



Northern New York Agricultural Development Program 2025 Project Report

Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York

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- Wild Work Farm, Keene Valley, Essex County
- Meadow Farmstead, AuSable Fork, Essex County
- Bucksberry Farm in Saranac, Clinton County
- Sanctuary Farm in Vermontville, Franklin County.

Introduction:

Allium vegetable crops, including onions, leeks, and garlic, are staple crops on many Northern New York (NNY) vegetable farms because of their cold tolerance and storage ability. Growing garlic has gained popularity over the last decade, as farms produce this crop to meet consumer demand and to sell for seed. Additionally, farmers are interested in extending the season for these crops through overwintering, use of high tunnels, and improved storage ability. In our 2025 grant activities, we focused on season extension of alliums through overwintering onions in high and low tunnels, managing the invasive leek moth for improved crop quality, and providing vegetable production support to NNY farmers.

Note: The use of brand names or any mention/listing of specific commercial products or services herein is solely for educational purposes and does not imply endorsement by the Northern New York Agricultural Development or project collaborators, nor discrimination against similar brands, products, or services not mentioned.

Overwintered Onion Trial

Our 2025-2026 overwintered onion variety trial is currently underway in its first season at the Cornell Willsboro Research Farm at the time of this report in January 2026. We thank the Northern New York Agricultural Development Program (NNYADP) for its flexibility in granting us funding for projects that span calendar years. The objective of our variety trial is to compare yield and crop quality amongst overwintered onion, scallion, and shallot varieties planted in high and low tunnels.

Our experiment in 2025 consisted of four replicate plots per variety arranged in a randomized complete block design, each in a high tunnel and in low tunnels set up in an adjacent field at the Cornell Willsboro Research Farm in Willsboro, New York. We grew the onions in two 2'x42' long beds in the high tunnel and low tunnels, with four replicates per variety in both settings. Beds were 3' apart.

The soils were amended prior to planting according to DairyOne soil test results. The soil type in the high tunnel and field is Stafford loamy sand. Both the high tunnel and low tunnel field received nitrogen (N) at a rate of 100 lbs/ac, and phosphorus (P) at 50 lbs/ac using NatureSafe (13-0-0) and Giroux's dehydrated poultry manure (4-3-2). Potassium (K) was applied at 150 lbs K/ac and 100 lbs K/ac in the high tunnel and low tunnel field, respectively, using potassium sulfate (0-0-52). The field also received lime to increase the soil pH prior to planting.

We tested 21 varieties (Table 1), including many red varieties, based on grower input that early red onions are in greater demand and sometimes more difficult to grow, warranting further variety trialing. All but one onion variety ('Shakespeare') was started from seed on August 22, 2025 in 128-cell trays in a greenhouse. Shakespeare was started from sets. We included 'Shakespeare' because it was a replacement for 'Forum' sets, which were very popular amongst overwintered onion growers for many years; 'Forum' was discontinued in 2025. All varieties tested were available commercially except for 'EXP-378,' an experimental red onion variety from Bejo Seeds. 'EXP-378' was the only onion seed treated with fungicide. All others were untreated and suitable for organic production. We transplanted the seeded onions on October 1 and the 'Shakespeare' sets on October 16, at a later date due to delayed availability from the supplier.

Low tunnels were installed over top of the onion beds on December 1, after nighttime temperatures consistently dropped below 25°F, as per recommendation by Johnny's Selected Seeds. The low tunnels were constructed from electrical conduit bent into gothic-style hoops that were 3' tall by 3' wide when set into the ground. We covered the low tunnels with AgriBon+ AG70 2.0 oz/sq yd heavy duty row cover secured with plastic clamps, underneath one layer of 6 mil greenhouse plastic (Figure 1). Edges of the low tunnel coverings were secured flush with the ground, using sandbags every few feet. The high tunnel consisted of a 20'x48' single layer plastic structure without heat. Within the high tunnel, onion beds were covered with AG70 row cover on wire hoops, also on December 1 (Figure 2).

