

CFAES OHIO STATE UNIVERSITY EXTENSION

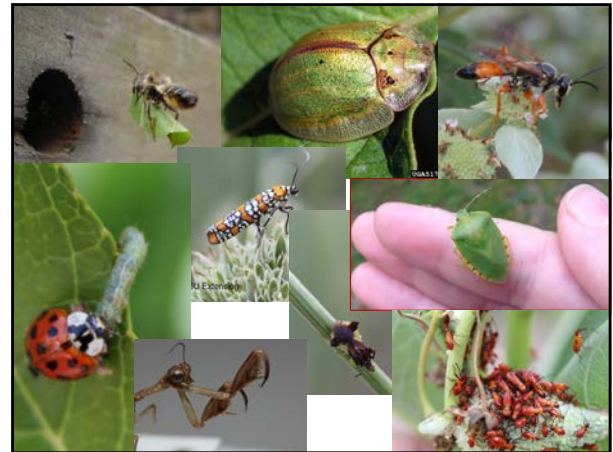
Small Beasties!

Working WITH and Encouraging the critters of the farm ecosystem

Microbes, Insects, Worms, Reptiles, Amphibians, Birds and MORE...

THE OHIO STATE UNIVERSITY
COLLEGE OF FOOD, AGRICULTURAL,
AND ENVIRONMENTAL SCIENCES

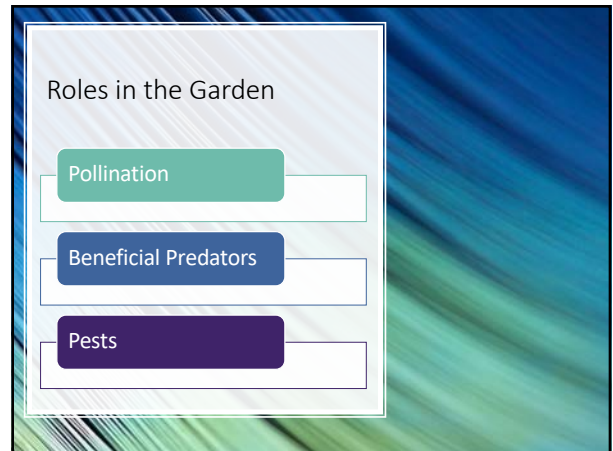
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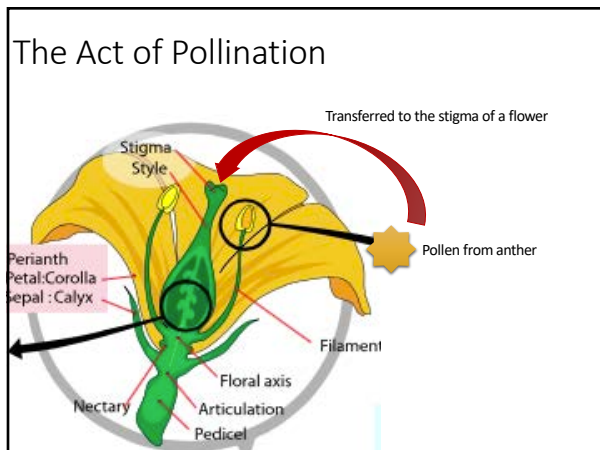
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Critically Important

- As most people now know...
- Value of crops pollinated by insects is estimated at \$29 billion per year from just 58 key crops!
- Approximately 75% - 80% of ALL flowering plants need pollinators
- 1 in 3 bites of food...

