

AG FACTS

Lettuce and Onion Insect Pests

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DO NOT REMOVE

Aster leafhoppers (1/8-inch long, gray-green, fig. 1) transmit aster yellows disease to lettuce (fig. 2), onions, carrots, celery, and other crops and weeds. The leafhoppers overwinter as eggs in grasses and small grains or migrate into Michigan from southern overwintering sites. Many weeds are sources for the disease, including Queen Anne's lace, pineappleweed, and mare's tail or horseweed. Aster leafhoppers must pick up the disease from an infected plant, and the disease must incubate inside the leafhopper for approximately 3 weeks before it can be transmitted to other crops or weeds. Growers should scout fields at least twice per week to detect newly-arriving leafhoppers. A sweep net is required to sample and correctly identify these active insects.

Green peach aphids (1/16-inch long, yellow-green; fig. 3) are serious pests of lettuce but not onions. Aphids can build up to very high numbers and injure the lettuce plant, causing twisting and distortion of new growth. They can also cause contamination at harvest. They may overwinter as eggs on an overwintering host or migrate into Michigan from southern locations or perhaps overwinter in greenhouses. On the overwintering host, the eggs hatch in the spring and, after several generations on the overwintering host, winged aphids are produced. These migrate to many other weeds and crops, including lettuce, celery and carrots. Winged forms are especially common when the host plant is dying or aphids are becoming crowded. The mother does not lay eggs but gives birth to baby aphids and all will be females. Each aphid can give birth to 50 to 100 young and there may be 5 to 10 generations or more per year. In the fall, a generation with winged males and females is produced. These migrate back to overwintering hosts, mate and lay eggs.

Aphids have an extremely high reproductive rate but are often held in check by natural enemies (lady beetles, hover fly larvae, lacewing larvae, fungal diseases and tiny wasps - fig. 3). Unfortunately, insecticide or fungicide sprays can sometimes disrupt this natural control and result in aphid outbreaks. Aphids can be monitored by direct visual observation of plant foliage. Yellow sticky cards or water traps can also be used, but identification is difficult because many harmless aphids and other insects may also be trapped.

Variiegated cutworms and cabbage loopers are occasionally pests of lettuce and may be a contaminant of the lettuce at harvest. These and other caterpillars can be monitored visually, and adults can be monitored using pheromone (sex attractant) lures and traps. However, preventive treatment is usually required when the crop is close to harvest to ensure crop quality. **Tarnished plant bugs** injure lettuce by injecting a toxic saliva in the process of feeding. This may cause distorted new growth or leave dead areas of tissue in the lettuce leaves.

Onion thrips (fig. 4) are a major foliar pest of onions and also attack many other crops and weeds. They feed by scraping away the leaf surface and can reduce onion growth and yields. Thrips overwinter as eggs in weeds and small grains and may also overwinter in cull onions and onions in storage. During the season,

thrips eggs are laid in the plant tissue and hatch in 4 to 8 days, depending on temperature. Larvae feed on the leaves, especially in protected areas inside the plant, on new growth. They require 4 to 6 days to develop and enter the soil for pupation. Pupation takes approximately 4 days. The adults emerge from the soil and continue to feed on the foliage.

Thrips can be monitored visually. They are resistant to some commonly used insecticides and are also protected from insecticides by their preferred location on the plant; eggs are in the plant tissue, larvae and adults feed in protected areas of the plant and they pupate in the soil.

Onion maggot adults (flies, fig. 5) emerge in mid-April to May and feed on pollen of dandelions and other flowers. Onion maggots are adapted to cool, wet weather and development occurs at temperatures above 40°F. Eggs (fig. 6) are laid in or on the soil at the base of the plants, or sometimes on the bases of the plants. Eggs hatch in 3 to 5 days, depending on temperature. However, the eggs are sensitive to drying and heat (112°F soil temperature is lethal to the eggs). After hatching, larvae (fig. 7) burrow down into the soil and feed on onion roots and the bulb for 2 to 3 weeks. They pupate in the soil (fig. 8) and emerge as adults in 2 to 3 weeks, except for the third generation, where adults emerge the following spring. There are 3 generations of onion maggot per year. Larvae of the first generation can cause severe injury to onion seedlings (fig. 9). Second generation eggs and larvae often have very low survival, except during periods of cool, wet weather. During the summer, the flies prefer previously injured onions for egg laying and larvae have a difficult time entering and surviving on an uninjured well-developed bulb. Third generation larvae feed and develop on cull and sprouting onions left after harvest and overwinter as pupae. Very high survival of larvae during the fall provides high numbers of adults the following spring to attack the new crop.

Onion flies and egg laying can be monitored visually, but the most effective treatment is applied at planting. Onion maggots have developed resistance to all of the common insecticide groups. Foliar insecticide sprays have no measurable effect on onion maggot injury and cause high mortality of natural enemies of the onion maggot. These natural enemies include lady beetles, small ground beetles and rove beetles, a tiny wasp, several predacious flies and a fungal disease, *Entomophthora muscae* (fig. 10). Foliar insecticide treatments should be avoided as much as possible, especially during the seedling stage, when onion maggot injury is most important. Reducing fungicide sprays using onion disease forecasting systems may increase the mortality of onion flies from *Entomophthora*.

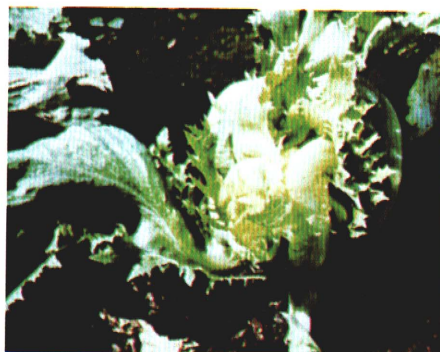
For insecticide recommendations, commercial growers should consult MSU Extension bulletin E-312, *Control of Insects, Diseases and Nematodes on Commercial Vegetables*. Home gardeners consult bulletin HYG-001, *Home Insect Pest Management Guide*.

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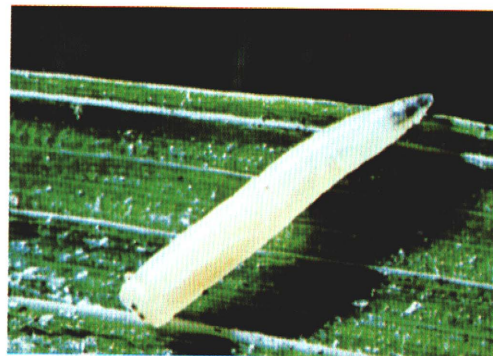
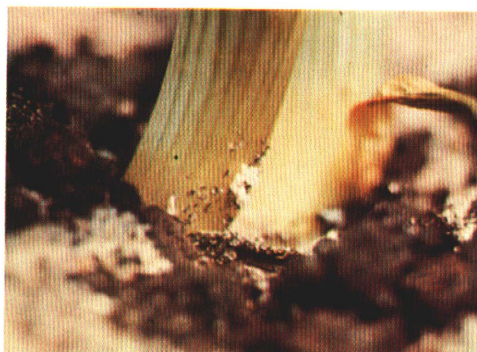
1. Aster leafhopper adult (left: front view; right: top view)

2. Aster yellows disease in lettuce (note growth and yellow color)



3. Green peach aphids (left); nymphs and wasp parasitoid (right)

4. Onion thrips (left: close-up; right: on onion)



5. Onion maggot adult

6. Onion maggot eggs

7. Onion maggot

8. Onion maggot pupa



9. Onion maggot damage in field



10. Diseased onion maggot adult