We set up two data loggers (HOBO MX2303 with solar radiation shields, Onset Corp., Bourne, MA) to measure air and soil temperature in our onion experiment to compare temperatures between the high and low tunnel structures and the outdoors adjacent to the tunnels. Two data loggers were set up in each of the three locations on October 16 and will remain there until onion harvest.

The onions are currently (January 2026) dormant in the tunnel structures, and we expect growth to resume in February as the days grow longer and temperatures increase. In March 2026, we will remove the low tunnel coverings in a staggered timeline according to outdoor temperatures, first removing the outer plastic and later the row cover in late March/April. In the high tunnel, we will remove the row cover around the same time or slightly earlier. We expect to harvest the scallions in the experiment in March or April. The bulb onions and shallots will be harvested sometime in June. For our harvest data collection, we will record average maturity date, weight and diameter of bulbs, percentage of plants that are unmarketable due to bolting (flowering), and other notes on quality.

Concurrently, we are developing enterprise budgets on our high and low tunnel onions to compare the potential for profitability of this crop grown in the different settings. In fall 2025, we gathered data on the costs of materials and labor needed for the high and low tunnel production systems. We will continue to collect data on these costs in 2026 and will compare costs-to-revenue estimates based on the yield of the highest-yielding onion variety. We will submit a report addendum of our final overwintered onion findings from the variety trial and enterprise budgets in July 2026.

Leek Moth Monitoring and Biological Control Release

In 2025, we monitored for the invasive leek moth on four farms in three Northern New York counties: Essex: Wild Work Farm in Keene Valley and Meadow Farmstead in Au Sable Fork, Clinton: Bucksberry Farm in Saranac, and Franklin: Sanctuary Farm in Vermontville. The purpose of our trap network was to identify the flights of this pest to inform timing of management strategies, including release of the biological control agent *Trichogramma brassicae* (a small wasp) that the project team distributed to the four farms as part of this project. Previous research studies at the University of Vermont have shown that *T. brassicae* releases into onions can reduce leek moth crop damage by ~50%. The aim of our wasp releases was to gather more information on efficacy to reduce leek moth crop damage on NNY farms and farmer perceptions on their use. Each farm had reported leek moth damage in their allium crops in previous years, and were concerned about leek moth in 2025.

Leek moth has three flights during the growing season. Wasps must be released during the onset of the flight to be most effective, as the wasp parasitizes eggs laid by the moths. Insecticides are most effective when applied approximately a week after peak flight. Additionally, netting must be in place during leek moth flights, but can be removed for production activities between flights.

Our trap network provided information for our four participating farms to manage leek moth, and trap counts were released regionally via the ENYCHP listserv, the New England Vegetable Pest weekly call, and conveyed to interested farmers and gardeners in NNY counties.

We used delta traps with sticky cards and pheromone lures (Figure 3). to monitor for leek moth from April through garlic (Bucksberry) or onion harvest (Wild Work, Meadow, Sanctuary) in August. We captured leek moth during each of the three flights, with the first flight beginning in mid-late April, the second flight in late June, and the third in early August. Two traps were set up at each farm, one white trap and one red trap, each at opposite ends of the allium field. We included one of each trap color to determine which was most effective in trapping leek moth.

Either the project team (or occasionally the growers) checked the traps weekly. At first trap catch for each flight, we ordered *T. brassicae* wasps from Arbio Organics and released them within

the allium fields according to suggested rates for medium to high infestation (3-4 wasps per sq ft). We used the controlled release form of *T. brassicae*, which consisted of cardboard cards with wasps sandwiched between in a delayed release medium (Figure 4). The cards are advertised to release the wasps over two weeks.

At most weekly farm visits, we scouted the allium crops at the farms and checked for leek moth damage and caterpillars in a 25-plant sample for each crop (onions/shallots, scallions, and/or garlic). While there are no widely-used damage thresholds for leek moth, garlic producers in Québec use a threshold of 1 infested plant per 25-plant sample to trigger insecticide sprays.

