Growing with Beneficial Insects

Soil School
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Ag biodiversity can

- Mitigate the effects of pesticide drift
- Stabilize soil erosion
- Decrease dust, weed seed migration, compete with invasive spp.
- Increase water quality
- Increase organic matter in soil which fosters microbial diversity and reduce contamination risks (buffers between fields reduced risks in Cornell; Strawn et al 2013)
- Increase crop pollination
- Provide food and shelter for beneficial insects which can aid in pest management and decrease pesticide use
What is an insectary planting?

- Shelter from pesticide and soil disturbance, places to hunt, reproduce and to spend the winter. Some need replacement of dwindling nesting sites; native bees, barn owls.

- Diverse sources of food. Rule of thumbs: make blossom happen all season long; plan for chaos; fit within production plan.

- Many insect adults need a high energy food source to lay eggs and rear colonies (hover flies, lady beetles parasitic wasps and native bees). This comes in the form of pollen and nectar.

- IMPORTANT: Different beneficial organisms need different types of food. Insects and organisms need different types of food at different stages in their lives.
Farm practices that include insectary plantings: flowering cover crops, non-harvested strips, letting crops go to flower

Photo by P Skinkas
Enhancing already existing habitat: field edges, farm roads, fence rows and riparian areas
In-field insectary plantings
Plan for Chaos
Beetle Banks

In-field, raised beds of native bunch grasses that provide non-disturbed, over-wintering habitat, from which generalist predators disperse in the spring.
Insectaries and beetle banks

Bank, seeded 2009 with native and other grasses (Idaho fescue, sheep’s fescue, sand dropseed, orchard grass, needle and thread and basin wild rye)

Insectaries include flax, poppy, alfalfa, buckwheat
Fitting Practices in Farm Production Plan

- Perennial or annual planting
- Length of time for site establishment
- Labor involved in establishment & maintenance
- Costs for space, and supplies/funding
- Can it be harvested as crop

Is the timing right for resources provided, organisms desired, ability to do

How does the value of the practice compare to other practices?

Does it increase over time?
What beneficial insects are you familiar with?
Insects are different at life stages: becoming more familiar with predators, parasitoids and pollinators will help you provide what they need to be on farm and aid in pest suppression.

CBC not always a quick fix
Not a linear equation
More like checks and balances
Who are we finding?

In beetle banks: important predators: carabid beetles, spiders, earwigs and rove beetles
**Predators: True bugs:** prey and shelter

**Occur on foliage**

- **big-eyed bug** (2-3mm)
  - All stages of spider mites, flea beetles, thrips, leafhoppers, aphids, corn earworm.

- **minute pirate bug**
  - DBA flower bugs

- **predacious stink bugs**
  - Prey on small insects, eggs, caterpillars and beetle larvae
  - Are mass reared

- **damsel bugs**
  - Imported cabbageworm, army worm, lygus bugs & others
  - Uses toxin to subdue prey

- **assassin bugs**
  - Ambush prey, attack small flying insects
Parasitoids

Both benefit from pollen and nectar sources AND prey

tachinid flies

Hosts: moth and butterfly larvae (i.e. cabbage loopers), beetle larvae (i.e. June and elm leaf)

Pollinators

Predators

Syrphid, hoverflies
Parasitic Wasps

Need pollen and nectar sources as adults, prey to reproduce
Making mummies

Mummies = good monitoring tool

Important in managing aphids in Christmas Trees
PNW Christmas Tree Pests

Mites

Aphids

Douglas Fir Needle Midge and Twig Weevils

Rain Beetles

Benes occur in Assemblages

Spiders
Predatory mites

Coccinellids
Lacewings
Parasitic wasps
Predacious midge larvae
Damsel bugs, predatory mirids and other predatory true bugs

Predacious ground beetles
Parasitic wasps
Earwigs? Spiders?

Birds, Foxes, Coyotes, Owls

Larvae drop to soil to pupate
Native Pollinators: Bees

Roughly 4000 species in N. America
and 600 + species in OR

Three groups of native bees:

Solitary ground nesters

Tunnel nesters (about 30%)

Bumble bees, social cavity nesters (above or below ground)
Questions/Remarks?

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