Status of Neonicotinoid Registrations in Specialty Crops - Mint

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Midwest Mint Growers Meeting

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New & Current Insecticide Registrations in Mint

- **MoA (1A):** acephate, carbaryl, methomyl, vydate (Orthene, Sevin, Lannate)
- **MoA (1B):** malathion, chlorpyrifos, ethoprop (Malathion, Lorsban, MoCap)
- **MoA (4A):** thiamethoxam (Actara) - RR
- **MoA (5):** spinosad, spinetoram (SpinTor, Conserve, Radiant) – RR
- **MoA (6):** abamectin (Agri-Mek, etc.)
- **MoA (9B & 9C):** flonicamid (Beleaf)
- **MoA (10B):** etoxazole (Zeal)
- **MoA (11):** Bacillus thuringiensis subsp. (Agree, Condor, DiPel, Lepinox, etc.)-RR
- **MoA (18):** methoxyfenozide, tebufenozide (Confirm, Intrepid)
- **MoA (21A):** fenpyroximate (Fujimite, Portal)
- **MoA (22A):** indoxacarb (Avaunt) - RR
- **MoA (28):** chlorantraniliprole (Coragen) – RR
- **MoA (UN):** bifenazate (Acramite), azadirachtin (Aza-Direct, etc.), Chromobacterium spp. (Grandevo)- RR
Reduced-Risk Foliar Registrations – Worm Pests

- **Radiant®SC (spinetoram) - registered**
  - Macroyclic lactone (spinosad: MoA group 5)
    - Use rate 4 - 12 oz / ac (Lepidoptera)
  - 10-14 days persistence (improved photostability)
  - Very low impact on beneficials
  - **Not currently registered for use**

- **Coragen™ (chlorantraniliprole)**
  - Anthranilic diamide (MoA group 28)
    - Use rate 3.5 - 5 oz (Lepidoptera) +MSO 5% v/v
  - 14+ days persistence
  - Very low impact on beneficials and low toxicity
  - Ovicidal activity
DuPont Cyazypyr™
US 2014 Registration

- **Exirel 10OD** (cyantraniliprole)
  - Anthranilic diamide (MoA group 28)
    - Use rate 6.7 – 13.5 fl oz (Lepidoptera ++) +MSO 5% v/v
  - 14+ days persistence
  - Very low impact on beneficials and low toxicity
  - Ovicidal activity
  - EPA – Submission 2013,
    - Anticipated Approval late 2014 – 2nd Registration package

- Loopers, cutworms, mint root borer, leafhoppers, planthoppers,
US Insecticide Market - Neonicotinoids

- Almost half of the insecticide expenditure ($848M) is on two active ingredients, imidacloprid (Admire, Gaucho) and thiamethoxam (Cruiser, Platinum).
- Single largest insecticide class in domestic use
- Emerging issues with non-target impacts
Factors Harming Honey Bee Populations

 Colony Collapse Disorder (CCD)
  – caused by viruses, mites, stress, pesticides that weakens bee’s immune system
  – honey bee colonies lose approximately 30% of all of their worker bees annually
  – responsible for a loss of 50-90% of colonies in beekeeping operations across the U.S.
Factors Harming Honey Bee Populations

- Diseases (e.g., American foul brood)
- Parasitic mites (NRC 2006)

*Tracheal mite (Acarapis woodi)*

*Varroa mite (Varroa destructor)*
Many native bees are in decline
Bees and Midwestern Agriculture
With bees

Your produce choices with bees
Without bees

Your produce choices

without bees

Key findings include:

**Parasites and Disease Present Risks to Honey Bees:**
The parasitic Varroa mite and new virus species have been found in the U.S. and several of these have been associated with Colony Collapse Disorder (CCD).

**Increased Genetic Diversity is Needed:**
Genetic variation improves bees thermoregulation, disease resistance and worker productivity.

**Poor Nutrition Among Honey Bee Colonies:**
Bees need better forage and a variety of plants to support colony health.

**Need for Improved Collaboration and Information Sharing:**
Best Management Practices associated with bees and pesticide use, exist, but are not widely or systematically followed by members of the crop-producing industry.

