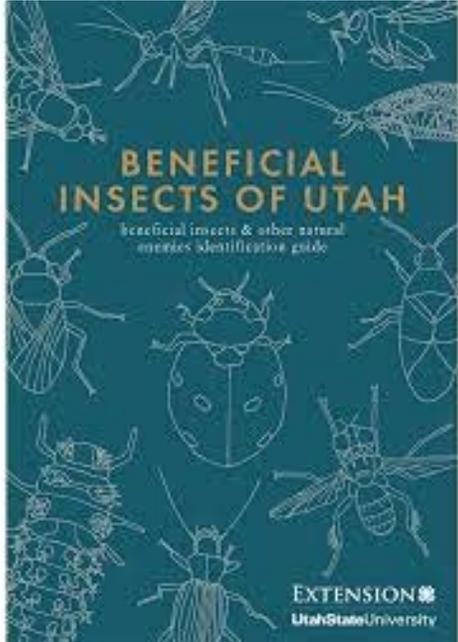


Attracting Beneficial Insects to Manage Pests

Laura Horn



What are beneficial insects?



Parasites (usually specialists)

Tachinid flies

Wasps (65,000+ species of parasitic/ parasitoid wasps worldwide)

Predators (usually generalists)

Beetles (ladybug, ground beetle, soldier beetle)

Flies (syrphid fly aka hoverfly, robber fly)

“True” bugs (assassin bug, big-eyed bug, minute pirate bug)

Wasps (hornet, yellowjacket, paper wasp)