Results by Farm

Trap catches varied by farm, with the largest number of leek moths captured at Wild Work Farm (Figure 5) in Essex County. In previous years, Lissa had reported serious losses to her leek crops due to leek moth. We released wasps at Wild Work six times total during the first, second, and third leek moth flights until onions were harvested between August 7 – 13. At Wild Work, all alliums were grown in the field. The numbers of allium plants with leek moth damage and/or caterpillars ranged from 0–4 plants per 25-plant sample throughout the season, with the highest number of damaged plants found in the onion crop. The farmer, Lissa Goldstein, applied Entrust (spinosad, a product approved for use on certified organic operations) to the onions the first week in July to control leek moth and onion thrips; no other insecticides were used on the crop.

Despite damage exceeding the threshold (1/25 plants) several times during the season in chives, garlic, scallions, and onions, Lissa reported no crop loss (with the exception of some garlic scapes that she was not planning to sell) and she believed that the wasp releases were a beneficial contribution to her allium integrated pest management (IPM) program. A combination of insecticide application timed using our trap counts, wasp releases, and forgoing a highly susceptible crop (leeks) allowed Lissa to successfully prevent leek moth losses in 2025.

At Meadow Farmstead in Essex County, we released wasps six times, on the same dates as Wild Work Farm (Figure 6). Traps were maintained at the farm from April 14 through August 26, until after the onions were harvested. No insecticides or other leek moth management tactics, other than the wasp releases, were used here. At Meadow Farmstead, chives, scallions, garlic, and onions (overwintered and main season) were grown in the field. Garlic was also grown within a high tunnel.

Infested or damaged plants ranged from 0-10 plants per 25-plant sample, with the highest numbers of damaged plants found in the garlic crop grown in the field, and chives. While leek moth damaged the garlic scapes (of little economic value to Meadow Farmstead), farmer Becca Burke did not report any holes from caterpillars boring into the garlic bulbs. She also did not observe any noticeable damage to the onion bulbs. While some damage to chives limited marketability, Becca was satisfied with leek moth management in 2025 and believes that the wasp releases prevented her from losing yield due to caterpillar damage to her alliums.

In Clinton County, we monitored for leek moth at Bucksberry Farm in Saranac. Alliums grown at Bucksberry Farm included chives and garlic in two high tunnels, and garlic in the field. Traps were maintained from April 17 through August 5, after garlic had been harvested, and we released wasps four times (Figure 7). Located farther north than the Essex County farms, we captured leek moth a week later at Bucksberry. Plant damage was higher at Bucksberry Farm compared with Wild Work Farm and Meadow Farmstead, reaching up to 9 per 25 garlic plants with caterpillars or plant damage, and very high (nearly all) high tunnel chives infested. The

farmer, Bryan Briscoe, had intended to sell the tunnel chives as potted plants but could not, due to leek moth infestation. He cut the plants back to remove caterpillars and pupae. Damage in garlic was mainly only to scapes which he did not plan to sell, and Bryan reported that up to 10% of garlic bulbs were unmarketable due to leek moth, in comparison to 30-30% in 2024. Bryan was unsure whether the wasps made a difference in controlling leek moth on his farm, but found value in our weekly visits scouting his crops.

Lastly, we monitored for leek moth in Franklin County at Sanctuary Farm in Vermontville. At Sanctuary Farm, grower Denise Griffin grew mainly garlic for market, but also produced a small patch of onions and high tunnel leeks for personal use. The alliums were grown in two fields, one with garlic and onions near the high tunnel leeks, and another on the opposite side of the farm with only garlic. We monitored for leek moth from April 21 through August 13 in both fields, after onions were harvested (Figure 8). Unlike the other farms, we only used red traps at Sanctuary Farm after the first two weeks due to an unacceptable by-catch of pollinators in the white trap. Wasps were deployed six times at Sanctuary Farm.

In addition to the wasps, Denise applied *Bacillus thuringiensis subsp. kurstaki* to control leek moth caterpillars on her garlic on June 21, when 21 of 25 plants in the main allium field near the high tunnel were infested. At least 85% of the total onion crop experienced damage due to leek moth. High levels of infestation in the field near the high tunnel may be attributed to their proximity to overwintering leeks. The leeks in the high tunnel fostered a large number of leek moth caterpillars. Denise did not believe that the wasps were effective in reducing leek moth damage to her allium foliage, and she believes that leek moth pressure was greater in 2025 than in 2024. She identified a small number of garlic bulbs that had been damaged by leek moth from her 2025 harvest.