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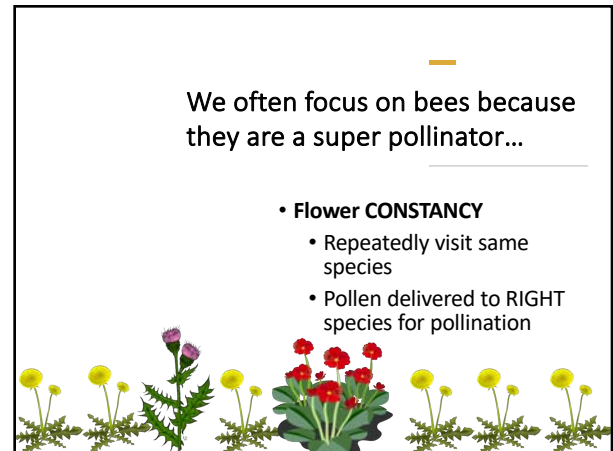
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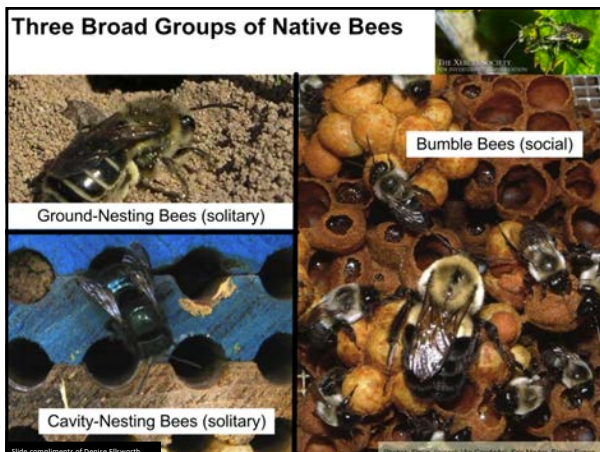
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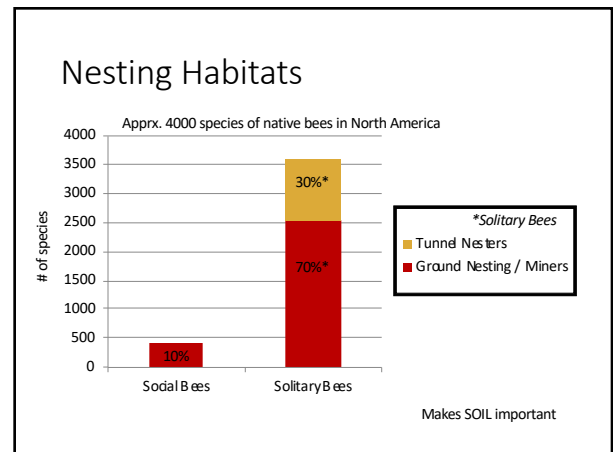
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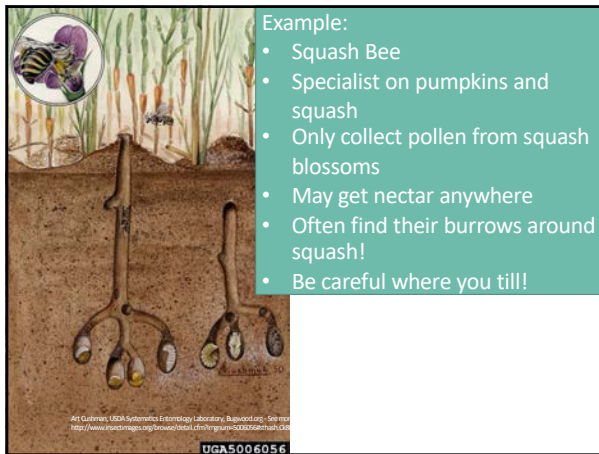
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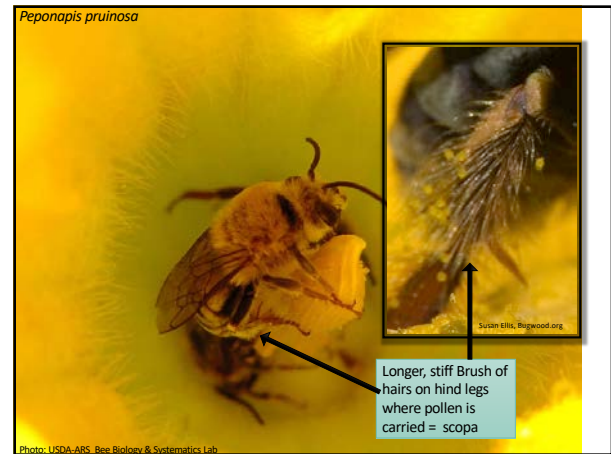
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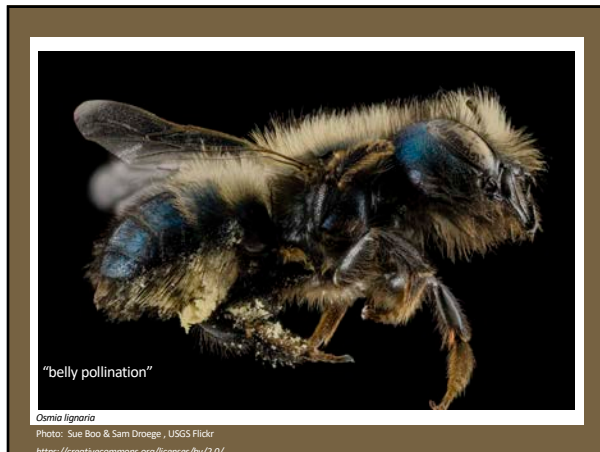
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Bee Houses

