



## Spinach Leafminer *Pegomya hyoscyami*



**Figure 1.** Spinach leafminer damage to beet leaves (HGIC, University of Maryland)



**Figure 2.** Spinach leafminer damage on Swiss chard leaves. (HGIC, University of Maryland)

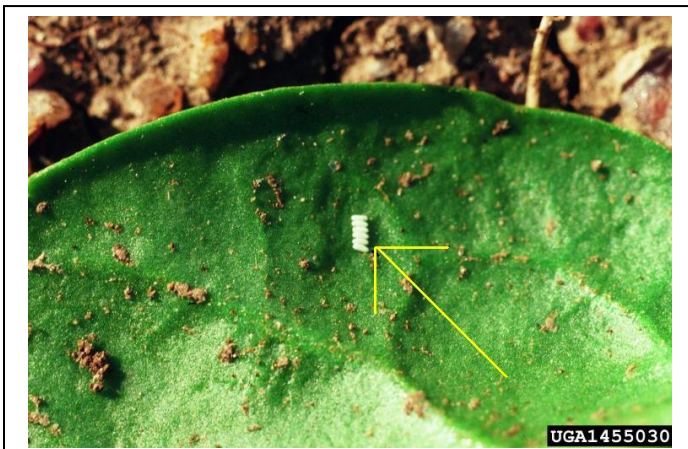
**Injury:** The spinach leafminer attacks spinach, beet, sugar beet, Swiss chard and many weeds including lamb's-quarters, chickweed and nightshade. The insect's mines make the vegetables unsightly and unappetizing as well as destroying part of the crop (**Figure 1** and **Figure 2.**). The maggots feed between the upper and lower leaf surfaces of the host plants mining out the tissue in between. As the maggot grows, the mines coalesce with others and blotches are seen on the affected leaves. It is not unusual for several larvae to be in the same leaf. The spinach leafminer is most injurious to spinach, chard and beet greens. Injury to the leaves of beets and sugar beets also decreases the size of the root crop.

**Description:** The adult of the spinach leafminer is a fly about 1/4 inch long and gray in color. The adults may be seen flying near the ground between the plants. The egg is white and about 1 mm long (**Figure 3.**). The maggot or larval stage is white to yellowish and legless (**Figure 4.**). The puparium or resting stage is a hard, brown structure about 1/5 inch in length.

**Life History:** In April or May adult flies of the spinach leafminer appear in the garden. The females deposit eggs singly or in rows of two to five side by side on the underside of the leaves. In four to six days the tiny maggots hatch from the eggs and work their way into the leaf tissue. The larvae excavate the mine, which is at first thread-like, but as the maggot grows the mine becomes blotch-like. The larvae are full-grown in seven to 16 days at which time they drop to the ground and burrow a few inches into the soil. Here each larva changes to the puparium or resting stage. Two weeks to a month later the adult flies emerge and will soon lay eggs for another brood. In central New York there are three generations and a partial fourth each year. Winter is passed as a puparium in the soil.

**Management:** Because this insect overwinters as a puparium in the soil near where the crop was infested the previous year, **crop rotation** should be practiced especially if one tries to

mechanically protect plants from this insect. Cover plants with **fine netting** or **cheesecloth** or **floating row covers** to protect them from adult egg-laying flies. Netting will not keep out insects that are already in the soil. Be sure that the edges of the row cover are well anchored so insects cannot get under them. The protective covering should be placed over the crop at planting time and, with spinach, might be left on until ready to harvest. **Hand pick** and destroy infested mined leaves when first seen before the larvae drop to the soil will help control the leafminers. If leaves are just placed on a compost pile, fly larvae might continue to develop and emerge as adults to reinfest crops.



**Figure** The white eggs of the spinach leafminer (At the end of the arrow). (Whitney Cranshaw, Colorado State University)

**Control weeds.** Destroying the insects' wild food plants should also be helpful in reducing the numbers of leafminers. This includes lamb's-quarters, chickweed and nightshade in and around the garden

*Control in beets:* Beets are typically not sprayed for leafminers except if leaves intended for consumption are infested. Use horticultural oil, or neem oil. Some products require a longer number of days between application and harvest; check labels.

*Control in spinach:* If needed when mines appear and, if necessary, at seven-day intervals thereafter (check label directions), apply neem oil, or spinosad.

Note: a multipurpose product with insecticidal soap and sulfur should not be used as noted on the label; it damages spinach.

*Always check the pesticide label to make sure both the crop and the pest are listed, and to check for the minimum number*

*of days to wait between application and picking the crop ("Days to Harvest").*

Reprinted from *Spinach Leafminer* prepared by Carolyn Klass, Senior Extension Associate, Department of Entomology, Cornell University, 4/78. 2/91 slightly revised.

Pesticide and management recommendations obtained from: *Part I Guide to Pest Management Around the Home, Cultural Methods* and *Part II -- Pest Management Around the Home, 2009-2010 Pesticide Guidelines*, Miscellaneous Bulletins 199S74-I and 139S74II, Cornell Cooperative Extension Publications. Online versions of these publications are available at <http://ipmguidelines.org/Home/> .

The Pesticide Management Education Program (PMEP), in cooperation with the New York State Department of Environmental Conservation (NYSDEC), maintains a web site with a searchable database for pesticide products currently registered in New York State. Homeowners who have Internet access can locate currently registered products at <http://pims.psur.cornell.edu/>. Several different queries are available that will produce a summary for the product(s) that the system locates. If the system fails to locate the product in question, then that product is not currently registered in New York State. The database also provides a summary of important information related to every product currently registered. Two data fields "Status" and "Expiration Date" are provided in each summary. Products with a status of "Registered - Discontinued" are currently registered but will probably be discontinued for use, sale, and distribution in New York State after the date noted in the "Expiration Date" field.

**This publication contains pesticide recommendations. Changes in pesticide regulations occur constantly and human errors are still possible. Some materials mentioned may no longer be available, and some uses may no longer be legal. All pesticides distributed, sold or applied in New York State must be registered with the New York State Department of Environmental Conservation (DEC). Questions concerning the legality and/or registration status for pesticide use in New York State should be directed to the appropriate Cornell Cooperative Extension Specialist or your regional DEC office. Read the label before applying any pesticide.**

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