

## Vegetable Leafminers

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Leafminers are insects that feed on the mesophyll tissue between the upper and lower epidermis of leaves. The insects called leafminers may be the larval stages of flies, moths, sawflies or beetles but those that feed on vegetables all belong to the order diptera - the flies. Leafminers present a more serious problem in vegetables, such as spinach or chard, that are harvested for their foliage. Those species discussed in this publication include the serpentine leafminer (*Liriomyza brassicae*), vegetable leafminer (*Liriomyza sativae*) and the spinach leafminer (*Pergomya hyoscyami*).

### Appearance



Dipteran leafminer with frass and damage

Maggots of the **serpentine leafminer** produce slender, winding mines between the epidermis' of beet, cabbage, radish, spinach, and turnip. Because most of these vegetables are grown at least in part for their foliage, damage results in an unsalable crop.

The **vegetable leafminer** presents more of a problem in greenhouse production than in field-grown crops. However, greenhouse-grown tomato and cucumber transplants are susceptible to attack. The adult is a shiny yellow-brown fly with black markings.

Hosts of the **spinach leafminer** include beet, spinach, chard as well as the common weed, lambsquarters. Adult flies are ¼ inch long, grey with black bristles. The larvae are pale green maggots.

**Symptoms and Effects** The damage that results from leafminer activity may appear as blisters, blotchy mines, or serpentine tunnels. Feces of the larvae can contaminate leafy tissue intended for consumption. Stunting, due to a reduction of photosynthetic leaf surface area, can also be a problem in vegetable crops not marketed solely for their foliage. Spinach leafminers produce serpentine mines initially but later produce large, undifferentiated blotches. Larvae of the vegetable leafminer may feed on more than one leaf and complete their growth.

**Life Cycle** Leafminers overwinter as pupae either in the soil or in infested plant debris. In spring, adult flies emerge and lay eggs on or near susceptible hosts. When the eggs hatch, the larvae immediately begin to enter the leaf and mine the mesophyll tissue between the upper and lower leaf surfaces. Once the larvae have completed development they may remain in the plant or drop to the ground to pupate. There may be several generations per year, however the first generation is often the most damaging.

**Scouting Suggestions** It is important to detect leafminer damage early before the marketability of the crop is reduced. In addition, implementing control must be done before the leafminer enters the leaf where it will then be protected by the plant itself. Leafminer eggs are laid on the lower leaf surface and this is where one should look to locate early mining activity.



Serpentine Leafminer damage

To date, threshold levels have not been determined but the plant stage of growth is an important factor that must be considered when determining whether to implement control as young plants can withstand less damage than older ones. On leafy crops such as spinach, lettuce, and chard, a 5% threshold level is often used.

### **Control**

**Non-Chemical:** Deep plowing in early spring to destroy infested weeds and plant material from the previous season can reduce the severity of leafminer outbreaks. Covering susceptible crops with floating row covers to exclude the flies from laying eggs may also be beneficial. Weed hosts such as pigweed, lambsquarters, plantain, chickweed, and nightshade should also be destroyed.

Parasitic wasps can provide a limited degree of natural control of leafminers.

**Chemical:** Because of the protected habit of leafminers within the plant, insecticidal control is often difficult. In addition, some leafminers populations have exhibited resistance to organophosphate insecticides making control difficult. If insecticides are used, they must be applied early in the insect's life cycle to be effective.

**For pesticide recommendations:** See UW-Extension Bulletin A3422 or contact your County Extension Agent.