- Drill holes in untreated wood
- Or reeds, paper straws, bamboo
- Hole diameter $\frac{1}{4}$ - $\frac{3}{8}$ inch, but $\frac{5}{16}$ is magic number for orchard bees
- 4-8 inches deep. CLOSED ENDED
- Shelter face southeast
- Protect from direct midday sun-overheat

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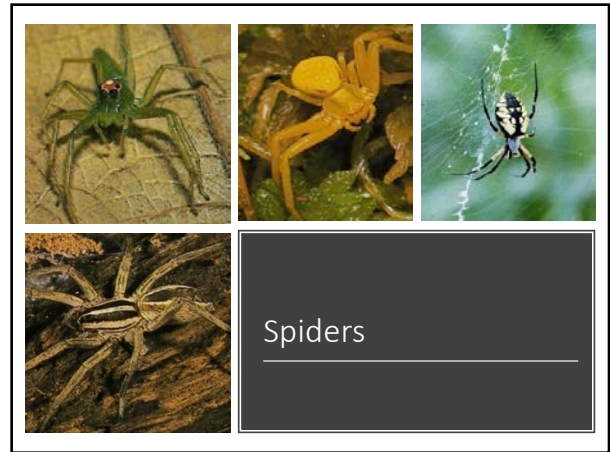
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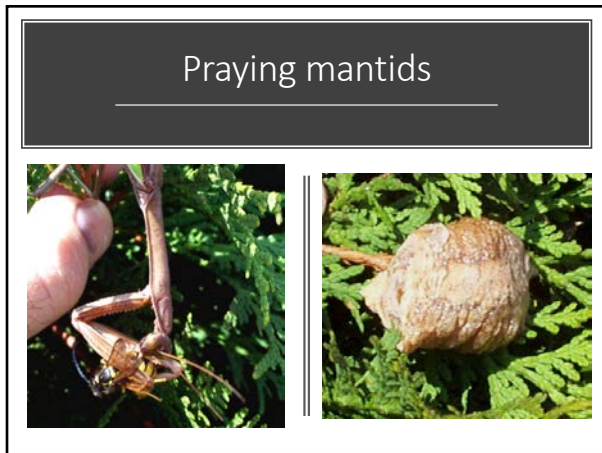
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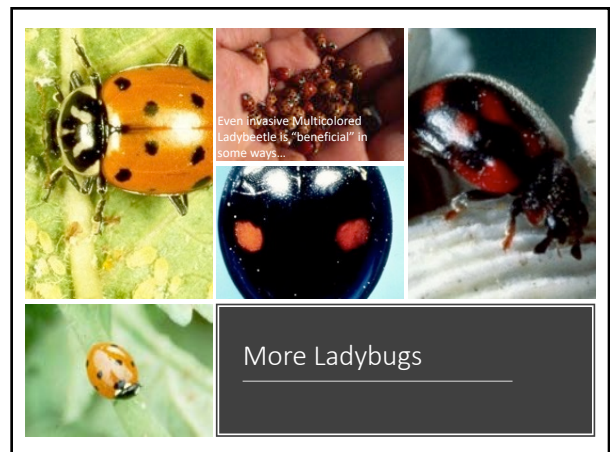
