

February 2021

LEEK MOTH RESEARCH UPDATE

Research Background

For the past six seasons, our team, the Vermont Entomology and Participatory Research Team (VEPART), in collaboration with the Agroecology and Livelihoods Collaborative and UVM Extension has led an on-going research program to build an effective IPM program for the management of leek moth (LM), *Acrolepiopsis assectella*, in allium crops (see Figure 1).

Our team is currently conducting a multi-year project to answer the following research questions:

1. What is the current and potential distribution of the leek moth?
2. What cultural and/or biological control tactics are effective for the management of leek moth in onion crops?



Figure 1. Leek moth larva, pupa & damage on garlic & onion

Leek Moth Distribution

Thanks to the efforts of numerous growers throughout the NY/VT region, our research team has been tracking the expansion of the leek moth (Figure 2) from its original introduction in northern NY for the past several years. According to our most recent data, the current distribution of the moth, indicated in yellow, includes northeastern NY, a large majority of VT, northern NH and western Maine (Figure 3).

For growers interested in participating in our leek moth monitoring program, we will have a limited number of



Figure 2. Adult leek moth on a sticky card

traps and lures available for the 2021 growing season. Please contact us directly via our email contacts at the end of this brief if you are interested.

Parasitoid Wasp Field Trials

In collaboration with the Canadian biological control company, [Anatis Bioprotection](#), we are currently testing the efficacy of the parasitoid wasp, *Trichogramma brassicae*, as a biological control option for managing leek moth in onion crops. This past year we completed our second consecutive season testing the efficacy of these parasitoid wasps.

The 2020 growing season, as with much of everything this past year, was unique. As a general trend across all of the parasitoid wasp field trials, leek moth presence and damage was substantially lower in comparison to the last year (2019). Three (out of 4) of the replicated field trials showed less than 1% leek moth incidence per 50 onion plants in both the release and control plots. The sole trial that did show >1% damage, displayed no difference between the control and release plots.

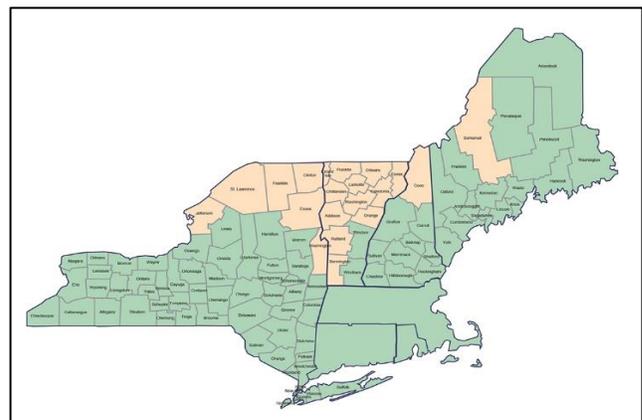


Figure 3. Leek Moth Distribution

The inconclusive results from the 2020 trials is likely the result of climate factors affecting the physiology of both the leek moth and the trichogramma parasitoid wasps.

Insect populations are very sensitive to extreme temperatures and fluctuations in humidity. The 2020 summer growing season was typified by extreme temperatures and drought across much of the region. Due to these conditions, reduced leek moth and parasitoid activity is not a surprising result. These results are a stark contrast from the 2019 field season, where we saw significantly higher levels of leek moth AND effective suppression of leek moth in plots where the parasitoid wasps were released. We will be repeating these trials, a third time, this upcoming season.

Post Harvest Trials

Onion topping as a cultural control

Because leek moth typically lay their eggs in the above ground tissue of onions, a grower suggested that we test the utility of onion topping as a strategy to remove larvae before they can move into the onion bulb and cause damage during curing or long-term storage (Figure 4).

Onion topping displayed a significant effect on the incidence of leek moth damage during curing (Table 1). **“Topped” onions exhibited significantly fewer larval exit holes when compared to onions cured with intact leaf tubes.** These results suggest that topping prior to curing may prevent leek moth larvae from feeding upon stored onions by never bringing them in from the field in first place. In addition, larvae are likely found farther than 10” from the shoulder of the bulb at the time of harvest.



Figure 4. Leek moth larval exit holes and feeding damage in onion bulbs.

However, onions harvested from the Borderview research farm, did exhibit significant variability in quality among the different treatments. Both uncut onions and onions cut at 10” from the shoulder of the onion exhibited significantly higher incidence of onion rot, 10% and 12% respectively. The direct mechanism(s) for these differences were not easily discernable as the observed pathologies (i.e. rotted onion layers) were not assessed for particular diseases or abiotic conditions.

Other Avenues of Research

In addition to our leek moth work, this upcoming field season our research team will be conducting a variety of field trials focused upon management of several important insect pests in the region. These projects include:

- Cultural and biological control tactics for the management of **wireworms** in root crops
- Evaluation of **swede midge** tolerance and resistance among four popular kale varieties
- Assessing the efficacy of a novel low-tech bait for disrupting **spotted wing Drosophila** egg-laying in berry crops.

Participatory Action Research

Participatory Action Research (PAR) is an essential component of our research and drives our research agenda. Thanks to the input of the local grower Vermont community, much of our work aims to directly address issues with grower informed strategies. In the spirit of PAR, **we are including a link to our most recent grower survey on LM to better inform our research efforts moving forward.** <https://forms.gle/ZC7bxytwRtKKGrpbA>

For more information regarding any of our research and/or monitoring efforts or participating in any of our future research, check out our website: go.uvm.edu/pests

Feel free to reach out to our research team at any time!

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Table 1. The effect of topping on leek moth damage incidence in onions stored for 6 months

Topping Treatment	Percentage of onions displaying rot (n=50)	
	Horticultural Research Farm	Borderview Research Farm
Inches from shoulder		
0	0%	10%
1”	4%	6%
6”	0%	4%
10”	0%	12%

Onion topping and long-term storage

Onion topping did not significantly affect onion quality after six months of cold storage across both research trials.

Vermont Entomology and Participatory Action Research Team (VEPART)
 Scott Lewins – slewins@uvm.edu Vic Izzo – vizzo@uvm.edu