Alyssum Habitat Hedges to Attract Beneficial Insects for High Tunnel Pest Management

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For more information visit the High Tunnel Habitat Plantings project webpage: https://site.uvm.edu/hightunnelhabitats/

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High tunnels are plastic covered structures that protect crops from extreme and unpredictable weather. These covered environments also can harbor pest outbreaks. Aphids, spider mites and thrips are pests that pose significant management challenges in high tunnels that can cause significant damage and economic loss. Successful biological control requires a buildup of natural enemies early in the season. However, releases of commercial natural enemies are costly.

Habitat/insectary plants promote establishment of wild natural enemy populations in agricultural settings and play a vital role in conservation biocontrol to increase on-farm biodiversity. Alyssum (*Lobularia maritima*) [Brassicales: Brassicaceae] is easy to grow and effective for attracting and supporting beneficials in a variety of agroecosystems. The goal of this project was to evaluate alyssum habitat hedges planted in the space between high tunnels as an integrated pest management (IPM) strategy to attract and sustain natural enemies in vegetable crops.

Guidelines are provided on how to establish alyssum habitat hedges and what beneficial insects and pests we observed visiting these alyssum hedges on Vermont farms.

Alyssum Habitat Hedge Production Guide

- ***Seedbed preparation:*** In autumn, prepare the bed by covering the area (4-ft wide) with a tarp or weed cloth to stifle grass and weeds. In spring (late April/May), when the ground is workable, till the strip to break up the sod. It may take several passes with a rototiller to create a fine seed bed. Apply fertilizer or compost on the bed.
- ***Alyssum spacing:*** Lay heavy duty landscape fabric (~5oz) or black plastic down to reduce weed growth. Drip irrigation tape should be installed under the fabric before it is laid down and pinning in place to support alyssum over the summer. Make 3-in diam holes in a 3-ft wide strip down the middle of the fabric. We recommend 18 holes/3 ft sq. A 3-ft sq. plywood template can be prepared by making holes with a hole saw. Lay template on the plastic to cut out the holes to ensure consistent plant spacing. Holes can be burned into the fabric prior to planting with a hand-held blow torch. Move the template down the center of the strip along the full length of the tunnel. You can also purchase weed cloth with premade holes. Space on either side of the strip is left covered but not planted to reduce weed growth on the edge.
- ***Alyssum production:*** Use untreated sweet alyssum seeds which are widely available. In the first year, alyssum can be started from seed in a heated area (April) and transplanted or it can be directly seeded in early-late May. In the second year, alyssum will likely reestablish from overwintered seed. If there any bare places, hand till the soil with a trowel and seed directly or transplant seedlings.
- ***Strip maintenance:*** It is best to irrigate and fertilize the strip regularly. To prolong flowering, plants can be trimmed back if time permits, but this is not essential. Strips should be weeded regularly to reduce competition. Alyssum should be scouted regularly because pest outbreaks may occur and need treatment to reduce populations. Weed cloth can be kept in place over winter. Plant debris should be removed in early spring to encourage alyssum to regrow.

Space between high tunnels suitable for a habitat hedge.

Alyssum started from seed (April) in heated area.

Seedbed prepared with a rototiller (May).

Landscape fabric weed barrier set in place.

3-ft wide area ready to be planted with drip tape installed beneath. tape.

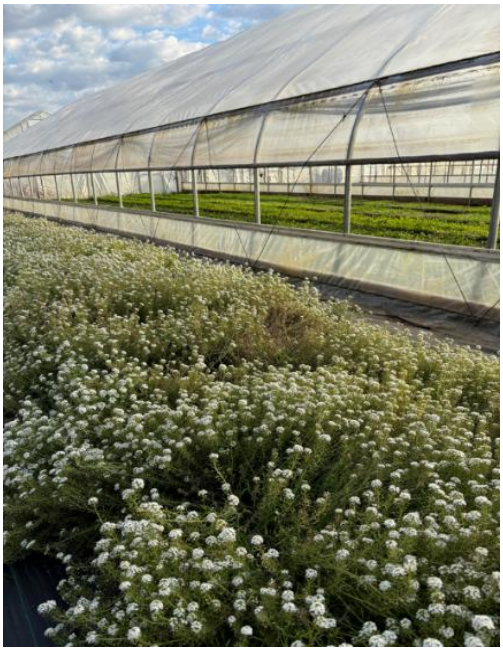
Alyssum ready for transplanting (May).

Alyssum transplanted seedlings (left) and direct seeded (right).



Alyssum plantings in Vermont in May (left), June (middle) and July (right).

Alyssum planting in July (above) and September (below).



Alyssum planting in October.

Alyssum debris in spring (early April) before removal.

Alyssum reestablishing from overwintered seed (April-early May).

Alyssum growth in June in plants transplanted (left and right) and direct seeded (center).

Alyssum growth in late May in transplanted (left) and reestablished areas from overwintered seed (right).

Weed growth in alyssum strip. Weeding while plants are small is highly recommended.

