

Preparing for the Fall Flight of Allium Leafminer Ethan Grundberg

The invasive fly pest, allium leafminer (*Phytomyza gymnostoma*), has been established in the Northeast since 2016 and has caused crop damage as far north as Washington County, NY, as far east as central Connecticut, and as far west as the Finger Lakes region of NY (see map for known distribution). In research trials, the fall flight has caused damage to over 98% of leeks that were not covered or managed with insecticides, so now is the time to plan for managing allium leafminer (ALM) in the coming weeks.

Lifecycle: Though we still do not have accurate phenology models to allow us to predict the emergence of the fall flight, fall ALM adult activity has begun in mid-September the past four years (September 19th, 2017, September 11, 2018, September 9th, 2019, and September 8th, 2020), so we anticipate a similar emergence time this year. Adults are active for approximately 7 weeks, or through the end of October. Emerged adults create the diagnostic line of oviposition puncture marks on allium leaves during feeding and egg-laying. Larvae that hatch from eggs eat their way down the inside of the leaves toward the bulbs opening up physical wounds where soft rot pathogens often enter. The larvae then pupate either inside the bulb and stem or in the soil around the plants for the winter and early spring. The spring generation typically emerges in mid-April and is active for about 5-6 weeks.

Damage: Since there are typically fewer cultivated and wild alliums in the environment in the fall, growers in Pennsylvania and New York have experienced a “concentration effect” with their fall grown alliums. Leeks that were not treated with insecticides averaged over 40 maggots and pupae per plant, with a high of 160, in research trials conducted by Teresa Rusinek and Ethan Grundberg in the fall of 2020. Much smaller populations of allium leafminer can still be problematic, causing cosmetic damage to scallion foliage and opening physical wounds in leeks where soft rot bacteria can ruin the crop.

Cultural Controls: Growers relying on row cover to exclude adult flies from host crops should install the covers before the flight begins. Field trials funded by Northeast SARE in 2020 demonstrated that waiting until two weeks after the fall flight had begun to cover leeks resulted in much higher densities of ALM larvae and pupae in the plants (see more information from the trials [here](#)). Growers have had success using insect netting, like Protek-Net, to reduce the risk of heat stress associated with remay. Both remay and insect netting must be well anchored to prevent gaps between the ground and the crop to be effective.

Rusinek and Grundberg have also found that ALM severity was reduced by about 33% in both spring and fall scallions and well as fall leeks when those alliums were planted on reflective plastic mulch compared to either black or white plastic. However, unsprayed fall leeks on reflective mulch in 2019 still had, on average, over 30 ALM maggots and pupae per plant, so using reflective mulch alone does not appear to provide sufficient suppression. Rusinek and Grundberg have found that combining reflective plastic



Adult ALM oviposition marks on onion leaf
Photo: E. Grundberg

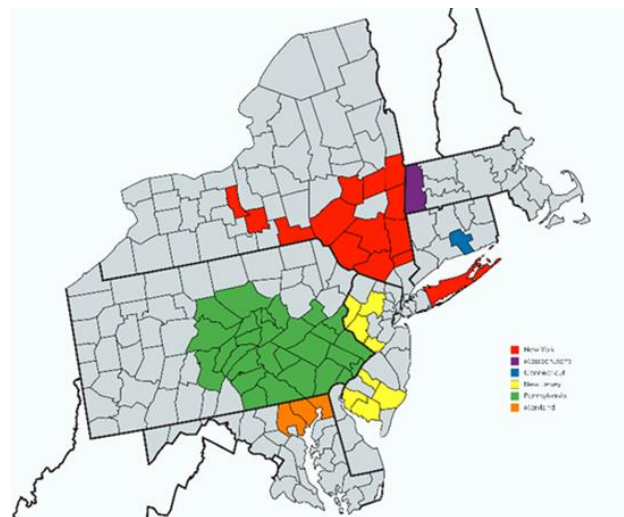
mulch with two carefully timed applications of Entrust with M-Pede (see chemical controls below) has resulted in up to a 92% reduction in the number of ALM maggots and pupae in leeks compared to unsprayed leeks on white plastic mulch.

Chemical Controls: Cornell entomologist Dr. Brian Nault has been conducting insecticide efficacy trials for ALM management since fall 2017. Based on preliminary findings from those trials, it appears as if a number of conventional chemistries are effective at reducing damage from ALM on transplanted onions and scallions. Those included in the trials that are already labeled for leafminer management on leeks and green onions in New York include Exirel (cyantraniliprole, IRAC Group 28, 2(ee) label required and available on the <https://www.dec.ny.gov/nyspad/products?3> website) at 13.5 fl oz/acre, Radiant (spinetoram, IRAC Group 5) at 8 fl oz/acre, and Warrior II with Zeon Technology (lambda-Cyhalothrin, IRAC Group 3A) at 1.6 fl oz/acre. Growers who have been spraying leeks all summer for onion thrips need to make sure that they have not already reached the maximum annual application rate of Radiant and Exirel (cyantraniliprole, the active ingredient, is also in the pre-mix product Minecto Pro and counts toward maximum active ingredient application rates). Growers outside of NY can consider using Scorpion 35 SL (dinotefuran, IRAC Group 4A), which has been the most effective insecticide at reducing damage from ALM in both NY trials and in Pennsylvania, but is not registered for use in New York State.



