

Pacific Pests, Pathogens and Weeds - Online edition

Zucchini (vegetable) leafminer (262)

Common Name

Vegetable leafminer, chrysanthemum leafminer, melon leafminer

Scientific Name

Liriomyza sativae. See other fact sheets for accounts on separate species (**Fact Sheet nos. 259 & 377**) and, for a general account, (**see Fact Sheet no. 110**).

Distribution

Asia, Africa, North (Hawaii), South and Central America, the Caribbean, Europe, Oceania. *Liriomyza sativae* is recorded from American Samoa, Australia (Cape York), French Polynesia, Guam, New Caledonia, Papua New Guinea, Samoa, and Vanuatu. (**see Fact Sheet no. 110**).

Hosts

Wide on many vegetables and flowers. The preferred hosts are plants in the legume, daisy and potato families, but it is recorded from several others (e.g., capsicum, carrot, cucumber, lettuce, melon, onion, tomato, and more).

Symptoms & Life Cycle

The damage is done by (i) the feeding and egg-laying of the female flies resulting in white puncture marks on the leaves, and (ii) the maggots eating between the upper and lower leaf surfaces, making tunnels (or mines) as they go (Photos 1&2). Heavy attacks result in plant stress, moisture loss, defoliation and exposure of fruit, which, in turn, may cause sunscald. On young plants, leaves may die early, leading to the death of the plant. Where mines occur on plant parts that are marketed, consignments may be rejected, even if only slight damage has occurred, because of the concern that the pest can be moved internationally in the trade in horticultural produce.

Eggs are laid in the leaves and this produces small white speckles. The maggots hatch and create white, irregular coiled tunnels (hence the name - the mines look like serpents) as they eat their way through the surface layers. The tunnels increase in size as the maggot grows. Frass or faecal material occurs as black lines inside the mines, first on one side and then the other. When mature, the maggots fall to the soil and pupate.

The adult is a fly, black above, yellow under; the head is also yellow with large eyes. Males and females are similar in colour, but females are larger up to 1.7 mm. Females feed on sap from leaves, making holes with their ovipositors, the tubes used for egg laying; and both sexes take nectar from flowers. The life cycle is rapid, only 2 weeks in warm weather.

Spread is by flying and by the movement of plants, both domestically and internationally, soil or packaging.

Impact

There are many instances of losses from infestations of *Liriomyza sativae* around the world in different crops. Young plants are particularly susceptible to damage, resulting in deformation or death. If attack comes early, and leaves are lost, it is likely that yields and/or fruit size will be reduced.

If pesticides are used, perhaps for the control of other insect pests, there is always the potential for serious leafminer outbreaks in crops in the potato, cucurbit, legume and daisy families.

Detection & inspection

Look for puncture marks on the leaves, and coiled, white tunnels characteristic of *Liriomyza* species; look to see if there maggots feeding at the end of the mines. If adults are needed for identification, place sticky yellow traps among the host plants. If pupae are needed for growing out and adult identification, place trays beneath plants to catch the mature larvae.



Photo 1. Leafminer damage to zucchini by *Liriomyza* sp.



Photo 2. Close-up of Photo 1 showing the white, irregular leaf mines of *Liriomyza* sp.

Management

QUARANTINE CONTROL

Although widely distributed, there are many countries still vulnerable to introduction of *Liriomyza sativae*. Therefore, it is necessary to prevent this leafminer from extending its range. Biosecurity authorities need to be alert to the fact that movement of this pest across national borders is associated with the trade in nursery plants, cut flowers and vegetables.

NATURAL ENEMIES

There are many parasitoid wasps (mainly Eulophids and Braconids) that are natural enemies with a worldwide distribution. Unfortunately, they are sensitive to (oil-based) insecticides and the removal of these parasitoids results in damaging leafminer outbreaks. Preventing the destruction of parasitoid wasp populations is the first, and perhaps, most important aspect of controlling this and other *Liriomyza* leafminer pests. Those parasitoids that are thought to have particular promise in Pacific island countries, these are: *Chrysocharis (parksii) oscinidis*, *Neochrysocharis diastatae* (previously, *Chrysonotomyia punctiventris*), *Diglyphus begini*, *Diglyphus intermedius* and *Banacuniculus utilis* (previously, *Ganaspidium hunteri*). In Hawaii, *Banacuniculus (Ganaspidium) utilis* is important on *Liriomyza sativae*.

CULTURAL CONTROL

Before planting:

- Maintain good weed control in and around nursery areas and in the field.
- Plough the land before planting to expose the pupae in the soil.
- Carefully check each plant for signs of mines before planting in the field.
- Avoid planting a new crop susceptible to leafminers immediately after the harvest of an older one; leave 1-2 weeks for pupae in the soil to hatch.

During growth:

- Handpick leaves with mines if numbers are low, or destroy the mine in place.
- Keep weeds to a minimum in and around field crops.

After harvest:

- Collect and burn or bury trash after harvest.
- In high-value crops cover the soil with mulch to prevent the adults emerging from the soil.

CHEMICAL CONTROL

If insecticides are needed, avoid using broad spectrum types, for instance synthetic pyrethroids, carbamates or organophosphates. Not only will they destroy natural enemies, but are likely result in resistant leafminer populations. Use the following:

- Neem. Neem is said to reduce the egg-laying period of leafminers and effect the development of the maggots.
- Abamectin and spinosad, both derived from bacteria. Abamectin is considered the most effective and least harmful to natural enemies.
- Cyromazine, an insect growth regulator.

When using a pesticide, always wear protective clothing and follow the instructions on the product label, such as dosage, timing of application, and pre-harvest interval. Recommendations will vary with the crop and system of cultivation. Expert advice on the most appropriate pesticides to use should always be sought from local agricultural authorities.

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Information from Waterhouse DF, Norris KR (1987) *Biological Control Pacific Prospects*. Inkata Press. Melbourne; and CABI (2015) *Liriomyza sativae* (vegetable leaf miner) Crop Protection Compendium. (<https://www.cabi.org/cpc/datasheet/30960>); and from *Liriomyza sativae* (Blanchard), Crop Master. EXTension ENTOMology & UH-CTAHR Integrated Pest Management Program. (http://www.extento.hawaii.edu/Kbase/Crop/Type/liriom_s.htm); and from JL Capinera, UF/IFAS, University of Florida. (http://entnemdept.ufl.edu/creatures/veg/leaf/vegetable_leafminer.htm).

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