Beneficials Visiting Alyssum Habitat Planting

Alyssum is attractive to a wide variety of beneficial insects that provide pollination and pest management services. Most of the beneficials we observed were syrphid flies, which are often bee mimics. They are also called hover flies because they may remain suspended in air in one place, seeking flowers or egg laying sites below. As adults, they are valued pollinators, while as immatures (larva/maggot), they either predate on small soft-bodies pests or feed on decaying organic matter. Tachinid flies, which look like a common house fly, are also attracted to alyssum. They parasitize a variety of pest caterpillars, beetles and bugs. They lay white eggs on pest bodies, which hatch into larvae that bore into the host and feed, killing the pest.

Various bee pollinators were observed visiting the alyssum, esp. honeybees if colonies were nearby. Several small parasitic wasps (<0.001 in.) were also seen, many of which were aphid parasitoids. Predatory bugs, including assassin and ambush bugs and *Orius*, were frequent visitors in mid-summer. They feed on small pests such as adults and nymphs. *Orius* bug is also commercially available. There were also several species of predatory lady beetles and thrips which, in both the larval and adult stage, feed on pests.

Syrphid flies whose larvae predate on small, soft-bodied pests.

Oblique Streaktail
(*Allograpta obliqua*)

Margined Calligrapher
(*Toxomerus marginatus*)

Tufted Globetail
(*Sphaerophoria contigua*)

Common Flower Fly
(*Syrphus ribesii*)

Syrphid flies that have aquatic/semi-aquatic larvae that feed on decaying organic matter.

The Black-Shouldered Drone Fly
(*Eristalis dimidiate*)

Transverse-banded Drone Fly
(*Eristalis transversa*)

Eurasian Drone Fly
(*Eristalis arbustorum*)

Orange-spotted Drone Fly
(*Eristalis anthophorina*)

Common Drone Fly
(*Eristalis tenax*)

Thick-legged Hoverfly/Common Compost Fly (*Syritta pipiens*)

Tachinid Flies

Beetles & Bugs

Banded Feather-legged Fly
(*Tricopoda plumipes*)

Swift Feather-legged Fly
(*Trichopoda pennipes*)

Spotted (pink) Lady Beetle
(*Coleomegilla maculata*)

Archytas metallicus

Hystricia abrupta

Jagged Ambush Bug
(*Phymata americana*)

Bees & Wasps

Green Sweat Bee
(Halictidae family)

Western/European Honeybee
(*Apis mellifera*)

Blue-winged/Two-spotted Scoliid Wasp
(*Scolia dubia*)

Tarnished Plant Bug
(*Lygus lineolaris*) adult.

Striped Flea Beetle
(*Phyllotreta striolata*)

Pests on Alyssum Habitat Strips

Flea beetles (various species within the Chrysomelidae family) and tarnished plant bugs (*Lygus lineolaris*) were the most common pests observed on alyssum. Less common were thrips, aphids, stink bugs, squash bugs and cucumber beetles. Although several pests were found on the tomatoes growing in the high tunnels adjacent to the alyssum, they did not reach levels that caused damage. However, because of the potential for alyssum to harbor pests, regular scouting is advised. If high pest numbers are observed, a treatment that has a short residual effect, may be needed.

Beneficials on Crops Next to Alyssum Strips

Wild natural enemies from the surrounding area may be attracted to the alyssum strips and migrate then into the adjacent high tunnels. In particular, we observed syrphid flies, most commonly near aphid colonies and often in their immature stages. We found green lacewing larvae, voracious predators and their white eggs attached to a thin filament. Aphid mummies—what remains of an aphid after it is parasitized by a wasp--were also frequently seen. Late in the summer we also found the fast-moving predatory bug *Orius*.

Eastern Calligrapher
(*Toxomerus geminatus*)

Syrphid fly larva/maggot.

Green lacewing larva (*Chrysoplera* sp.).

Green lacewing eggs (*Chrysoplera* sp.).

Aphid mummy parasitized by a *Praon* sp. wasp (Braconidae family).

Aphid mummy parasitized by a parasitic wasp (Braconidae family).

Minute Pirate Bug (*Orius insidiosus*)

Final Remarks

Insects included herein are just a few of the many beneficials and pests detected in our habitat hedges and adjacent high tunnel crop plants. Growers should become skilled at distinguishing the good bugs from the bad. It is also important to be able to recognize the different life stages of the beneficials.

Providing floral resources is a valuable conservation biocontrol tool to increase on-farm biodiversity. These plantings provide food in the forms of pollen, nectar and pests. They also offer refuge from inhospitable weather or protection from predators. The habitat gives the beneficials places to lay eggs, pupate or overwinter. Growers are sometimes encouraged to make prophylactic releases of commercial natural enemies early in the season. This can be costly, and if there is no food for them, they die. Alyssum strips provide an alternate food source when the pest is absent. The pests always come eventually, so supporting beneficials early in the season ensures they are on site in the vicinity of crops when they are needed. For more information about habitat plantings and identification of insects in Vermont, visit the links below.

Additional Resources

- High Tunnel Habitat Plantings (University of Vermont). https://site.uvm.edu/hightunnelhabitats/
- Hopwood J, E Lee-Mäder, L Morandin, M Vaughan, et al. (2016). Habitat Planning for Beneficial Insects: Guidelines for Conservation Biological Control. Xerces Society for Invertebrate Conservation. https://xerces.org/publications/guidelines/habitat-planning-for-beneficial-insects
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- Xerces Society. (2025). Conservation Biological Control. https://www.xerces.org/pesticides/ecological-pest-management/conservation-biological-control
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Lady beetle larvae.

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