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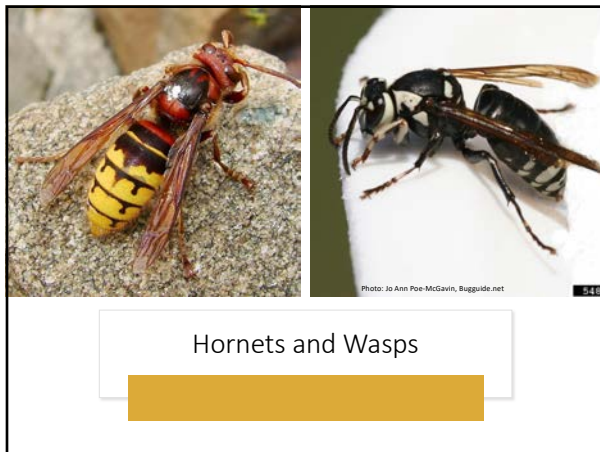
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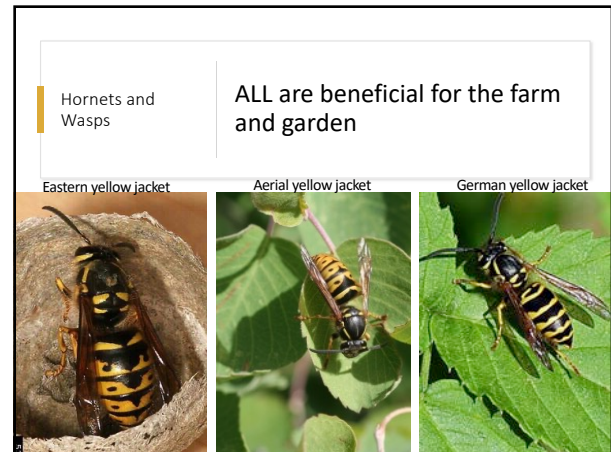
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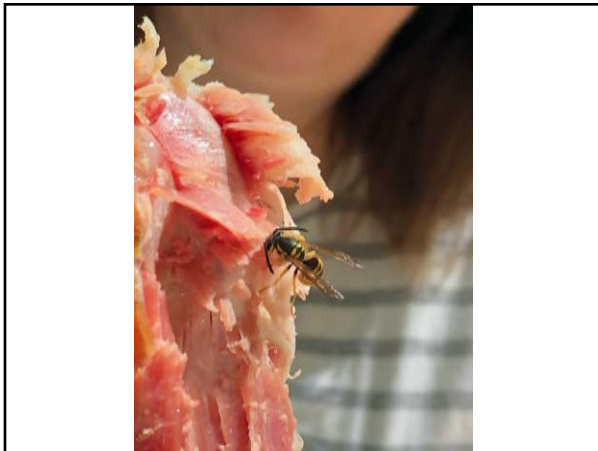
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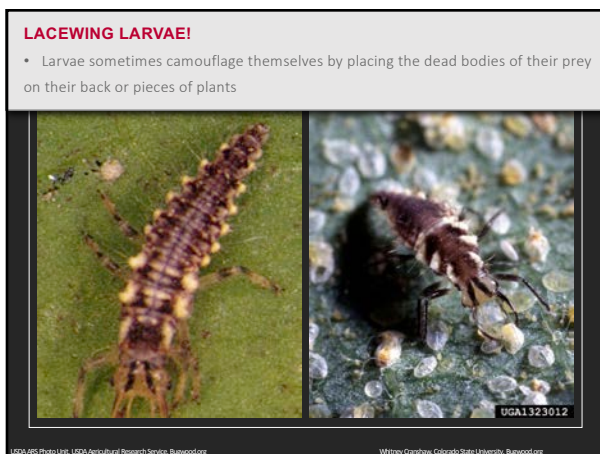
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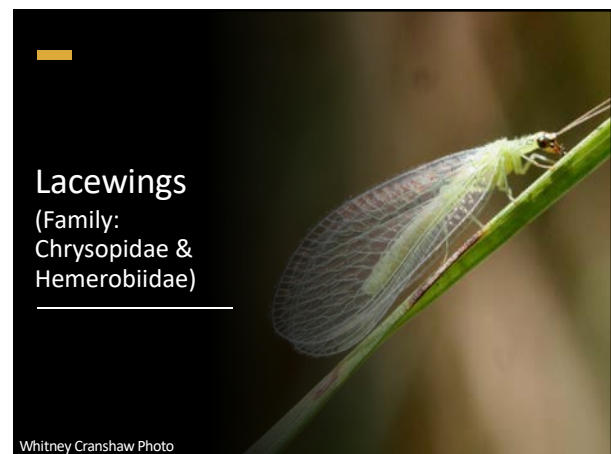
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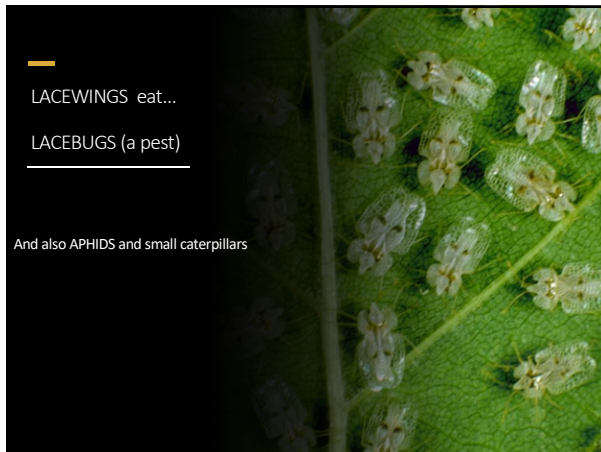
