Virginia Cooperative Extension
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Allium Leafminer in Virginia

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Introduction

Allium leafminer (ALM) (Phytomyza gymnostoma), an invasive pest first detected in the United States in 2015, has spread through onion-growing regions in the Northeast and Midwest. This pest targets commercial alliums such as onions, garlic, leeks, chives, and shallots, causing significant injury to crops.

Identification

Allium leafminer adults are small, dark grey/black flies, measuring about 3mm in length. They have yellow “knees” and a distinctive yellow orange marking on the top and front of the head. The larvae are white, legless, and feed inside plant leaves, causing visible damage.

Distribution and Host Range

Initially detected in Pennsylvania in commercial leeks, ALM has expanded to other states in the Northeastern US including Virginia. This pest’s host range includes commercial allium crops such as onions, garlic, leeks, and shallots. ALM has been found on a range of wild *Allium* species, including *Allium vineale* (wild garlic), *Allium canadense* (wild onion), and *Allium tricoccum* (ramps). These wild species are common weeds and can serve as alternate hosts and reservoirs, which may increase the likelihood of pest pressure in surrounding commercial crops. Additionally, ALM may be a threat to commercial nurseries that produce ornamental alliums, but more information is needed to determine risk for this industry.

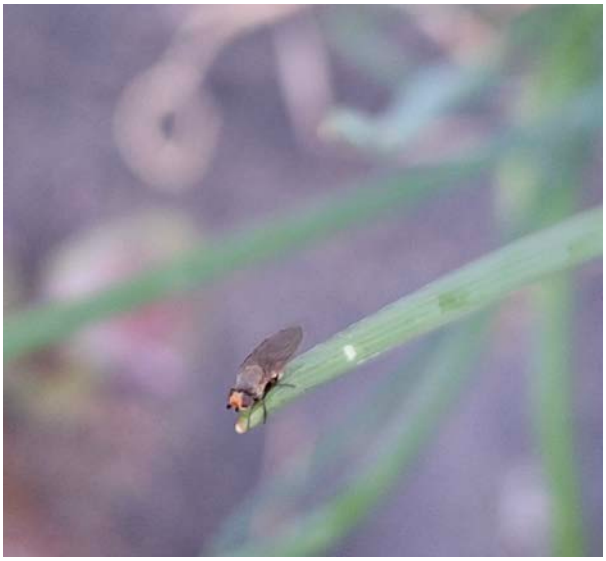

Figure 1: Allium leafminer adult on chive. (Grace Stern, Virginia Tech)

Life Cycle

ALM has two generations per year, with a summer diapause between the generations. Adult flies emerge in early spring after overwintering in the pupal stage in the soil. Females lay eggs on the leaves of allium plants, after egg hatch, larvae burrow into the plant tissue, feeding and causing visible injury. The larvae travel down the plant to the bulb where they will pupate.

After the first generation completes its lifecycle, a summer diapause occurs. During this period, ALM pupae are dormant under the soil line, allowing the pest to survive the hot summer months when host plants may be less abundant. Diapause is an adaptive survival strategy that ensures the pest is not exposed to unfavorable conditions, in this case, during peak summer temperatures.

A second generation of adults emerges in late summer. These flies lay eggs on late-season allium

species. Crops commonly harvested during the autumn months, such as leeks and long-day onion varieties, are at the highest risk. The second generation ALM pupae will overwinter in soil, emerging as adults in early spring.

Description of Injury

Oviposition Scarring: A key symptom of ALM infestation is the unique and visibly obvious oviposition scarring. This occurs when adult females use their ovipositor to pierce holes in the leaves to feed or lay eggs. Scarring from this pest activity is characterized by multiple small, circular spots in a row on the leaf surface, generally near the tips and edges, visible to the naked eye. These marks are the first sign of ALM presence.

