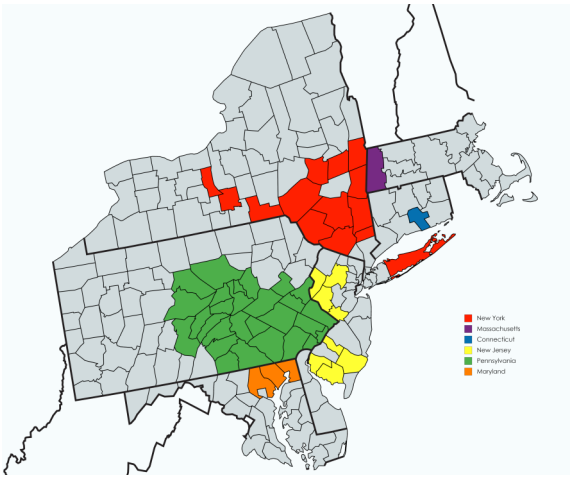
Allium Leafminer

Information for Home and Public Gardens



March, 2020

Background

Allium leafminer (ALM), *Phytomyza gymnostoma* Loew, is a new invasive insect pest in the Northeast that attacks plants in the *Allium* genus, including onion, garlic, leek, scallions, shallots, chives and ornamental alliums. Originally from Europe, ALM was first detected in Lancaster County, Pennsylvania in 2015 and in New York the following year. ALM distribution and activity has increased in southeastern NY and has moved into central NY and much of the rest of the Northeast. To date, ALM activity and damage has been observed and confirmed in 14 counties in NY, throughout eastern Pennsylvania, all of New Jersey, western Massachusetts, Delaware, and Connecticut. It is likely that this pest will continue to spread and threaten Allium plantings throughout New York.

Adult ALM fly with distinctive yellow head alongside diagnostic line of pale green oviposition scars near tip of scallion leaf. Photo: E. Grundberg

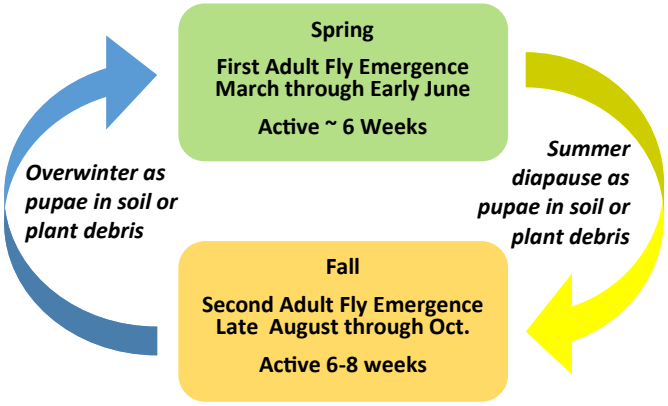
Damage

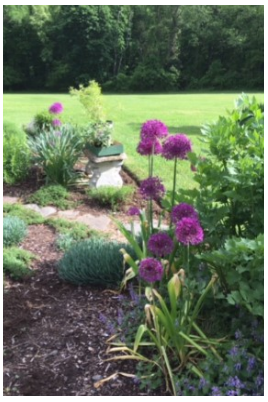
The first sign of damage is a series of small yellowish-white leaf punctures, also called oviposition scars, made only by the female ALM fly. These punctures serve as a feeding site or for laying eggs that will hatch into larvae. The most damaging stage of ALM is the larvae, also called a maggot, which initially feeds within leaves and "mines" downward until it completes its development in the bulb. This larval feeding can cause onion and leek leaves to be wavy, curled and distorted. Moreover, feeding by larvae create entry routes for bacterial and fungal pathogens that cause plants to rot in the field. In species with larger leaves such as leeks and garlic, it is often necessary to peel back leaves to find the insect and accompanying damage.

Lifecycle

Allium leafminers overwinter as pupae in plant tissue or surrounding soil. Adults begin to emerge sometime between late march to mid-April and continue to emerge over approximately 6 weeks. Adults lay eggs into the leaf tissue of alliums. Larvae mine leaves, and move downward into the base of leaves or into bulbs, where they pupate. Pupae may remain in the allium tissue or become incorporated into soil with crop debris. These first generation pupae undergo a diapause, or resting period, which lasts through much of the summer. Pupae will develop into adults and begin to emerge sometime between late August to mid- September. Second generation adults lay eggs into Allium species for up to 8 weeks. After hatching, larvae will continue to develop late into the fall and overwinter as pupae that will give rise to the following Spring adult ALM flight.

