Using Natural Enemies to Control Pests

- Conservation of Natural Enemies
  - Why plant flowers in your landscape and garden
- Alternative insecticides
- Using ACORN Alternative Control Guide to:
  - find biological control agents
- Tips for purchasing natural enemies (greenhouse only)

Conserving Natural Enemies

- Provide Food and Shelter
- Use selective pesticides
- Reduce pesticide use (Thresholds etc.)

Why Plant Flowers?

- To attract natural enemies.
- To provide shelter/shade.
- To produce pollen and nectar.
Euonymus scale in Indiana

- 2 generations/year
- Scale sampling coincides with crawler emergence and estimates parasitism of the parent generation

Density of live female euonymus scale

Means with the same letter are not significantly different (Fisher’s Protected LSD, p < 0.05).
**Encarsia citrina**

![Images of Encarsia citrina Life Cycle Stages]

**Natural enemy abundance in *Euonymus fortunei***
*(Sticky Cards 2001)*

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean Number of Natural Enemies per Plot ± S.E.M.</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td>10 ± 2</td>
</tr>
<tr>
<td>June</td>
<td>15 ± 3</td>
</tr>
<tr>
<td>July</td>
<td>20 ± 4</td>
</tr>
<tr>
<td>August</td>
<td>25 ± 5</td>
</tr>
<tr>
<td>October</td>
<td>30 ± 6</td>
</tr>
</tbody>
</table>

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**Where can you learn more about flowers that attract natural enemies?**


**Mints**

*Monaha spp.*

Common Name: Mints

Site Name: [Site Name](http://www.site.com)

Common Name: [Common Name](http://www.commonname.com)

Flower Color: [Flower Color](http://www.flowercolor.com)

Flower Size: [Flower Size](http://www.flowersize.com)

Flower Type: [Flower Type](http://www.flowertype.com)

Flower Habitat: [Flower Habitat](http://www.flowerhabitat.com)

Flower Uses: For [Flower Uses](http://www.floweruses.com)
Add what you need

Tips for Purchasing and Using Natural Enemies:

- Identify the pest.
- Determine which natural enemy could work.
- Order from a reputable supplier.
- Check the quality.
- Follow directions.
- Evaluate. Did it work?
- Give the supplier & Extension feedback.

Where to purchase the good guys

SUPPLIERS OF BENEFICIAL ORGANISMS IN NORTH AMERICA

Contents

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Using ACORN Alternative Control Guide

Use the ACG to:

- Identify pest and their natural enemies (NE) on your landscape and garden plants.
- Find alternative control tactics you can try.
- Plan your vegetable garden.
- Find flowers to feed and protect NE in your garden.
### Alternative Controls

<table>
<thead>
<tr>
<th>Pest Control Type</th>
<th>Control Method</th>
<th>Area Reference</th>
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<tbody>
<tr>
<td>Natural Enemies</td>
<td>Not regularly</td>
<td>Not currently in AGRONET</td>
</tr>
<tr>
<td>Herbicides</td>
<td>Not regularly</td>
<td>Not currently in AGRONET</td>
</tr>
<tr>
<td>Conventional Bayer Insecticides</td>
<td>Not currently in AGRONET</td>
<td></td>
</tr>
<tr>
<td>Cabbage Looper</td>
<td>Sprays with the use of water bugs with bacteria with B. C. V. (Bacillus thuringiensis) to harm the adults. It is effective at the early stages of feeding. (B. C. V. is also available for use on the winter crop for the next season, the Baker.)</td>
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### Alternative Control Guide

#### Cabbage Looper

- **Concentration Per Year:** 2 to 3
- **Degree of Infestation:** Depends on the needs

### Alternative Control Guide

#### Tachinid Fly - *Forisa nigrata*

- **Natural Enemy Type:** parasitoid
- **Life Stage of Parasite:** Adult
- **Hosts:** Cabbage

### Alternative Control Guide

#### Cabbage Looper

- **Main action:** Sprays with the use of water bugs with bacteria with B. C. V. (Bacillus thuringiensis) to harm the adults. It is effective at the early stages of feeding. (B. C. V. is also available for use on the winter crop for the next season, the Baker.)
Some pesticides kill more pests than natural enemies

Use pesticides that are compatible with biological control:

- Microbials
- Botanicals
- Insect growth regulators
- Others
Botanical insecticides

Naturally occurring toxic materials derived from plants

Usually non-specific, with short residual activity

36 DAT
Other insecticides

Oils smother the insects.
  • Nonspecific

Insecticidal soaps pass through the insect cuticle and poison it.
  • Nonspecific, but little residual activity

Other insecticides

Spinosad kills caterpillars, leafminers and thrips.
  • Spares most natural enemies of spider mites and aphids
  • Kills bees and wasps
  • Does not kill borers

Finding natural enemies in the field

• Be an insect detective, find NE at home.
• Need help identifying the NE?
  Use the ACORN Alternative Control Guide (ACG):
    - Picture
    - Hints about location (e.g., food and shelter)
ACORN Website

To contact us:
Visit our web site at
www.entm.purdue.edu/acorn