Trap Test

The number of leek moth caught in white versus red delta traps was nonsignificant according to a t-test comparison of trap counts across sites ($p > 0.05$). Numerically, trap counts were higher in the white traps at three of the four sites, but were higher in the red trap at one farm. We were unable to compare red versus white trap counts at Sanctuary Farm, as we removed the white trap from this location due to concern of nontarget bycatch. We noticed more nontarget insects captured in the white delta traps, including beneficial bees, predatory flies, and other insects. In the future, we will only use red traps to avoid unnecessary capture of other insects.

Results Summary:

In summary, the Essex County farms participating in our wasp releases were pleased with the results of the wasp demonstrations and felt as though the wasps reduced the amount of leek moth damage to their crop. One farmer expressed a concern with the timing of wasp release; i.e., if leek moth traps are checked only once per week, there is a delay in identifying the start of flight, and then a delay receiving the wasps after they are ordered, in total up to two weeks. All farms appreciated the project team trapping leek moth on their farms, which gave them useful information in understanding the populations on their farms and timing of flights. Historical records of flight timings on their farms will allow them to order wasps ahead of predicted flights in the future, better optimizing the timing of their release.

High levels of leek moth infestation were found on the participating Clinton and Franklin counties' farms, likely due to alliums overwintering in their high tunnels, fostering leek moth. Additionally, the colder temperatures, particularly in Vermontville, may have limited the activity of the wasps earlier in the season during the first flight. The wasps prefer temperatures of at least 68°F. While *T. brassicae* prefers warmer temperatures (approximately 68-80°F), leek moth flights occur as early as late March when temperatures are still below freezing.

All farms appreciated the IPM support for their allium crops, and despite leek moth caterpillars and damage over-threshold in crops, none experienced serious economic losses. During our weekly visits, we were able to scout onion crops for other pests and diseases and provide production support for other crops as well.

Vegetable Production Support Garlic Workshops

In March 2025, we held two daylong Garlic and Brassica Crop Workshops for Vegetable Growers: March 4 at Whallonsburg Grange in Essex, NY and March 11 at the CCE St Lawrence County Learning Farm in Canton, NY. Based on a grower needs survey including northern NY vegetable producers, we offered a half day of brassica programming in the afternoon following our garlic program in the morning. Speakers included Crystal Stewart-Courtens on growing garlic, Elisabeth Hodgdon on leek moth and swede midge management (NNYADP 2024 project), and farmers who discussed garlic and brassica production on their farms. Farmer presenters included Jean-Paul Courtens of Philia Farm in Johnstown, NY, David Marchant from Riverberry Farm in Fairfax, VT, Raymond Luhrman of Fox Creek Farm in Gallupville, NY, Mike Champagne of North Point Community Farm in Plattsburgh, NY, Mike Davis of Harvest Hill Farm in Willsboro, NY, and Dan Kent of Kent Family Growers in Lisbon, NY. For each crop group, we held a farmer-to-farmer discussion (Figure 9) that offered participants the opportunity to learn from their peers and share information on their growing practices. Attendees (14 in Essex, 23 in Canton) represented five NNY counties (Clinton, Essex, Franklin, Lewis and St. Lawrence).

Marketing Factsheets

Lindsey Pashow created seven factsheets on the follow topics plus a marketing template to help produce growers: 1) General marketing; 2) Developing a marketing plan; 3) Finding markets; 4) Market evaluation; 5) Working with wholesale buyers; 6) Online marketing; and 7) Value-added products.

These factsheets coincide with a webinar series available on the [CCE Harvest NY YouTube channel](#). The factsheets are available currently in an online [Box folder](#) and are available from the Extension specialists and will be distributed during future programming.