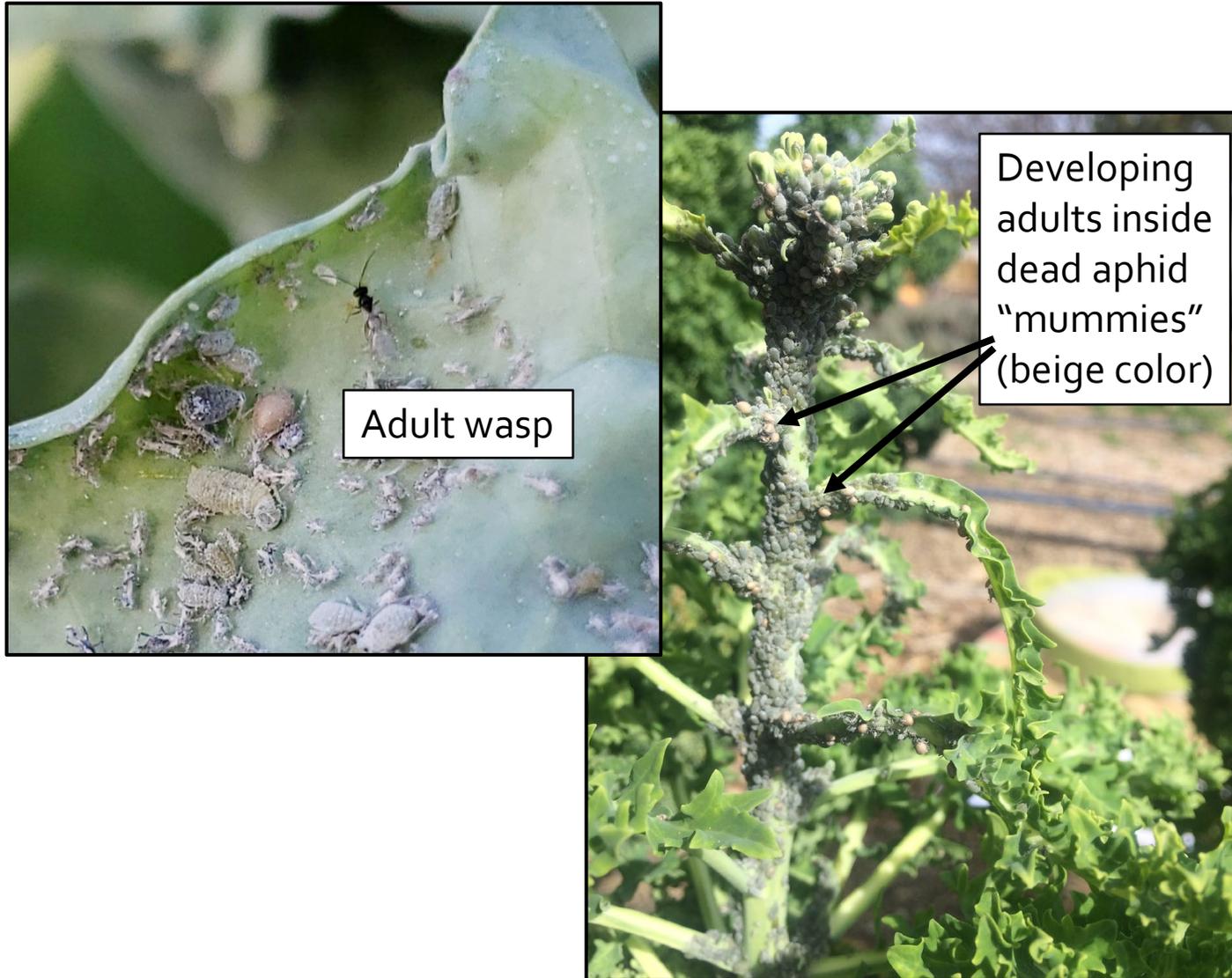
Lacewings

Spiders

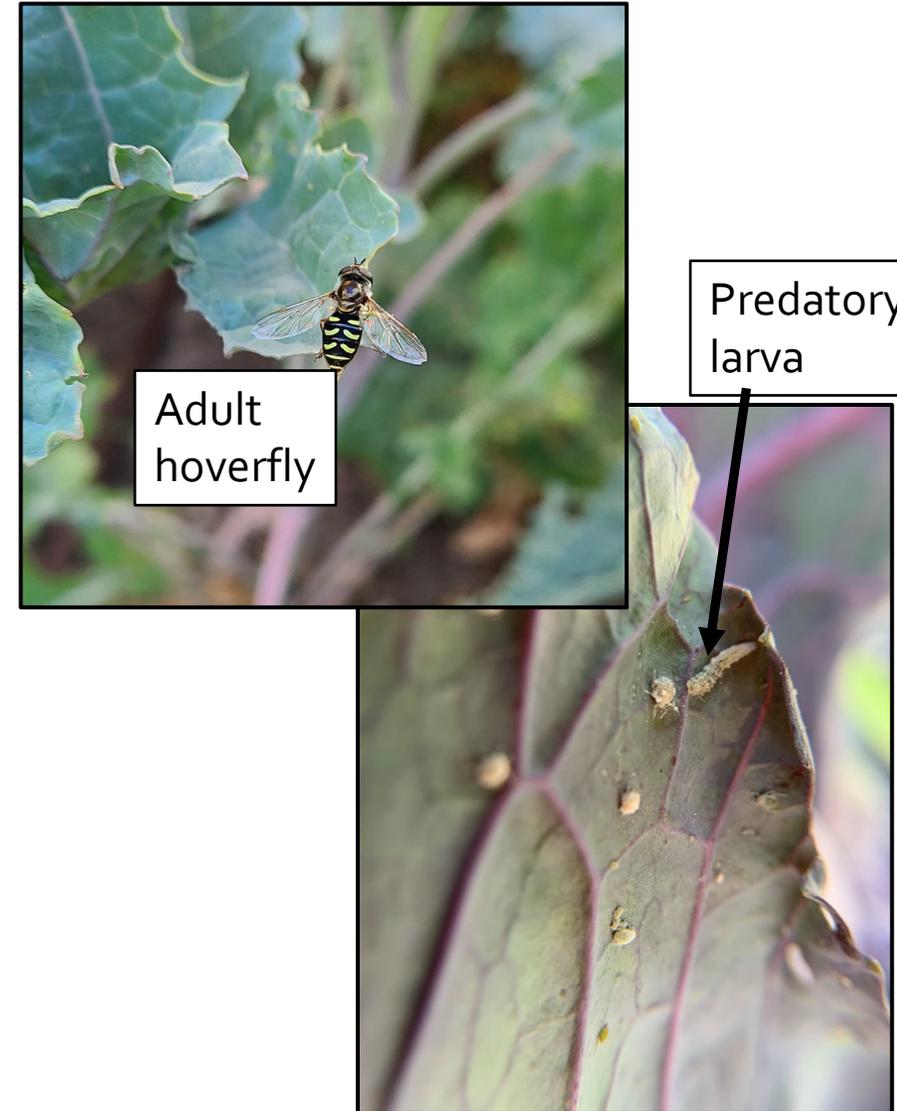
Predatory mites, predatory midges, and more!!