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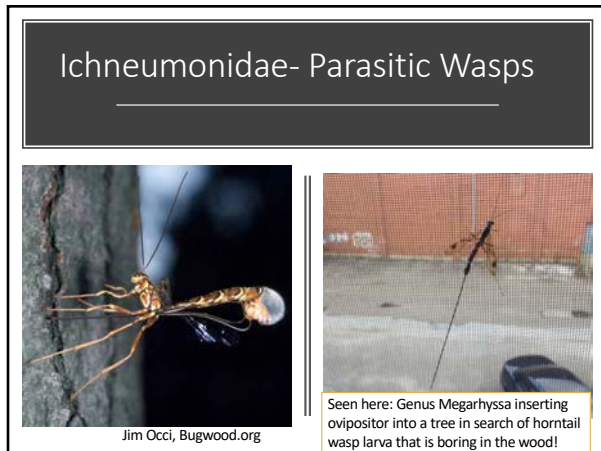
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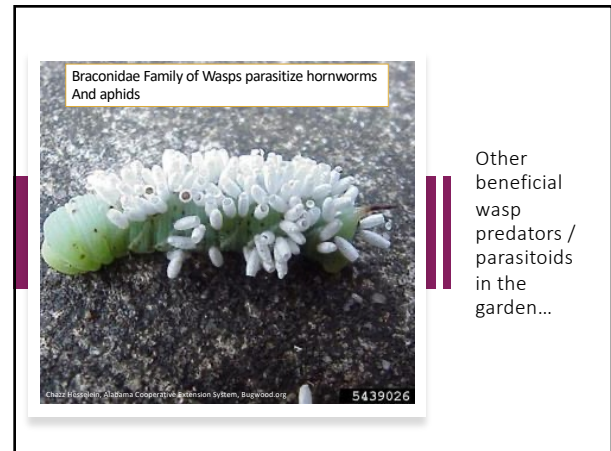
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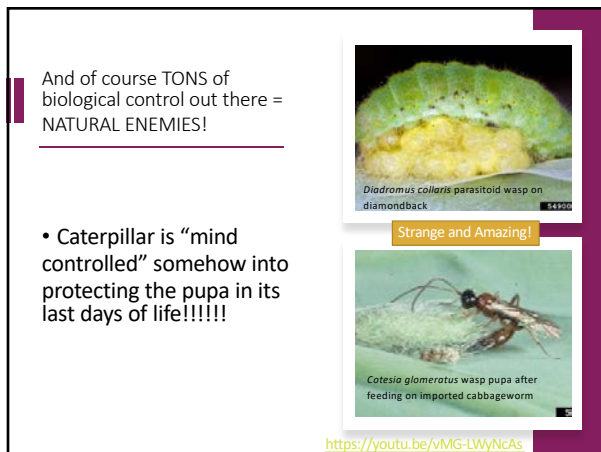
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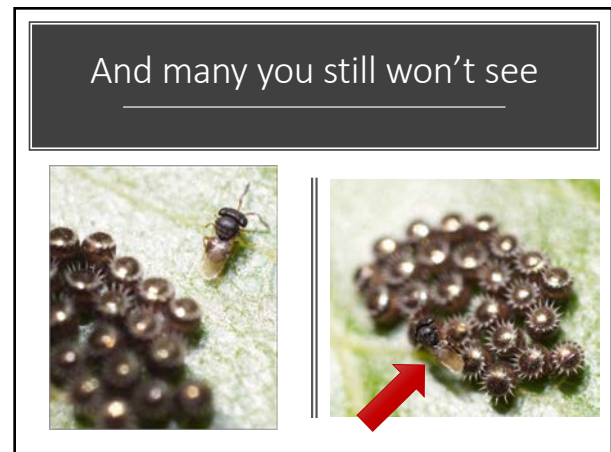
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http://www.youtube.com/watch?feature=player_embedded&v=r1EVCevAgnY