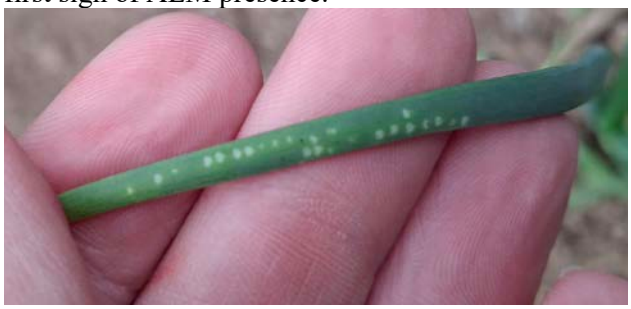

Figure 2: Allium leafminer oviposition scarring on cultivated onion. (Grace Stern, Virginia Tech)

Larval Injury: The larvae feed inside plant leaves and stems, creating serpentine "mines" which reduce the plant's ability to photosynthesize and interfere with normal water and nutrient flow in the plant. This can lead to distortion, yellowing, and visible feeding trails.

Decreased Marketability: The feeding injury slows plant development, reducing crop yield and quality. In severe cases, entire plants may die. Infestations can also lead to stunted growth and delayed maturity, affecting marketability. Infestation also opens the door to plant pathogens and may lead the bulbs of alliums to decay before harvest.

Allium crops exported to areas of the US without ALM infestations may be rejected by regulatory authorities if they possess larvae or pupae, or oviposition injury.

Monitoring and Scouting:

Regular monitoring is essential, particularly during the spring and fall adult ALM activity period (adult flight). During this time adult flies can be seen on plant tips in the cooler parts of the day. Injury to leaves will be observable with the naked eye. Early detection is crucial for effective control. Daily scouting in predicted flight windows is recommended.

Management Strategies

Insecticides can be effective when applied at the correct time, typically when adult flies emerge in spring and fall. It is important to rotate insecticides with different modes of action to prevent resistance development. Both conventional and OMRI listed insecticides are effective against ALM. Insecticides are most effective against adults during flight.

Adjusting planting dates can help avoid peak infestations. Early or late planting may reduce exposure to adults. However, this strategy should be balanced with other factors such as climate conditions and market schedules. **Row covers** are proven to reduce injury.

The role of **natural enemies** in ALM management is still relatively unknown. However, two native species of parasitic wasps (*Halticoptera circulus* and *Chrysocharis oscinidis*) have been found to parasitize ALM larvae and pupae. Female wasps lay their own eggs inside developing larvae or pupae, eventually killing their parasitized ALM host. To promote beneficial insect populations, reduce insecticide use and maintain a diverse farming environment.

After harvest, it is important to **remove and destroy all crop residue,** which can harbor overwintering larvae. This practice reduces the risk of pest buildup and reinfestation in the following growing season.

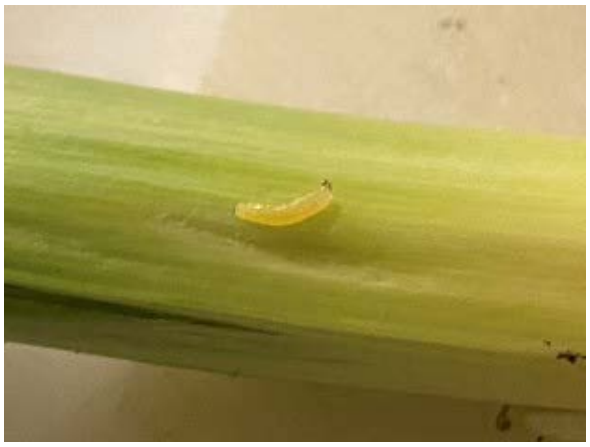

Figure 3: Allium leafminer larva on cultivated leek (Sean Boyle, USDA-ARS)

Conclusion

ALM poses a serious threat to commercial allium crops. With an integrated pest management (IPM) plan that includes monitoring and timely intervention, growers can reduce negative impacts. Understanding ALM's lifecycle, identifying injury early, and implementing a mindful combination of chemical, cultural, and biological control measures are essential components for successful ALM management. Scouting proactively and adopting a multifaceted approach will help ensure a profitable harvest.

For more information and pest management recommendations, contact your local extension office or visit resources such as VCE's Home Grounds and Animals Pest Management Guide or Mid-Atlantic Commercial Vegetable Production Recommendations.

References

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2025 ENTO-609NP