- Beneficial insect species outnumber pest species
- Beneficial insects tend to be solitary in the landscape
- Review guides then scout: flowers, crops, & undisturbed areas; scout during the day and night (many beneficial insects are nocturnal)!

Parasitoid wasp: *Diaeretiella rapae*



Hoverfly: *Eupeodes* sp;
Predatory larvae



Seven spotted lady bug: *Coccinella septempunctata*
Predatory adult and larva



Green Lacewing: Chrysopidae family
Predatory larvae



Lacewing adult and larva photo credits:
Jack Kelly Clark, University of California IPM Program

What is (Conservation) Biological Control?

Actively encouraging Beneficial Insects, aka “natural enemies”, aka the insects/spiders/mites that attack pests.

- Chemical-free, organic
- A long-term strategy
- Part of IPM / IPPM: preventative (creating the right environment, i.e., conditions that don't favor pests)

Should I do it...?

YES!

- ✓ Increases biodiversity on farm
- ✓ Plantings support other wildlife ++birds, reptiles, pollinators
- ✓ Plantings support soil health ++organic matter and other nutrients
- ✓ Plantings support water quality – filter runoff to/from farm

AND..... More time & labor

- ✓ Monitoring (for beneficials + pests)
- ✓ Installing habitat
- ✓ Maintaining habitat (2-3 yrs)

The targeted/ scientific approach



- Start with **one pest problem**
- **Research:** Important beneficial insects that prey on your pest)
 - Beneficial Insects of Utah (USU); ATTRA doc, Appendix A
 - Xerces "Habitat Planning.."
- **Analyze:** Pinpoint the beneficial insects you want to attract
 - Do some additional research on those beneficial insects
 - Compile habitat needs of those insects
- **Execute:**
 - Conserve all existing habitat on the farm
 - Create/plant some new stuff
 - Protect and grow your habitat; think long-term
 - Be mindful with chemicals

General approach

#1 Don't kill beneficial insects: Eliminate insecticides or use only targeted ones. Beneficial insect species will take much longer to recover than pests! (They have fewer generations per year)

#2 Recognize and conserve existing habitat Look at undisturbed areas that could provide egg-laying sites, overwintering shelter, or other shelter; all native flowering plants including "weeds"

#3 Add more flowering plants Those that together provide continuous blooms throughout the growing season to support as many beneficial insects as possible. Most need nectar and pollen, "alternate" prey, and places to lay eggs & hatch larvae

#4 Manage your habitat to minimize harm (see #1)

#1 Don't kill beneficial insects: Eliminate insecticides or use only targeted ones. Beneficial insect populations will take a long time to recover, if they get knocked back.

Application timing

When beneficial insects are not active or least likely to be active
(Must know the life history of your target insects)
(Residual toxicity lasts longer in cool temps, so chemical can be active the next morning..)

