppers. Take 20 sweeps in five representative areas of the field and determine the average height of the crop at each location. Economic thresholds for alfalfa vary with crop height (see table). In clover or trefoil, an

¹ Potato Leafhopper: *Empoasca fabae* (Harris)

insecticide application is recommended when there are one or more leafhoppers (adults or nymphs) per sweep of the net. If the infested crop is almost ready to cut, remove it first, check the regrowth and spray if needed. The potato leafhopper remains a threat throughout the season, so checks should continue until the final hay cutting is made.

Management:

Biological Control - A naturally occurring fungal pathogen helps reduce populations of the potato leafhopper under cool, moist conditions. Predators and parasites appear to play only a minor role in regulating this pest.

Cultural Control - Cutting of forages is an effective method for reducing leafhopper damage. Adult leafhoppers will leave the field when it is cut. The wingless nymphs will remain behind, but without foliage to feed on they quickly die. If a field is at or above threshold and is mature, cutting is the preferred control measure.

Chemical Control - An insecticide treatment is justified when leafhoppers exceed thresholds and the crop is not yet mature enough for harvest. With systemic insecticides, 10 gallons of spray per acre with ground equipment is sufficient for effective control. With non-systemic insecticides, a minimum of 10 gallons of spray per acre in small plants (less than about 6 inches tall) and 20 gallons per acre in taller plants should be applied.

| Economic thresholds for potato leafhopper on alfalfa | |
|--|---------------------------------------|
| Stem height (inches) | Average no. leafhoppers per net sweep |
| < 3 | 0.2 adults or nymphs |
| 4 - 6 | 0.5 adults or nymphs |
| 7 - 12 | 1.0 adults or nymphs |
| over 12 | 2.0 adults or nymphs |

Recommended insecticides for controlling potato leafhoppers in alfalfa¹

| Chemical | Formulation ² | Rate ³ | RUP ⁴ | Restrictions ⁵ |
|-----------------------------|--------------------------|-------------------|------------------|---|
| dimethoate (Cygon) | 4 EC | 1/2 - 1 pt | N | PHI 10 days, max. 1 application per cutting. |
| carbaryl (Sevin) | 80 S | 1 1/4 lb | N | PHI 7 days, do not apply if plants are wet. |
| Lorsban | 4 EC | 1 - 2 pt | N | PHI 14 days at 1 pt, 21 days at > 1 pt, max. 1 application per cutting. |
| permethrin (Pounce, Ambush) | 3.2 EC | 2 - 8 oz | Y | PHI 0 at <0.1 lb ai, PHI 14 days at >0.1 lb ai. |
| Furadan | 4 F | 1 - 2 pt | Y | PHI 14 days at 1 pt, 28 days >1 pt, max. 1 application per cutting. |
| PennCap-M | 2 | 2 - 3 pt | Y | PHI 15 days. |
| Guthion | 50 WP | 3/4 - 1 lb | N | PHI 14-21 days; see label. Max. 1 application per cutting. |
| Imidan | 50 WP | 2 lb | N | PHI 7 days, max. 1 application per cutting. |
| Trichlorfon (Dylox, Proxol) | 80 SP | 2/3 - 1 1/4 lb | N | PHI 0 days, max. 3 applications per cutting. |
| diazinon | 4 EC | 3/4 - 1 pt | N | PHI 7 days hay, 0 days grazing. |
| malathion | 5 EC | 1 1/2 - 2 pt | N | PHI 0 days. |

- ¹ Be sure your equipment is properly calibrated. Refer to Extension Bulletin E-1582 **Chemical Control of Insects and Nematodes in Field and Forage Crops**, available at your county Extension Office.
- ² Other formulations may be available.
- ³ Rate per acre.
- ⁴ Restricted Use Pesticide.
- ⁵ PHI = Pre Harvest Interval

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This publication contains pesticide recommendations based on research and pesticide regulations. However, changes in pesticide regulations occur constantly. Some pesticides mentioned may no longer be available, and some uses may no longer be legal. If you have questions about the legality and/or registration status for using pesticides, contact your county Extension office.

To protect yourself and others and the environment, always read the label before applying any pesticide.

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