Bees and Sustainable Food Production

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Michigan State University

MSUE & MSU AgBioResearch State Council
March 12, 2013
Berry Crops Entomology Program @ MSU

- Pest management & pollination.
- Research & extension.
- Blueberry, grape, raspberry, strawberry...and biofuels.
- 3 postdocs, 3 graduate students, two technicians, and a small army of undergraduate students!
Agriculture’s global extent

Cultivated Systems: Areas in which at least 30% of the landscape is cultivated

Millennium Ecosystem Assessment, 2005
Pollination reduces the risk of low yields and poor quality
Michigan fruits and vegetables

- Blueberry: $120 million
- Cherry: $80 million
- Apple: $105 million
- Strawberry: $6 million
- Peach: $10 million
- Pickling cucumbers: $35 million

Honey production

- 4 million pounds: $7 million
Integrated Crop Pollination

The combined use of different pollinator species, habitat augmentation, and management practices to provide reliable and economical pollination of crops.
• Do farm management practices affect wild bee communities?
• Can pollinator habitat support wild bees and pollination?
Temporal overlap of pollinator and pest activity

- Osmia bees
- Andrenid bees
- Halictid bees
- Bombus queens
- Bombus workers

Blueberry bloom
Insecticide use in Michigan blueberries, 2001-2011

USDA – NASS Reports

Percent of acres treated

- Organophosphate
- Carbamate
- Pyrethroid
- Neonic.
- IGR
- Org.

- Azinphos-methyl
- Malathion
- Phosmet
- Methomyl
- Carbaryl
- Esfenvalerate
- Fenpropatrin
- Zeta-cypermethrin
- Acetamiprid
- Imidacloprid
- Tebufenozide
- Methoxyfenozide
- Bacillus thuringiensis

- 2001
- 2003
- 2005
- 2007
- 2009
- 2011
Trends in insecticide use

- **Broad spectrum**
- **Reduced risk**

 USDA – NASS Reports
Spotted Wing Drosophila

Welcome to MSU’s Spotted Wing Drosophila site

This site contains information and links for growers and homeowners about a new invasive pest in Michigan, the Spotted Wing Drosophila.

- Factsheets
- Monitoring
- Crop recommendations
- Educational meetings
- Contacts
- Response Team

2012 Update

For weekly updates on the status of this pest, stay informed through the MSU Extension pages focusing on fruit crop management.

Some key articles from MSU Extension New:

- End of season spotted wing Drosophila management in raspberries © (Oct. 29, 2012)
- Fall-harvesting berry growers need to monitor and manage SWD © (Sept. 4, 2012)
- Post-harvest spraying for SWD pros, cons, and a list of issues © (Aug. 22, 2012)
- Trapping, fruit sampling and fruit protection methods © (July 2, 2012)
- SWD detections are increasing in fruit crops © (June 19, 2012)
- Monitoring for SWD to detect early activity © (May 29, 2012)
Michigan is the number one state in highbush blueberry production with growers producing over 100 million pounds of blueberries every year. This website was developed by Michigan State University's Blueberry Team to communicate information about blueberry production and pest management for the blueberry industry.

Search for MSUE Blueberry News past articles at MSUE Fruit.

MSUE Blueberry News

Brown marmorated stink bug in Michigan 2013 update

An invasive pest, the brown marmorated stink bug has now been found in 12 of 68 Lower Peninsula counties. MSU will continue to trap and monitor in 2013.

Posted on March 6, 2013 4:53pm by Michael Haas


Events

There are currently no events to display.

Ask an Expert

Give your question a title

Question

Location and County

Michigan

Ingham County
### Season-long pollinator plant mix options

<table>
<thead>
<tr>
<th>Native plant</th>
<th>Apr</th>
<th>May</th>
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<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
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<td>willow, <em>Salix</em> spp.</td>
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<td>black chokecherry, <em>Aronia melanocarpa</em></td>
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<td>wild cherry, <em>Prunus</em> spp.</td>
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<td>American elder, <em>Sambucus canadensis</em></td>
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<td>silky dogwood, <em>Cornus amomum</em></td>
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<td>golden Alexanders, <em>Zizia aurea</em></td>
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<td>common ninebark, <em>Physocarpus opulifolius</em></td>
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<td>beardtongue, <em>Penstemon hirsutus</em></td>
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<td>late figwort, <em>Scrophularia marilandica</em></td>
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<td>swamp milkweed, <em>Asclepias incarnata</em></td>
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<td>Culver's root, <em>Veronicastrum virginicum</em></td>
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<td>yellow coneflower, <em>Ratibida pinnata</em></td>
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<td>nodding wild onion, <em>Allium cernuum</em></td>
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<td>meadowsweet, <em>Spiraea alba</em></td>
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<td>yellow giant hyssop, <em>Agastache nepetoides</em></td>
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<td>horsemint/spotted beebalm, <em>Monarda punctata</em></td>
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<td>Missouri ironweed, <em>Vernonia missurica</em></td>
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<td>cup plant, <em>Silphium perfoliatum</em></td>
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<td>pale Indian plantain, <em>Cacalia atriplicifolia</em></td>
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<td>boneset, <em>Eupatorium perfoliatum</em></td>
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<td>blue lobelia, <em>Lobelia siphilitica</em></td>
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<td>pale-leaved sunflower, <em>Helianthus strumosus</em></td>
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<td>New England aster, <em>Aster novae-angliae</em></td>
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<td>smooth aster, <em>Aster laevis</em></td>
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Season-long pollinator plant mix options: [www.nativeplants.msu.edu](http://www.nativeplants.msu.edu)
Programs for pollinators on farms

Government programs provide cost-sharing.
- Available nationwide with continuous signup
- 2 acre minimum, in areas > 0.2 hectare

Michigan’s CRP-SAFE Program.
- 2009-2013, target of 2500 acres in productive lands
- Pays 90% of establishment costs (~$600 per acre) and rental
- Currently 1700 hectares enrolled
More native bees on blueberry flowers next to flowering habitat

Native bees per 15 minutes

- Grass Edge
- Grass Interior
- Flower Edge
- Flower Interior

F = 4.15
P = 0.013

Blaauw & Isaacs, in review
Pollinator habitat supports increased blueberry yield

Estimated yield per hectare (kg)

Year: 2011
- Grass: 6000 kg
- Flower: 7000 kg
- P = 0.029
- Interior: 6500 kg
- P = 0.39

Year: 2012
- Grass: 3500 kg
- Flower: 4000 kg
- P = 0.0038
- Interior: 4000 kg
- P = 0.018

Legend:
- Grass
- Flower
Awareness, education, demonstration
Integrated Crop Pollination

The combined use of different pollinator species, habitat augmentation, and management practices to provide reliable and economical pollination of crops
PROJECT OBJECTIVES
1. Identify economically-important wild pollinators and factors affecting their abundance.
2. Evaluate habitat management practices to improve crop pollination.
3. Determine performance of alternative managed bees as specialty crop pollinators.
4. Deliver ICP practices for specialty crop producers.
5. Determine optimal methods for ICP information delivery and measure ICP adoption.