Control drift

Be mindful of weather (temp and wind speed, best=mild steady wind 2-9mph)
Application method & equipment settings (best=low pressure nozzles which produce larger, heavier droplets)

#2 Recognize and conserve existing habitat Look at undisturbed areas that could provide egg-laying sites, overwintering shelter, or other shelter; always try to conserve native flowering plants, even “weeds”

- ✓ Wild areas within or adjacent to farm
- ✓ Borders or ditches with native vegetation
- ✓ Any flowering shrubs, trees, perennials, native grasses, native “weeds”*
 - *Only conserve native weeds (nonnatives are more likely to harbor pests)
- ✓ **Any/all undisturbed areas** – wood or rock piles, brush piles, debris piles, old logs and stumps, leaf litter, dead woody plant material, humid or woody areas that are shaded/sheltered, soil areas that stay moist in summer, any and all native bunchgrasses!
- ✓ Balance insect habitat with farm sanitation needs

#3 Add more flowering plants Blooms throughout the growing season; including insectary strips between crop rows, cover crops, annuals (from seed), or perennials (seed or plant)

- ✓ Nectar or Pollen. Many beneficial insects feed on nectar or pollen during their adult stage and lay their eggs/hatch larvae or hang out on flowering plants.
- ✓ "Alternate prey." Prey insects also hang out on flowers; these are important food before/after the target pest is present.

PLANTING GUIDELINES:



Succession of blooms (always have something flowering)

Shallow (small) flowers are best (i.e., big clusters of small flowers)

Diversity! 10-12 species

More Diversity! Variety in plant height/habit, flower shape, and color

#3 Flowering plants: examples

Annuals you can seed in early winter:

- Sweet alyssum (*Lobularia maritima*) **Spring + Fall**
- Ammi (*Ammi majus*, *Ammi visnaga*) **Late Summer**

Cover crops:

- Clovers (many spp, can tolerate shade) **Spring**
- Buckwheat (*Fagopyrum esculentum*) **Summer**
- **Herbs (Summer)**– Dill, parsley, cilantro
- **Leafy vegetables (Summer)**– Lettuces, brassicas
- Marigolds, Calendula **Summer**
- Sunflowers **Late Summer**

Most native perennial wildflowers and native perennial mixes respond well to early winter seeding (-James Loomis).

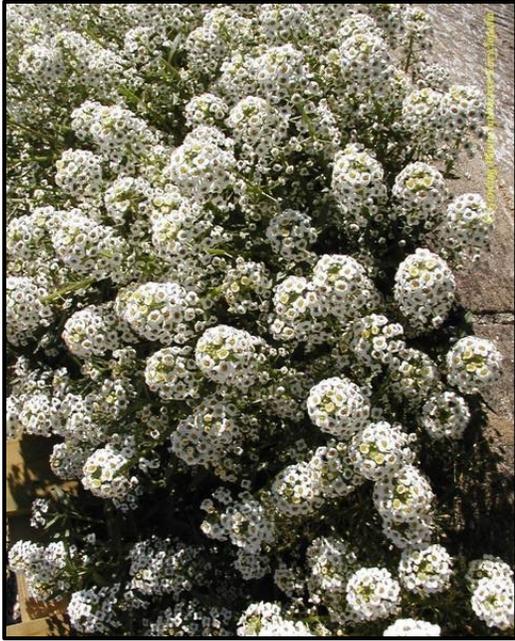
Other Perennials:

- Yarrow **Summer**
- *Sorbaria sorbifolia* **Summer**
- Goldenrod, **Late Summer**
- Rabbitbrush **Late Summer**

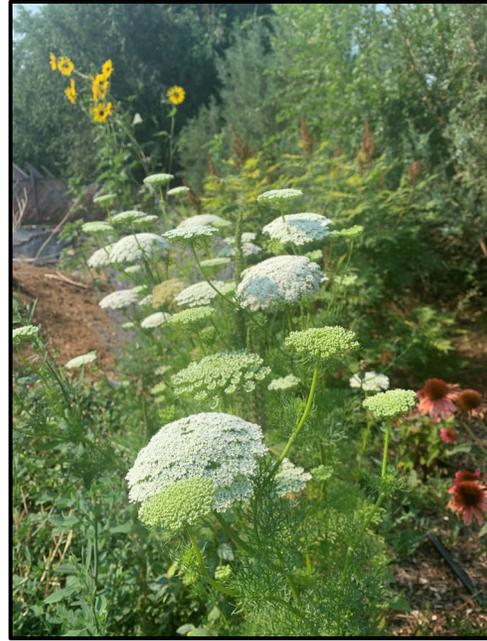
Any/all

- **Native bunchgrasses**

#3 Flowering plants: ANNUALS



Alyssum



Ammi



Flowering kale



Nonnative mix – INVASIVE!