Alliums may be infested with several dozen ALM Larvae and pupae. Larvae grow to 8 mm length (left); Larvae leave mines as they feed within leaf tissue (middle); Pupae may remain in the allium or fall out into soil (right). Photos: T. Rusinek





Crops of concern: Many alliums are at risk, especially those under organic production. However, the full ALM host range or species preference is not yet known. Gardeners in areas with established ALM populations have reported high levels of damage. The potential for damage is higher in the fall than in the spring across all allium species. ALM oviposition marks have been seen on wild ramps, but the potential for economic damage is unknown at this time. Damage occurs regularly in ornamental allium plantings where the first sign of attack are yellowing leaves and rotting toward the base caused by fungi or bacteria invading wounds.

First Generation (end of March thru June 1)	Second Generation (Mid-August thru Oct.*)
Garlic [2]	Leeks [3]
Shallot [1]	Bunching green onion [3]
Onion transplants/sets [2]	Scallions & Chives [3]
Direct seeded onions [1]	Overwintered Onions [2]
Scallions & Chives [3]	

Susceptibility to ALM Damage: 1= Low, 2= Medium, 3 = High

*Larvae may be present well into November

Management:

Inspect Transplants and Bulbs - Check for ALM oviposition marks, larvae and pupae before planting. Destroy ALM infested plant material by burning, solarizing, or burying as deep as possible.

Detecting ALM Emergence- Early detection is key for effective control and limiting spread of ALM. Currently, the most reliable method for detecting ALM emergence is to visually inspect allium plants for ALM adult flies and oviposition marks beginning in late March and again in early September.

Timing crops to avoid adult flights- If possible, delay planting to avoid the spring egg-laying period, and/or harvest early to avoid the fall egg-laying period. This technique combined with the use of exclusion netting for longer growing season crops like leeks, provides good control of ALM.

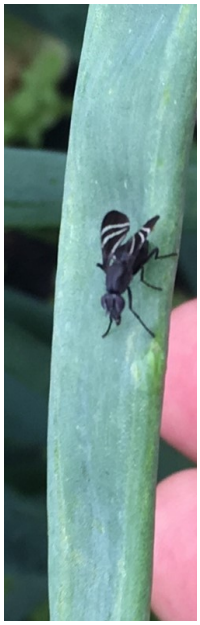
Row cover or insect netting provides a physical Barrier between the crop and insect pests like ALM. Photo E. Grundberg

Exclusion- Covering plants with row cover or insect netting prior to or immediately after emergence of ALM adults during the Spring and Fall flights, can reduce infestation. Exclusion will not work if infested alliums, including wild onion grass, grew in the same plot the previous season. Check alliums for oviposition marks before covering. If signs of ALM are seen on more than one or two plants, it is probably too far into the flight to achieve good control with exclusion. Higher levels of certain allium diseases such as Botrytis have been observed when row cover is used.

Insecticides– Growers should look for spinosad-based insecticides labelled for dipteran leafminers. Some of these products are labeled for use in organic gardening. Field trials conducted by ENYCHP vegetable specialist suggest that focusing two applications of a spinosad-based insecticide in the second and fourth weeks after first observed activity reduces damage significantly. ALM population pressure and the potential to cause damage can vary by location. Additionally, the progression of the Spring/Fall ALM flight may be differ due to temperature influence or other factors that can shift optimal spray periods.

Reflective Mulch– Field trials have shown that planting alliums on metalized reflective plastic mulch consistently reduced ALM damage from 22% to 36% compared to alliums planted on either black or white plastic. Combining the use of metalized reflective plastic mulch with two carefully timed applications of a spinosad-based insecticide can be an effective strategy for managing ALM for organic growers.

Look-alikes - The rotting and disintegration that follows ALM damage can also appear following damage caused by leek moth, onion fly, and black onion fly.



Left: Larval feeding damage from leek moth in onion. Leek Moth caterpillars are yellow-green, have legs and a distinct dark head. Photo: Amy Ivy

Right: The Black Onion Fly is a sporadic pest of alliums. Photo: Ethan Grundberg

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