Produce Auction Meetings

Judson Reid and Elisabeth Hodgdon presented at two meetings for the St Lawrence Valley Produce Auction (SLVPA) in 2025. On May 15, they led a high tunnel tomato discussion on soil fertility and health, trellising, and varieties, plus overwintering onions, leek moth, and food safety considerations for farm workers and family at Alvin Martin's farm in Brushton, where 8 people attended. On September 19, Judson and Elisabeth presented on season extension and cucurbit and strawberry pest management for the SLVPA annual meeting in North Bangor, 42 attended.

Farm Visits by County

Vegetable, berry, cut flower, greenhouse, food safety, and business support farm visits in 2025:
Elisabeth Hodgdon: Clinton: 50, Essex: 82, Franklin: 18, St. Lawrence: 1
Lindsey Pashow: Clinton: 12, Essex: 18, Franklin: 10, St. Lawrence: 2
Judson Reid: Franklin: 7, Jefferson: 1, St. Lawrence: 2.

Acknowledgements: We thank Jennifer Stanton, CCE ENYCHP Program Aide, for her work maintaining the leek moth trapping network, allium scouting, establishing the overwintered onion experiment, gathering data for enterprise budgets, and support organizing and promoting

outreach programs. We thank the farmers who hosted our leek moth traps and biocontrol demonstrations, and Adam Hainer of Juniper Hill Farm for providing greenhouse space to start our onion transplants. Lastly, we acknowledge assistance from Adam Sayward and Aaron Valachovik from the Cornell Willsboro Farm in constructing our low tunnels and maintaining the overwintered onion experiment.

Table 1. Onion, shallot, and scallion varieties grown in 2025-2026 Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York project in 2025, NNYADP.

Type	Variety	Color	Source
Onion	Barolo	Red	Johnny's Selected Seeds
Onion	Bridger	Yellow	Johnny's Selected Seeds
Onion	Candy	Yellow	Johnny's Selected Seeds
Onion	Hi-Keeper	Yellow	Territorial Seeds
Onion	Red Carpet	Red	Johnny's Selected Seeds
Onion	Red Long of Tropea	Red	Johnny's Selected Seeds
Onion	Red Mountain	Red	Territorial Seeds
Onion	Red Rock	Red	Johnny's Selected Seeds
Onion	Red Spring	Red	Bejo Seeds
Onion	Redwing	Red	Johnny's Selected Seeds
Onion	Rossa di Milano	Red	Johnny's Selected Seeds
Onion	Shakespeare*	Yellow	Johnny's Selected Seeds
Onion	T-448	Yellow	Johnny's Selected Seeds
Onion	Walla Walla	Yellow	Johnny's Selected Seeds
Onion	EXP-378	Red	Bejo Seeds
Scallion	Deep Purple	Red	Johnny's Selected Seeds
Scallion	Evergreen	White	Johnny's Selected Seeds
Scallion	Marksman	White	Johnny's Selected Seeds
Shallot	Conservor	Red	Johnny's Selected Seeds
Shallot	Innovator	Red	Johnny's Selected Seeds
Shallot	Matador	Red	Johnny's Selected Seeds

**Denotes variety started from sets versus seed*



Figure 1. Low tunnels covered in row cover attached to hoops with clamps in December 2025, prior to covering with plastic and securing with sandbags at the Cornell Willsboro Research Farm in Willsboro, NY. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025. Photo: J. Stanton.



Figure 2. Overwintered onions newly transplanted into the high tunnel at the Cornell Willsboro Research Farm in Willsboro, NY in October 2025 (left) and covered for the winter with heavy row cover in December, with farm manager Mike Davis in the background (right). Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025. Photos: left: E. Hodgdon; right: J. Stanton.



Figure 3, left. White delta trap for leek moth monitoring in garlic and overwintered onions at Wild Work Farm, Keene Valley, NY, April 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025. Photo: E. Hodgdon.

Figure 4, right. Delayed release formulation of *Trichogramma brassicae* parasitoid wasps released from cards attached to bamboo stakes in a garlic bed at Sanctuary Farm, Vermontville, NY, May 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025. Photo: E. Hodgdon.

