

Pest Alert

Allium (Onion) Leaf Miner (*Phytomyza gymnostoma*)



Photo credit: All photos from the Pennsylvania Department of Agriculture

The Allium leaf miner (*Phytomyza gymnostoma*) (also known as the onion leaf miner) infests crops and flowering plants in the Allium family such as leeks, onions, garlic, chives, shallots, and green onions. Leeks appear to be a preferred host plant. The insect's feeding softens plant tissues, increasing the risk of fungal and bacterial infections and impacting marketability. Up to 20 insects per leek stem have been recorded on heavily infested plants.

The Allium leaf miner is native to Poland and Germany. Recently, the geographic range has rapidly expanded. It is now present throughout Europe, reaching the United Kingdom in 2004. It was recently reported in Asia, Turkey, and parts of Russia and Turkmenistan. The status of leaf miners in areas where they have established can rapidly change from insignificant to serious. In areas of high infestation, there are reports of 100 percent damage and crop loss, and the insect appears to be the most damaging in organic or noncommercial backyard production. However, there are also reports of severe damage in traditional Allium production.

Early detection is vital for effectively controlling and limiting this pest's ability to spread and for protecting agricultural resources. A potential pathway for this insect is through commercial cargo or in passenger baggage.

Recently, the Allium leaf miner was collected as pupae from a leek and onion farm in Pennsylvania, marking the first detection in the United States. Identification was confirmed by USDA in February 2016. The pest was also confirmed in New Jersey in June 2016.

Pest Identification and Symptoms

The Allium or onion leaf miner has four life stages: egg, larva, pupa, and adult.

Eggs—small, 0.5 mm, white and slightly curved; eggs are laid on leaves

Larva—white to yellowish maggots that can reach up to 8 mm in length; larva can be found chewing into the leaf tissue with trails widening as they travel downward (the chewing activity gives "leaf miner" its name)

Pupa—reddish to dark brown, 3.5 mm long oval; pupa can be found at the end of feeding trails, located near or inside the bulb of the plant. Multiple pupae may be found in a single leaf and multiple leaves can be infested.

Adult—small greyish flies 3 mm long, with a largely yellow head with black behind the eyes; wing length varies from 2.9 mm in males to 4.0 mm in females. Legs are dark with yellowish knees. The yellow color may also be seen on the abdomen sides and the tips of the leg segments. The wings are clear with dark veins. Positive identification must be confirmed in laboratory through the dissection of an adult fly. Adults can fly, but more studies are needed on flight periods and distances.

Damage

Depending on the life stage, the Allium leaf miner can cause a variety of damage. Adult females make repeated punctures in leaf tissue with their ovipositor, and both females and males feed on the plant exudates. These punctures are the first sign the flies are active. Adult feeding



damage can be seen on the end of leaves and typically appears as a row of white spots. Adults may also be found feeding on damaged leaves. Larval galleries in the leaves are closer to the base of the plant, widening as they move deeper toward the bulb of the plant. These galleries, or mines, are more apparent in Allium with thinner leaves. Pupa can be found in the base of the plant, or down into the bulb itself. Pulling away several layers of leaves can reveal older larva or pupa.

Damage from Allium leaf miner can cause plant leaves to curl, appear wavy, or distorted. Leaf mines are most evident in species with thin leaves (chives). In species with larger leaves, it is often necessary to peel back the leaves to find the insect. In heavy infestations, plants can develop fungal or bacterial diseases, which cause further damage and result in unhealthy-looking plants.

Leeks and onions are reported to be the most heavily damaged crops. Damage to other Allium crops such as garlic, chives, shallots, and green onions has been reported in Europe.

The Allium leaf miner overwinters as pupae attached to plant tissues. At the beginning of



spring, adults emerge. Eggs are laid within plant tissues, usually at the leaf base. Larvae mine the leaves (moving downward into the stalk and eventually to the bulb), and pupate at the end of their galleries.

During summer, the pest develops within the plants. Another generation of adults emerges toward the end of summer and beginning of fall. In spring, damage is observed after the first adults take flight. On leeks that are small plants at that time of the year, just a few larvae can kill a plant, so an infested field can rapidly show a large number of missing plants. In autumn, plants are larger and tolerate higher levels of fly populations.

What You Can Do

Early detection is vital for protecting agriculture and for effectively controlling and limiting the spread of this pest. The following steps will help limit the spread of the onion leaf miner:

- Check your transplants for leaf mining damage before planting them in your vegetable garden;
- If you are located in USDA Plant Hardiness Zones 5, 6, or 7, cover plants in February, prior to the emergence of adults, and keep plants covered during spring emergence;

- Pick off and destroy infested leaves via shredding, deep burial, or incineration;
- Rotate crops that are not hosts for the insect; and
- Cut forage crops, removing remaining old plants and tilling the ground after harvesting.

Inspect Allium crops for signs of damage, larva, pupa, and eggs. Finding any of the onion leaf miner life stages should alert you to the possibility of infected material. If you believe your crop may be infected, do not move material out of the area, as this will greatly increase the risk of pest spread.

If you find signs of damage or an insect that you suspect is the Allium leaf miner, please contact your local Extension office or State Plant Regulatory Official as soon as possible. To locate an Extension specialist near you, visit the USDA-National Institute of Food and Agriculture Extension Web site at www.nifa.usda.gov/. A directory of State Plant Regulatory Officials is available on the National Plant Board Web site at www.nationalplantboard.org/membership. A list of USDA State Plant Health Directors can be found at <http://www.aphis.usda.gov/planthealth/sphd>.