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Control of

the

Six-Spotted

Leafhopper

in

Southern Ontario



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## SUMMARY

The six-spotted leafhopper, the insect that spreads the aster-yellows virus disease of many plants, may be controlled in lettuce, carrots and celery with sprays or dusts of DDT or malathion. Several applications, beginning about mid-May, may be necessary to obtain economic control of the pest.

## COVER ILLUSTRATIONS

Left. A carrot with advanced aster yellows. Note the excessive hairy growth on the root and the dwarfed shoots of fine yellow leaves from the crown. The larger leaves may show yellowing without twisting.

Right. Symptoms of aster yellows in head lettuce. Upper, symptoms in plant infected early: head loose, some leaves twisted, and central leaves turning yellow. Lower, symptoms in plant infected at later stage of growth: head open, central leaves twisted and yellowed.



# CONTROL OF THE SIX-SPOTTED LEAFHOPPER IN SOUTHERN ONTARIO

by

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Vast numbers of the six-spotted leafhopper<sup>2</sup> are present in southern Ontario from early June until late September. They feed and breed on many plants. The leafhoppers damage and weaken plants by feeding on them, and, of still greater importance, they spread a virus that causes a destructive plant disease known as aster yellows. Lettuce is the most important plant attacked by the leafhopper in southern Ontario, and late carrots and celery are often seriously infected with the disease. The disease is so named because it is common in China aster; when infected, this garden annual seldom produces normal blooms.



Figure 1. Adult of the six-spotted leafhopper.

## DESCRIPTION OF INSECT AND DAMAGE

The adult of the six-spotted leafhopper (Figure 1) is about an eighth of an inch long, is wedge-shaped, and varies in color from light green to dark greenish-brown. When disturbed, the adults may fly considerable distances, but they normally move by short flights of 4 to 5 feet. The nymphs look much like the adults except that they are smaller and have no wings.

In head lettuce that is infected with the disease (cover illustration), the inner leaves become yellowish and curled, usually before or just after heading begins. However, infection and the resulting symptoms may occur at any time during the plant's growth. Infected plants are very susceptible to various rots and never form marketable heads. Entire plantings of head lettuce may be killed by the disease.

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<sup>1</sup>Resigned on February 10, 1960.

<sup>2</sup>*Macrostelus fascifrons* (Stål).

In carrots the first symptom is a yellowing of the young leaves near the center of the crown. As the disease progresses, many fine-textured, abnormally yellowed leaves are formed. Later the carrot top becomes a mass of yellow, twisted, fernlike foliage. Also, many short, fibrous roots grow along the carrot root (cover illustration), and at harvest it is difficult to remove soil from these. Even after the carrots are washed and bunched they have an objectionable appearance. Moreover, they are woody and bitter. Infected carrots are more susceptible than healthy ones to crown and root rots in the field and in storage. In southern Ontario the late crops are often 75 per cent infected. Early carrots usually have only a trace of yellows.

In celery, the symptoms of yellows are much like those in carrots. Most plants infected early are stunted and have many pale stalks sprouting from the crown. In plants infected later the main stalks are yellowish and twisted (Figure 2) and cannot be marketed.



**Figure 2. Aster yellows in celery. Left and middle: stalks bent and twisted by disease. Right: normal plant.**

## DISTRIBUTION

In Canada the six-spotted leafhopper is common throughout all the provinces and the Northwest Territories. It is of greatest economic importance in Ontario, Quebec, New Brunswick, and Nova Scotia, where it spreads the aster-yellows

virus to various vegetables and ornamental plants. In Manitoba and Saskatchewan the disease is also important in sunflower and flax.

## LIFE HISTORY

As far as is known, adults of the six-spotted leafhopper do not overwinter in Canada, but many eggs overwinter on fall-sown rye, wheat, and barley. These eggs begin to hatch in early May in southern Ontario and the leafhoppers become adult about the last week of May. Also, adults migrating from the southern United States reach southern Ontario about mid-May. Here they lay eggs in winter cereals, spring-seeded oats, or early-seeded vegetables. About eight days after being laid, the eggs hatch into small, black nymphs. The nymphs molt five times, becoming adults in about two weeks. The first generation develops mainly on cereals. As these crops mature, adults disperse to nearby vegetables or weeds. They remain there until fall, when they return to winter cereals and another cycle begins. In southwestern Ontario there are four or five generations a year.

## HOW ASTER-YELLOWS VIRUS IS SPREAD

These leafhoppers take up the aster-yellows virus when they feed on infected plants and spread it to healthy plants while feeding. The virus multiplies in both the infected plant and the leafhopper carrying it. Some plants, like cereals, are apparently immune to the yellows although the leafhoppers develop on them.

The virus overwinters in Canada in many biennial and perennial weeds. There is, therefore, always a source of virus that can be taken up by the leafhoppers and quickly spread to healthy plants.

## CONTROL

Since many of these leafhoppers may carry the virus and since they may spread it quickly to healthy plants, it is important to keep the numbers of leafhoppers on susceptible crops as low as possible. Once a plant is infected, there is no way of preventing the disease from developing within it.

The following general recommendations will help to prevent multiplication and spread of the virus:

1. Destroy all weeds on roadsides and ditch banks alongside cropped areas early in the season to reduce breeding sites for the leafhoppers and sources of the virus. Spray these areas often throughout the season with one of the materials listed below.

2. Keep crops free of weeds throughout the season. Purslane, probably the most difficult weed to control in muck areas, is an ideal host of the leafhopper.



3. If possible, pull and destroy diseased plants as soon as symptoms of aster yellows appear.

4. When you have finished cutting successive plantings of head lettuce, spray or dust the remaining plants with an insecticide and disk or plow them under at once.

5. You will get better control of the virus if all growers in your area co-operate by destroying weeds and applying insecticide regularly against the leafhopper.

6. Begin the insecticide applications about mid-May even though leafhoppers may be very scarce. Use one of the following materials in the amount indicated per acre.

### Sprays

The volume of water used will depend on your equipment and the maturity of the crop. Thorough coverage is essential.

#### *Wettable Powders*

DDT, 50% . . . . .	3 pounds
Malathion, 25% . . . . .	4 pounds

NOTE: If you use a low-volume sprayer (20 to 40 gallons per acre), be sure that the return to the spray tank keeps the insecticide in suspension and that the nozzles do not clog. Do not use wettable powders in gear-type pumps or low-volume sprayers.

#### *Emulsible Concentrates*

DDT, 25% . . . . .	2 quarts
Malathion, 50% . . . . .	1½ pints

### Dusts

DDT, 5% . . . . .	30 to 40 pounds
Malathion, 4% . . . . .	25 to 30 pounds

### Number of Applications

#### *Lettuce*

For lettuce, applications every three to five days may be necessary for adequate control.

#### *Carrots*

Early-seeded carrots usually do not require treatment. Treat carrots sown for fall harvest three or four times at 7- to 10-day intervals. Make the first application as soon as leafhoppers are noticed in the crop.



## *Celery*

Treat celery seedlings in frames and outdoor beds as soon as they emerge, and every 7 to 10 days thereafter until about one month before harvest. The insecticides may be added to the spray used for blight control.

## **Cautions**

Follow closely all the cautions listed on the insecticide label. The interval required between the last application and harvest varies with the crop, the materials used, the number of applications, and the amount applied. Keep to the interval given in order to avoid residues that would render the crop unfit for sale.

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For further information write to the Entomology Laboratory, Chatham, Ontario.

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