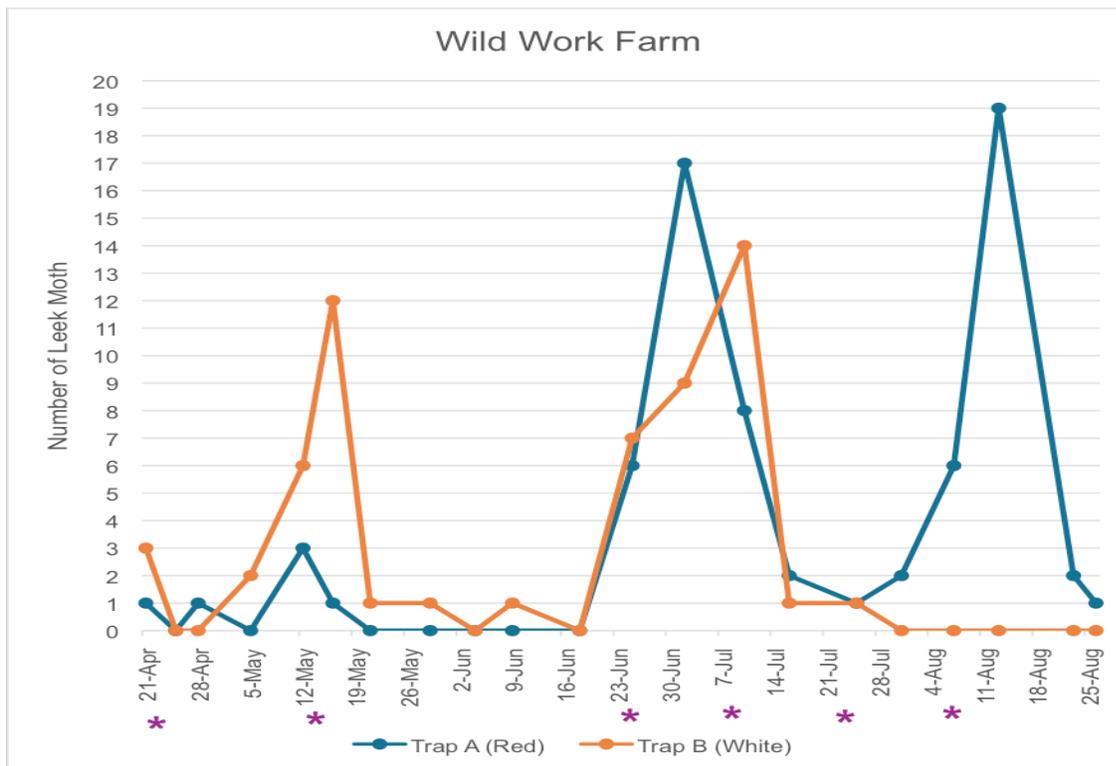


Figure 5. Weekly leek moth trap catches at Wild Work Farm, Keene Valley, NY. Asterisks indicate dates of *Trichogramma brassicae* wasp releases on April 24, May 16, June 25, July 10 and 25, and August 7, 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025.