How do we use Biological Control Purposefully?

- Use of NATURAL ENEMIES to maintain BALANCE in populations
- Predators
- Parasitoids
- Pathogens

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3 Types of Biological Control

- Classical
- Augmentative
- Conservation

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• Australian Vedalia Lady Beetle on Cottony Cushion Scale in Citrus Industry

Classical Control That Worked

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Classical that did NOT work...

introduction of non-native natural enemy to control a pest population.

Story of the Cane Toad

Others you know of....

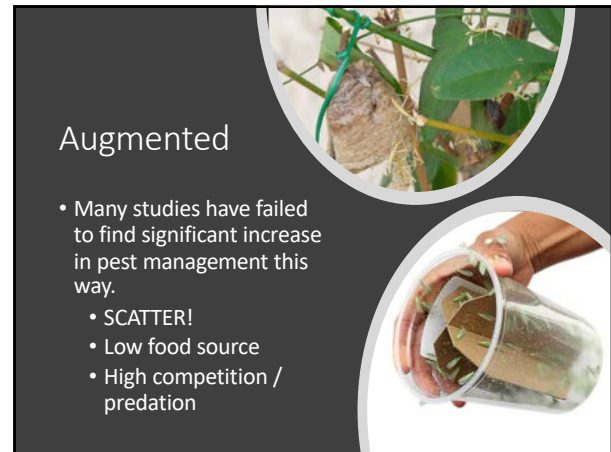
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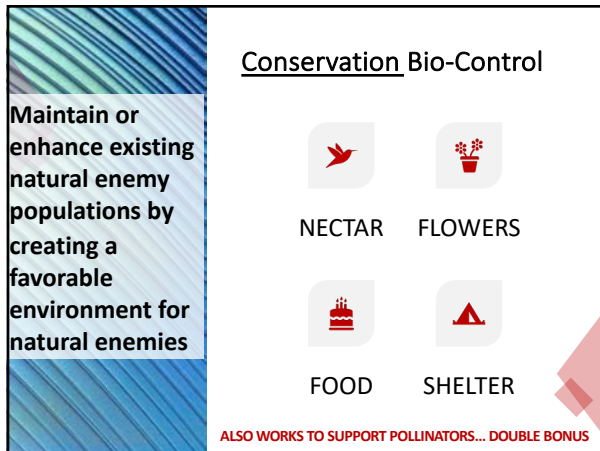
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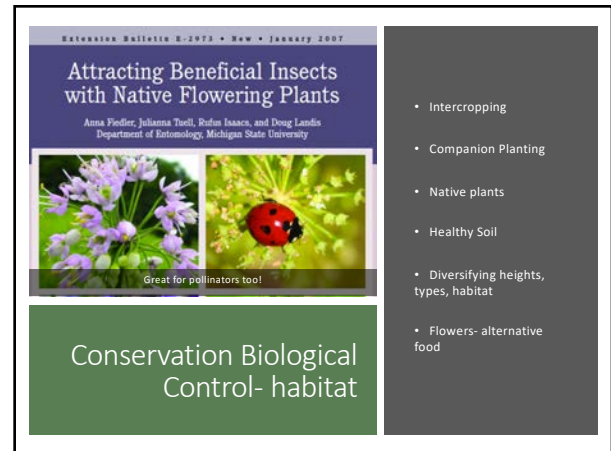
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Aim for year-round flowers, including early and late season bloom to provide a food source.



