

Leafminers on Ornamental Plants ¹

Eileen A. Buss²

Leafminers are usually the larvae of flies, moths, or beetles that feed or “mine” between the upper and lower epidermal leaf surfaces. The larvae tunnel through the leaf creating a narrow, whitish colored serpentine (winding) mine (Figure 1) or blotch (blister) (Figure 2) type mine. The tunnel is clear, except for the trail of black fecal material left behind as larvae feed. Female flies puncture or “stipple” leaves with their ovipositors to lay eggs in the leaf tissue or to feed on sap. Many ornamental plants are attacked by leafminers, but azalea, bougainvillea, ixora, hollies, chrysanthemum, lantana, oak, and boxwood are some of the preferred hosts.

Leafminer damage is very obvious, but healthy plants should be able to tolerate considerable injury before losing vigor or yield. However, during heavy infestations, plants appear bleached or faded and their aesthetic value is reduced. In some cases, the leaves turn yellow and drop, due in part to the entry of pathogenic fungi and bacteria into old mines. The following are examples of some common leafminer species, but many more species exist.



Figure 1. Citrus leafminer damage. Credits: J. Castner, University of Florida



Figure 2. Locust digitate leafminer. Credits: University of Florida

1. This document is ENY-326 (MG006), one of a series of the Department of Entomology and Nematology, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Date first printed: October 1993. Revised: June 2006. Please visit the EDIS Website at <http://edis.ifas.ufl.edu>.
2. Eileen A. Buss, assistant professor, Department of Entomology and Nematology, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

The Institute of Food and Agricultural Sciences (IFAS) is an Equal Opportunity Institution authorized to provide research, educational information and other services only to individuals and institutions that function with non-discrimination with respect to race, creed, color, religion, age, disability, sex, sexual orientation, marital status, national origin, political opinions or affiliations. U.S. Department of Agriculture, Cooperative Extension Service, University of Florida, IFAS, Florida A. & M. University Cooperative Extension Program, and Boards of County Commissioners Cooperating. Larry Arrington, Dean

Azalea Leaf Miner

Azalea leaf miner, *Caloptilia azaleella*, larvae make blister-like blotch mines on azalea (Figure 3). Single, white eggs are laid along a vein on the underside of a leaf. Larvae feed singly between the leaf tissue layers. A mine turns brown when the larva exits the mine, goes to the upper leaf surface, pulls the leaf over its body with silk, and chews holes in the leaf. A mature larva later chooses an intact leaf, rolls it up, and pupates inside. A small, yellow moth emerges after about 1 week and mates. Three or more generations may occur with overlapping life stages in Florida. The feeding damage is disfiguring, but does not destroy whole leaves.



Figure 3. Azalea leafminer damage. Credits: University of Florida

Yellow Poplar Weevil

Yellow poplar weevil, *Odontopus calceatus*, is also called the sassafras weevil, magnolia leafminer, and tuliptree leafminer, which reflects its host range. It also feeds on *Laurus nobilis*. The beetle larvae make blotch mines (Figure 4) in the leaves, and adults (Figure 5) feed on buds and leaves. Larvae are white, legless, and less than 2 mm long. Up to nine larvae may be in one mine. Pupation occurs in the mine. This is rarely an economically damaging pest, but adults may be pests by entering buildings in the winter.

Blotch Leafminer

The blotch leafminer, *Amauromyza maculosa*, is a pest of chrysanthemums in Florida landscapes, but is not a big problem commercial production. The



Figure 4. Yellow poplar weevil damage. Credits: University of Florida



Figure 5. Yellow poplar weevil adult.

adult is a small, shiny black fly, less than 3 mm long. Larvae are yellowish-white, and about 3 mm long. This fly has many hosts in the Compositae: *Baccharis*, *Bidens*, *Chrysanthemum*, *Emilia*, *Erechtites*, *Eupatorium*, *Gaillardia*, *Gnaphalium*, *Helianthus*, *Melanthera*, *Senecio*, *Sonchus*, and *Tagetes*. Three to six larvae commonly occur in a community mine. Heavy infestations may kill some leaves, but most damage is just aesthetic.

Citrus Leafminer

The citrus leafminer, *Phyllocnistis citrella*, is a potentially serious pest of citrus, kumquat, calamondin, and native Rutaceae. Adults are tiny moths (2 mm long), with white and silvery forewings and a black spot on each wingtip. Eggs are laid singly on the underside of young leaves. Larvae make meandering serpentine mines, which may result in leaf curling. However, both leaf surfaces may be infested during outbreaks. Usually, only one mine occurs per leaf, but heavy infestations can have 2-9 mines per leaf. Injury may also occur in succulent stems and fruits. Larvae pupate near the leaf edge. In

Florida, one generation may be completed within 3 weeks, with several overlapping generations per year.

