Bringing In The Other Good Guys

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Predators vs Parasitoids

Predators: actively & kill host
- Larger than prey
- Attack in immature stage, adult stage, or both
- Eat multiple prey
- Mobile to find & catch prey
- Most have broad host range

Parasitoids: kill host (parasites don’t usually kill)
- Smaller than host
- Kill in larval/developing stage
- Each larva kills one host during its development
- Larvae not mobile in the environment (adults mobile and seek hosts)
- Eggs laid in or on host
- Usually host-specific
Wasp Parasitoids

**Chalcids**

- *Trichogramma* on moth eggs
- *Aphelinus* for aphids
- *Aphelinus* mummy

**Braconids**

- *Cotesia* pupae on hornworm (after feeding within)

**Ichneumons**

- Predatory in larval stages, adults mostly feed on nectars
- *Aphidius* larva-pupa ‘mummy’
- *Praon* mummy

**Prominent ovipositor**

*Aphidius* & *Praons* attack aphids
Wasp Predators

Bald-faced hornet

Digger wasps (cicada killers)

Yellow jacket
Flies
Parasitoids & Predators

**Tachinids**
- Most adults eat honeydew & nectars
- Larvae internal parasitoids
- Look like houseflies with stout bristles on abdomen

**Cecidomyiids**
- Aphidoletes maggots attack aphids
- Feltiella maggots attack spider mites

**Asilids (Robber flies)**
- Eggs on caterpillar
- Predatory as adults & larvae (in soil)

**Syrphids**
- Maggots attack soft bodied prey
- "I am not a bee!"
Predatory Bugs

Pirate Bugs
- Orius

Predatory as adults & nymphs

Assassin

Damsel
- Geocoris

Big Eyed
- Spined Soldier
- Predatory stink bug (*Posidus*)

Predatory as adults & nymphs

Geocoris
Predatory Beetles

Lady Beetles

Predatory as adults & larvae
Some can be crop pests (Mexican bean beetle)
Others consume fungi
Commercially available spp.
- *Hippodamia convergens* wild caught & native
- *Adalia bipunctata* insectary raised & native
- *Stethorus punctillum*, non-native but other spp. natives

- *Hippodamia convergens* convergent lady
- *Adalia bipunctata* two-spotted
- *Stethorus* mite feeder
- *Psyllobora vigintimaculata* twenty-spotted
*fungus feeder (powder mildew)*
Predatory Beetles
Common Lady Beetles

**Introduced**

- *Coccinella septempunctata*
  - sevenspotted ‘C-7’

- *Harmonia axyridis*
  - Asian lady beetle

- *Propylea quatuordecimpunctata*
  - checker spot ‘P-14’

**Natives**

- *Coleomegilla maculata*
  - pink spotted

- *Hippodamia parenthesis*
  - parenthesis

- *Hippodamia variegata*
  - variegated
Predatory Beetles

**Soldier**
- Adults highly attracted to flowering plants (goldenrod, herbs) to feed on nectar & pollen

**Carabid**
- Ground beetles (some also eat seeds managing weeds)
- Predatory as adults & larvae

**Rove**
- Vast diet (fungi, small arthropods, decaying matter)
Lacewings
Brown & Green

Adults consume pollen & nectars

Predatory as adults & larvae

Mostly predatory as larvae

Eggs stalked

Eggs single
There Are Good Thrips!!

Black hunter thrips
(Aelothrips)

The sixspotted thrips
(Scolothrips sexmaculatus)

Franklinothrips vespiformis

Banded thrips or Banded-wing thrips
Aeolothrips fasciatus
Dragon/Damselflies, Mantids, Spiders
Natural enemies need:

- Adequate food sources (pests.getHosts.pollen.nectar)
- Shelter & proper climate
- Reproduction sites & lovers

**Habitat Plant Systems** provide the above to wild &/or released nat. enemies

- Successional perennials
- Annuals with long bloom times
Just Because it Has Flowers Doesn’t Make it a Good Habitat Plant

Attractive to pests & natural enemies

Abundant flowers with proper size, structure & pollen & nectar production all season

Tolerates wide range of growing conditions (hot or cold & dry)

Cheap, easy to produce & low maintenance

Not invasive or aggressive
Habitat Plant Options

Annuals

- Dill
- Zinnias
- Coriander/Cilantro
- Alyssum/Lobularia
- Sunflowers
- Buckwheat
Habitat Plant Options
Native Perennials

Pale-Leaved Sunflower
Horsemint/Spotted Beebalm
Sand coreopsis/lanceleaf tickseed
Hairy Beardtongue
Coneflower
New England Aster
Habitat Plants

Suitable for many types of production, natural and landscaped settings

Outdoor nursery mum plantings

Greenhouse ornamentals

Habitat rows in nursery and vegetable production

High tunnel vegetables
Overview

3 year study across 3 states (ME, VT, PA) examining habitat plant (annuals) attractiveness to aphids & their assoc. nat. enemies

Selected tunnels in year-round production (summer – tomato, pepper, etc. & winter – greens) with limited fallow periods.

Tested combinations of borage, marigold, bush green bean, alyssum, calendula, dill & viola.
Natural Enemies Attracted

Over 2,850 nat. enemy individuals visited habitat plantings

Majority were parasitic wasps & mummies, Orius adults & nymphs & syrphid adults

Others include various lady beetle life stages, predatory maggots, assassin bugs, soldier beetles, etc.
Habitats for High Tunnels

Habitat Plant Attractiveness

Alyssum most attractive in summer 31% (& winter ’41%’ not shown)

Borage 2\textsuperscript{nd} most attractive (21%) in summer followed by calendula, marigold & dill

Calendula & borage attracted a lot of pests (thrips, aphids), challenging to grow
Overview

Pilot study at 2 local nurseries in perennials July-September 2016
Habitats for Landscape Settings

Natural Enemies Attracted

Majority of nat. enemies attracted were Parasitic wasps, *Orius* & Syrphid adults

![Natural Enemies Attracted to Habitat Plants](image)
Take Home Message

Start slowly and keep it simple!

Alyssum has great potential as a year-round habitat plant

1. Cheap & easy to produce
2. Tolerant to wide range of heat & cold temperatures
3. Prolific blooms all season long with low maintenance

In summer, addition of marigolds adds extra attractiveness for reasons 1 & 3 above.

The Best Things In Life Are FREE!
Questions?

Thank You!

http://www.uvm.edu/~entlab/

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