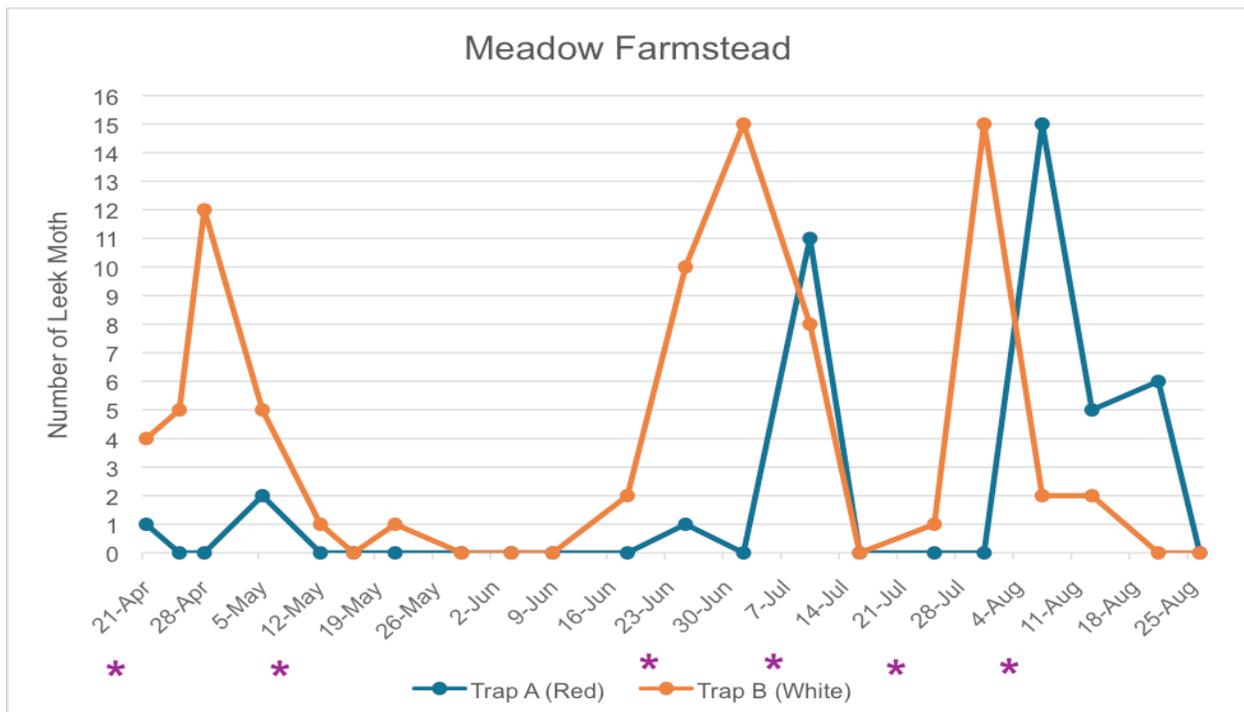


Figure 6. Weekly leek moth trap catches at Meadow Farmstead, Au Sable Forks, NY. Asterisks indicate dates of *Trichogramma brassicae* wasp releases on April 24, May 16, June 25, July 10 and 25, and August 7, 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025.

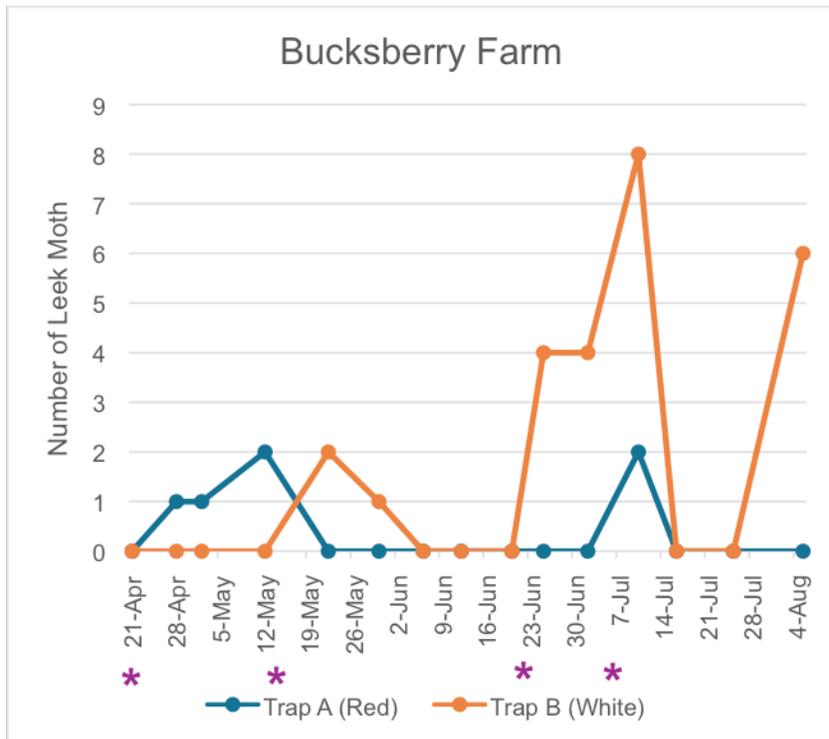


Figure 7. Weekly leek moth trap catches at Bucksberry Farm, Saranac, NY. Asterisks indicate dates of *Trichogramma brassicae* wasp releases on May 2 and 22, June 25, and July 10, 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025.