Cultural Control

Prune off and destroy infested branches. Keep plants healthy (properly irrigated and fertilized) so they can tolerate and outgrow the damage.

Biological Control

Populations are generally prevented from reaching truly damaging levels by a number of parasitic wasps that attack leafminers in Florida. Wasp larvae develop on or in the leafminer larva or pupa, and pupation occurs in or near host remains. In some species, the wasp stings the host, injects a paralyzing venom, lays an egg and its larva develops externally. The host ceases to feed and the parasitoid egg or larva is visible through the leaf epidermis. Parasitoid larvae developing internally are usually solitary, and after several days of development may be seen inside their leafminer host by using a hand lens against strong light.

Chemical Control

Leafminers are difficult to control because they are protected by the leaf tissue. The best time to manage leafminers is when larvae first hatch inside the leaves and begin to feed, but the damage may be inconspicuous. Treatment at this time also minimizes plant damage. But, if many large or long mines are seen, the leafminer may have completed its development, and control is not useful.

Systemic insecticides may provide the greatest control of leafminers. A systemic insecticide is absorbed into the leaf tissue, killing the insects inside. Non-systemic insecticides stay on the leaf surface and do not affect insects inside of them. Thorough spray coverage of the upper and lower leaf surfaces is especially important. Apply the pesticide according to directions outlined on the container label.

For More Information

Blotch Leafminer (<http://edis.ifas.ufl.edu/IN230>)

Citrus Leafminer (<http://edis.ifas.ufl.edu/IN165>)

Johnson, W. T. and H. H. Lyon. 1991. Insects that feed on trees and shrubs. Cornell University, Japan. 560 pp.

Leaf-mining Insects: <http://chemical-ecology.net/insects/leafmine.htm>

Table 1. Insecticides labeled for non-commercial (homeowner) use against leafminers in Florida.

Active Ingredient	Trade Name	Chemical Class
Acephate	Ortho Orthenex Garden Insect & Disease Control	Organophosphate
Carbaryl	Sevin	Carbamate
Cyfluthrin	Bayer Advanced Rose & Flower Insect Killer Schultz Lawn & Garden Insect Killer	Pyrethroid
Imidacloprid	Bayer Advanced Lawn Complete Insect Killer Bayer Advanced Tree & Shrub Insect Control	Neonicotinoid
Paraffinic Oil	SunSpray Horticultural Oil	Biorational
Permethrin	Ortho Bug-B-Gon Max Garden Insect Dust Ortho Mosquito-B-Gon Tree, Shrub & Lawn Concentrate	Pyrethroid
Pyrethrins	Bonide Yard & Garden Insect Killer Spectracide Bug Stop Insect Killer Green Light Fruit Tree Spray	Botanical

Table 2. Insecticides labeled for use by professional applicators to control leafminers on ornamental plants.

Active Ingredient	Florida Registered Products	Chemical Class	Signal Word
Abamectin	Avid 0.15 EC	Macrocyclic Lactone	Warning
Acephate	Acephate Pro 75 Orthene	Organophosphate	Caution Caution
Acetamiprid	TriStar	Neonicotinoid	Caution
Azadirachtin	Azatin XL Azatrol EC Ornazin	Botanical	Caution Caution Caution
Bifenthrin	TalstarOne	Pyrethroid	Caution
Buprofezin	Talus	Insect growth regulator	Caution
Carbaryl	Sevin SL Sevin 80 WSP	Carbamate	Caution Warning
Cyfluthrin + imidacloprid	Discus	Pyrethroid + Neonicotinoid	Caution
Cyromazine	Citation	Insect growth regulator	Caution
Deltamethrin	DeltaGard T&O	Pyrethroid	Caution
Diazinon*	Diazinon (RUP)	Organophosphate	Caution
Diflubenzuron	Adept Dimilin (RUP)	Insect growth regulator	Caution Caution
Dinotefuran	Safari	Neonicotinoid	Caution
Fenpropathrin	Tame 2.4 EC (RUP)	Pyrethroid	Warning
Imidacloprid	Merit Marathon*	Neonicotinoid	Caution Caution
Permethrin	Ambush 25W Astro Permethrin Pro Termite-Turf-Ornamental Pounce 3.2 EC*	Pyrethroid	Warning Caution Caution Caution
Pyriproxyfen	Distance IGR	Insect growth regulator	Caution
Spinosad	Conserve SC Bulls-eye Bioinsecticide	Microbial	Caution Caution
*Not for residential use RUP = restricted use pesticide			