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Include a diversity of flower shapes to attract many different pollinators.



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Use masses of color to attract pollinators.



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DIVERSE HEIGHTS!

Beneficial PREDATORS need diversity of height. Some prefer to ambush from above or below. Different behaviors and predation styles. The more diversity of habitat, the better.



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In small areas, plant single species together to increase visibility to pollinators and increase foraging efficiency.

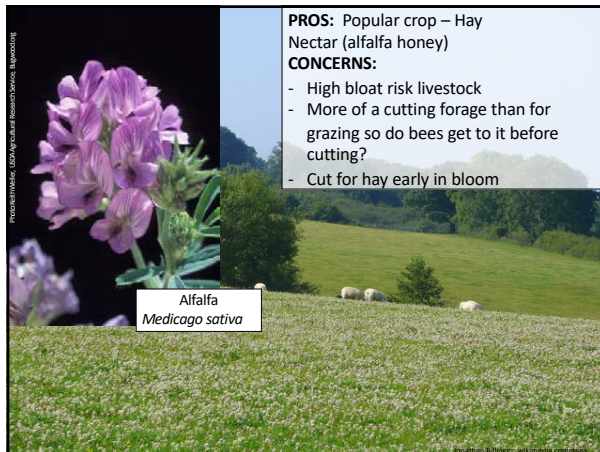


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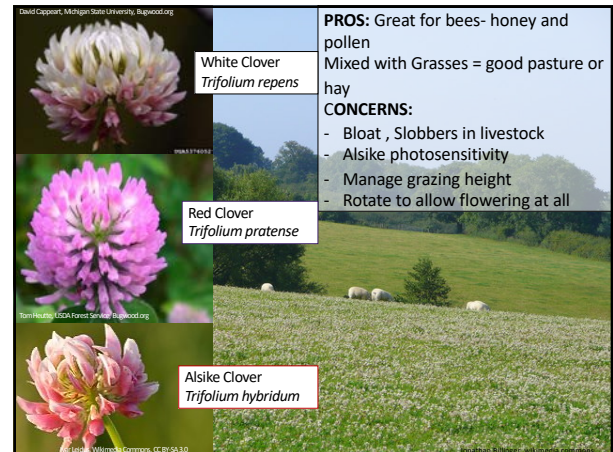
On the farm... even pastures can benefit our bugs...