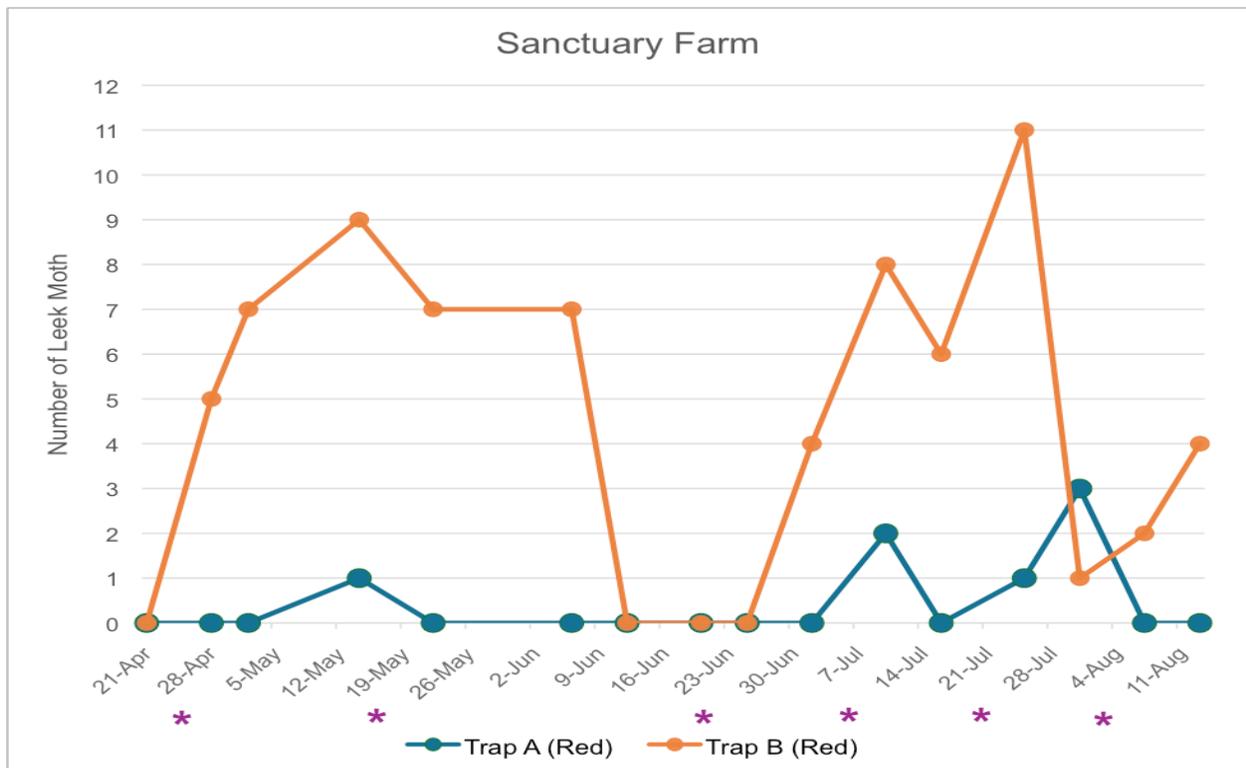


Figure 8. Weekly leek moth trap catches at Sanctuary Farm, Vermontville, NY. Asterisks indicate dates of *Trichogramma brassicae* wasp releases on May 2 and 22, June 25, July 10 and 25, and August 7, 2025. Techniques for Overwintering Onions and Improving Allium Pest Management in Northern New York, NNYADP, 2025.



Figure 9. Raymond Luhrman (third to right of easel) of Fox Creek Farm in Gallupville, Schoharie County, NY, talks about brassica production on his farm during the farmer-to-farmer brassica discussion at the Essex County Garlic and Brassica Vegetable Workshop on March 4, 2025. Photo: E. Hodgdon.