Spinach Leafminers

Figures 1, 2. Spinach leafminer damage to Swiss chard (top) and larvae exposed from leafmine in spinach (below).

Scientific Name: *Pegomya hyoscyami* (Panzer) (**spinach leafminer**); *Pegomya betae* Curtis (**beet leafminer**)

Order: Diptera (True Flies)
Family: Anthomyiidae

Identification and Descriptive Features: Spinach leafminers are most often noticed by the large, blotchy mines that they produce on the leaves of spinach, beets and Swiss chard. The larvae are pale yellow maggots found within the leaf mines. Adults are small (5-7mm) grayish and somewhat hairy flies that rarely are observed.

Distribution in Colorado: Two species of roughly similar habit – the beet leafminer and the spinach leafminer – occur in North America and both are present in parts of Colorado. However, spinach leafminer appears to be the dominant species found in Colorado gardens.

Life History and Habits: Winter is spent as a pupa in the soil near the base of host plants present during the previous growing season. Adults emerge in midspring (late April, early May) and, after mating, females lay a series of small egg masses on leaves of host plants over a period of 3-4 weeks.

Spinach leafminer eggs are laid on the underside of leaves, as small clusters. They are about 0.9 mm long, white and elongate. Eggs hatch about 3-6 days after they are laid.

Upon hatch the larvae tunnel into the leaves and begin the leafmining phase of their life. Very small larvae are nearly translucent, but older larvae become larger and develop a dirty white or pale yellow coloration. Larvae initially develop with the leaves on which the eggs are laid and multiple larvae may be present when mines coalesce into a large blotch. Larger larvae may move to adjacent leaves if food is exhausted when the initial leaf is largely consumed. Development is rapid and larvae usually are full grown within 10-14 days after eggs hatch.

Figure 3. Spinach leafminer adult.

Figure 4. Spinach leafminer egg mass.

During the growing season pupation occurs either within the leaf mine or in the soil beneath the plant. Multiple generations (2-4) are produced during the growing season, each cycle with adults emerging, laying eggs and larvae subsequently tunnelling leaves. Larvae developing late in the season (August or later) will usually enter the dormant condition of diapause when they pupate, and not emerge until the following spring.

Spinach leafminer is primarily noticed as a garden pest and is a minor species in large acreages of susceptible crops (e.g., sugarbeets, spinach). In addition to cultivated plants in the family Amaranthaceae (spinach, Swiss chard, beets) they may also feed on related weeds such as lambsquarters and pigweed. Some *Datura* species are also reported as hosts of spinach leafminer.

Management: Problems with spinach leafminer primarily occur in gardens where suitable host plants are grown throughout the season, particularly if spinach is overwintered. This allows for continuous breeding of the insect. Modifying planting plans so that there is a break in the availability of hosts plants can break the life cycle and reduce spinach leafminer populations.

Overwintered spinach and early sown crops that are present when the first flies emerge should be regularly (twice/week) examined for the presence of eggs. Egg masses on leaves can be crushed by a soft squeeze and leaves with actively developing larvae should be picked off and destroyed. (Dropping the discarded leaves in the garden likely will not be effective as the larvae will continue to develop in the leaves.)

Row covers can be useful for protecting new plantings. These will prevent the adult flies from landing and laying eggs on leaves. However, this method likely will not work for overwintered spinach as the overwintered pupae are present near the base of plants and the subsequently emerging adults will be present under the row cover.

Tillage may provide some control by deeply burying overwintered pupae.