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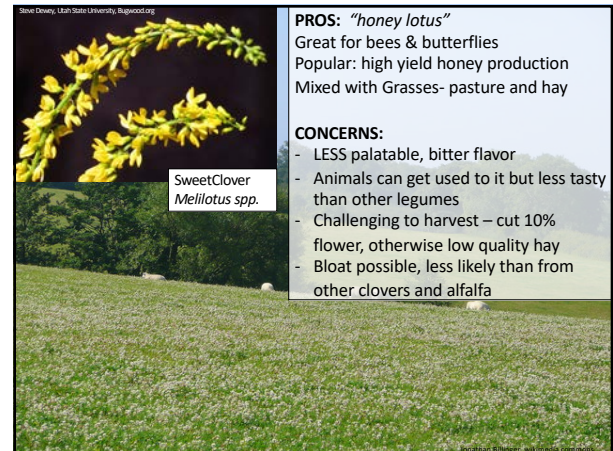
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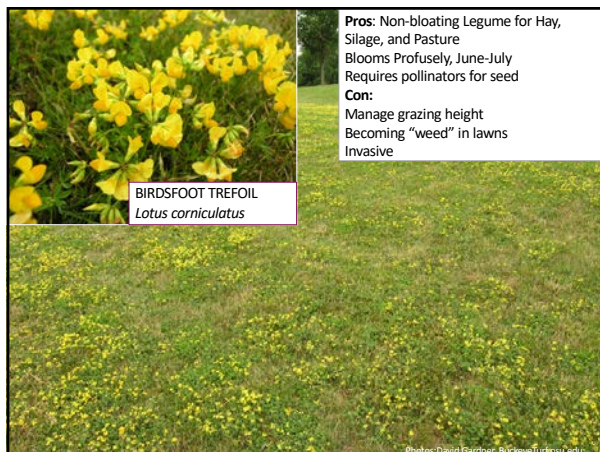
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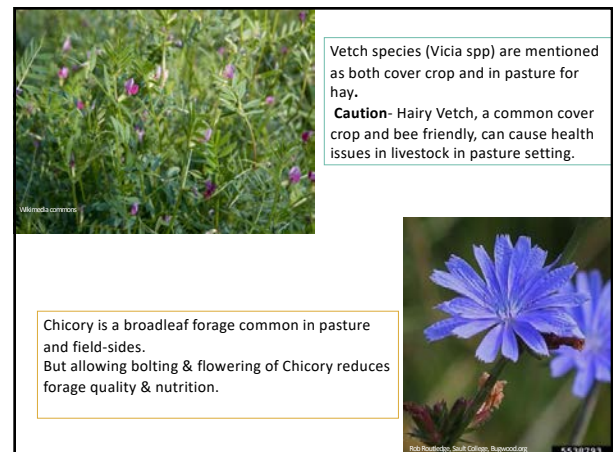
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Other Soil Organisms: Nematodes



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Fungi, Bacteria,
Viruses

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GAPS: Food safety

- Human-pathogens are a concern
- Compost TEA, Manure TEA



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Worms

- Glaciated Northern Ohio does not have any native earth worms.
- They aerate, move nutrients, cycle nutrients
- Can have negative impact on forest floor



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Worms

- Use what is there.
- Limit TILLING
- Good Organic Matter
- Leaf mulch OM and moist
- Limit Chemicals



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Frogs, Toads...

- Frogs, Toads and other reptiles and amphibians can be excellent predators of insects and rodent pests.
- Indiscriminate predators-eat beneficial too.
- Benefit from undisturbed soils AND cover of plants for beneficial insects...



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BATS

Bats are nocturnally active
April through September.



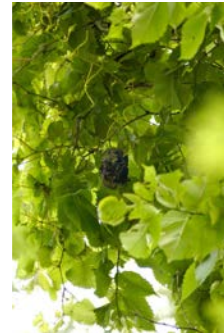
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Ohio Bats

Solitary Bats

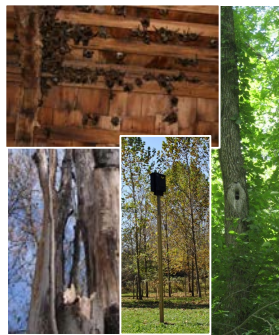


Silver-haired bat
Hoary bat
Red bat



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Ohio Bats



Colonial Bats



Little brown bat
Big brown bat
Indiana bat
N. long-eared bat

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White Nose Syndrome (WNS)



A deadly disease (90-100% mortality) of cave-hibernating bats caused by a white fungus that appears on the noses of infected bats.

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Bat Box

Do not put on a tree

Need 15 – 20 feet UNDER the box to glide out

House- but bat bugs...

BATCON.ORG
Bat House Instructions



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What Questions
do YOU have?

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