ALM pupae in Ulster Co. leek from fall 2016. Note the soft rot in the larval mines. Photo: T. Rusinek

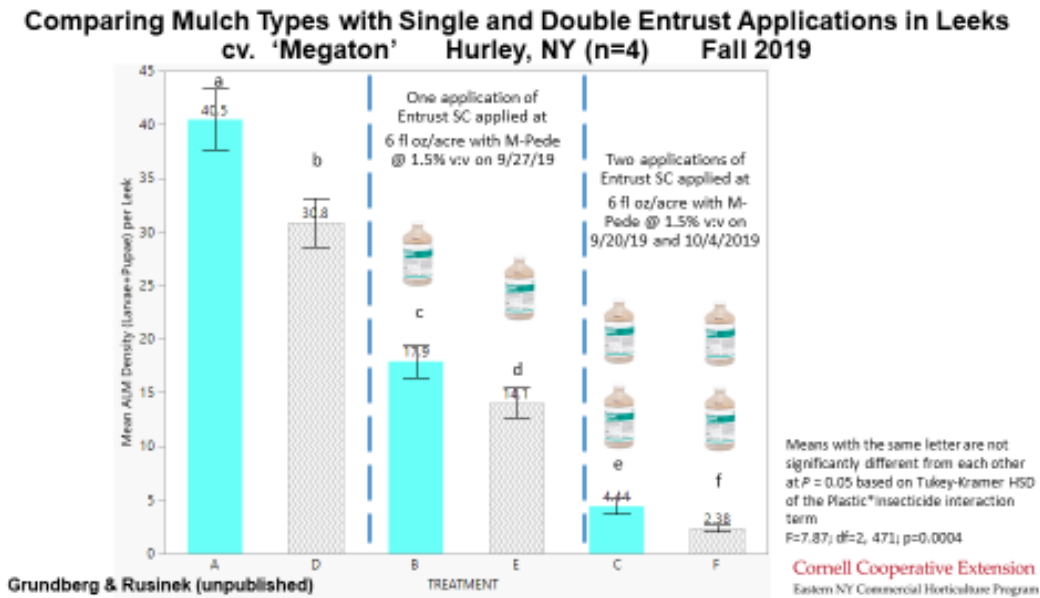
Organic growers unable to use row cover are encouraged to use Entrust (spinosad, IRAC Group 5) at the 6 oz/acre rate mixed with a 1%-1.5% v/v solution of M-Pede (potassium salts of fatty acids) for better penetration of the waxy cuticle. Given the resistance management restrictions on the Entrust label, growers are only able to make 2 sequential applications of spinosad before rotating to an insecticide in a different IRAC group. Given these restrictions, Rusinek and Grundberg designed trials in 2018 and 2019 in an effort to identify the most effective timing of 2 applications of Entrust plus M-Pede on leeks. This research found that focusing those 2 sprays 2 to 4 weeks after first detected ALM emergence provided the best control in fall leeks. As mentioned above, combining those two insecticide applications with reflective plastic mulch provided the largest numeric decrease in ALM maggots and pupae per leek in trials in 2019 (see graph). Pyganic, Surround, and Aza-Direct did not provide any statistically significant reduction in ALM damage in trials conducted by Dr. Nault. However, Rusinek and Grundberg will be evaluating adding a spray of Azera to a program with two applications of Entrust in 2021 to compare ALM suppression to two sprays



Current known ALM distribution as of fall 2020

of Entrust with M-Pede alone. Dr. Nault also compared the efficacy of Entrust with Nu-Film P to the performance of Entrust with M-Pede in at least one of his trials and found that adding Nu-Film, an aggressive sticker, resulted in more allium leafminer damage.

We suspect that the geographic distribution of ALM will continue to spread this fall, so growers north of the Capital District should be on the lookout for signs of activity in addition to farms in the Hudson Valley. We are recommending that growers thoroughly inspect allium leaves for the linear adult oviposition marks of at least 10 plants on each field edge on a weekly basis beginning the first week of September until activity is observed. If you have any questions about what you are seeing in your fall alliums, please contact one of the vegetable specialists on the ENYCHP team for diagnostic support.



Results from Rusinek and Grundberg (unpublished) fall 2019 research trials quantifying the number of ALM maggots and pupae per leek using white plastic mulch, reflective plastic mulch, and those mulches with different application frequencies of Entrust with M-Pede. Combining reflective mulch with two carefully timed insecticide applications provided the largest numerical decrease in ALM per leek.