#3 Flowering plants: PERENNIALS



Borski Farm (planting along wall)

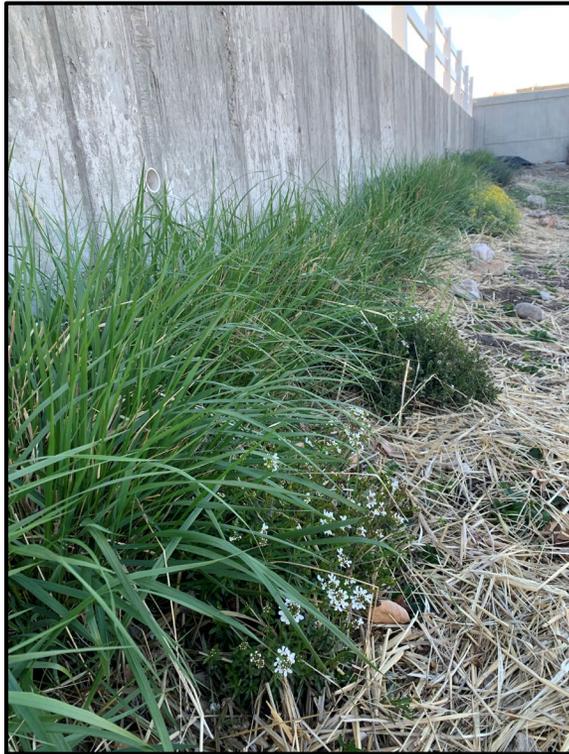


Green Phoenix Farm (WCG)



B.U.G. Farm:
On R: *Sorbaria sorbifolia*, Echinacea

#3 Utah "Hedgerow": NATIVE BUNCHGRASSES



Feather reed grass (spring)



Blue gramma grass (summer)



On L: Feather reed grass (summer)

New perennial areas - tips

Site preparation

- Remove existing weeds to create a clean, relatively weed-free seedbed
 - Do spend as much time as possible on this step: 1+ years
- OR..... Mow area, then spray several times starting in early spring; seed in fall

Habitat maintenance

- Use lots of mulch or straw
- Weed early and often (2 years)
- Give long/deep waterings to get plants well established (2 years)
- Back off watering after establishment

Manage expectations

- ❖ Beneficial insect populations take time (several years) to build up; Kill them and you are “back to square one” (-James Loomis)
- ❖ Beneficial insects increase in response to pests, but there is a lag; Beneficial insects are only visibly abundant in response to a pest outbreak
- ❖ “I’m only seeing a few beneficial insects / There are never enough..”
Keep in mind: a few beneficials can kill a lot of pests
The combined effect of several beneficial species can be significant
Biodiversity is key – attract as many types as you can

Online Resources

USU Extension, "Beneficial Insects of Utah" **free download** or print for \$6 USU Extension Store

ATTRA "Farmscaping to Enhance Biological Control," **free download** – see Appendix A "Plants that Attract Beneficials" and Appendix B "Pests and Associated Beneficial Insects"

Xerces Society, "Habitat Planning for Beneficial Insects: Guidelines for Conservation Biological Control," **free download**

NRCS Financial Assistance

Attend Session: **THURSDAY 2:10-2:30 PM**
(Thursday Afternoon = Funding/Grants/Financial Asst.)

NRCS "EQIP" Conservation Practices

Native Plant Field Borders (386, 332, 601)

Temporary Insect Strips

Hedgerows and Windbreaks (422, 380, 612)

Cover Crops (340)

Conservation Cover (327)

Herbaceous Buffer (603)

Tunnel Nests, Beetle Banks, Brush Piles (649, 645)

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