**Additional Research is Needed to Determine Risks Presented by Pesticides:**
The most pressing pesticide research questions relate to determining actual pesticide exposures and effects of pesticides to bees in the field.
Neonicotinoid insecticides in the News
Insecticide Seed Treatment Use Continues to be a Standard Agricultural Practice

<table>
<thead>
<tr>
<th>CROP</th>
<th>% of Total Acres Planted with Treated Seeds</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TOTAL NEONICOTINOIDS</strong> (Clothianidin, Imidacloprid, Thiamethoxam)</td>
<td></td>
</tr>
<tr>
<td>Canola</td>
<td>100%</td>
</tr>
<tr>
<td>Cereals</td>
<td>42%</td>
</tr>
<tr>
<td>Corn</td>
<td>94%</td>
</tr>
<tr>
<td>Cotton</td>
<td>42%</td>
</tr>
<tr>
<td>Rice</td>
<td>51%</td>
</tr>
<tr>
<td>Sorghum</td>
<td>75%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>32%</td>
</tr>
<tr>
<td>Sugar Beets</td>
<td>65%</td>
</tr>
</tbody>
</table>

*CTN 2010 Seed Treatment study
**A total of 147 million US acres are planted with neonicotinoid-treated seeds.
Global Insecticide Seed Treatment Use is Increasing

“The global insecticide seed treatment market is projected to reach nearly $1.6 billion by 2016, growing at a CAGR of 11.4%.”

Why are Seed Treatments so Popular?

- Saves time – just plant treated seed
- Less exposure to active ingredient (a.i.)
- Precise amount of a.i. applied to seed
- Often use considerably less a.i. per acre
- Less risk of killing non-target organisms
Annual Changes in Crop Uses in the U.S.


Annual Changes in Crop Uses in the U.S.


Annual Changes in Crop Uses in the U.S.


# Insecticide Seed Treatments for Specialty Crops in the U.S.

<table>
<thead>
<tr>
<th>Product</th>
<th>Active Ingredient(s)</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cruiser 5FS</td>
<td>thiamethoxam</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td>FarMore FI400</td>
<td>thiameth. + fungicides</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td>FarMore FI500</td>
<td>thiameth. + spinosad + fungicides</td>
<td>Neonic + Spinosyn</td>
</tr>
<tr>
<td>Poncho</td>
<td>clothianidin</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td>Sepresto 75WS</td>
<td>cloth. + imidacloripd</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td>CAPS</td>
<td>Sepresto + fungicides</td>
<td>Neonicotinoid</td>
</tr>
<tr>
<td>Trigard 75WP</td>
<td>cyromazine</td>
<td>Triazine</td>
</tr>
</tbody>
</table>
Routes of Insecticide Exposure

Systemic Movement

New Growth

14C-Thiamethoxam Concentration

Sucker

Lower leaves (present at treatment)

21 DAA
Routes of Insecticide Exposure

Guttation water
Unintended Consequences of Corn Dust

Honey Bees and the Corn Dust Research Consortium

Corn Dust Research Consortium Formed to Address Honey Bee Questions

Unique Stakeholder Consortium Sponsors Research to Reduce Honey Bee Exposure to Corn Planting Dust
Florida citrus grower fined $1,500 for killing millions of honeybees

Stephen Messenger
Business / Corporate Responsibility
August 20, 2013

That fine pales in comparison to Foti's losses, which he says include $240,000 in honey, not to mention the cost to local ecosystems.

"Fifteen hundred dollars ain't nothin to the grove people".
Rich Hatfield, a biologist with the Xerces Society, estimates that over 50,000 bumble bees were killed, likely representing more than 300 wild colonies. “Each of those colonies could have produced multiple new queens that would have gone on to establish new colonies next year. This makes the event particularly catastrophic.”
THE NEW EPA BEE ADVISORY BOX
On EPA’s new and strengthened pesticide label to protect pollinators

PROTECTION OF POLLINATORS

APPLICATION RESTRICTIONS EXIST FOR THIS PRODUCT BECAUSE OF RISK TO BEES AND OTHER INSECT POLLINATORS. FOLLOW APPLICATION RESTRICTIONS FOUND IN THE DIRECTIONS FOR USE TO PROTECT POLLINATORS.

Look for the bee hazard icon in the Directions for Use for each application site for specific use restrictions and instructions to protect bees and other insect pollinators.

This product can kill bees and other insect pollinators.
Bees and other insect pollinators will forage on plants when they flower, shed pollen, or produce nectar.

Bees and other insect pollinators can be exposed to this pesticide from:
- Direct contact during foliar applications, or contact with residues on plant surfaces after foliar applications
- Ingestion of residues in nectar and pollen when the pesticide is applied as a seed treatment, soil, tree injection, as well as foliar applications.

When Using This Product Take Steps To:
- Minimize exposure of this product to bees and other insect pollinators when they are foraging on pollinator attractive plants around the application site.
- Minimize drift of this product on to beehives or to off-site pollinator attractive habitat. Drift of this product onto beehives can result in bee kills.

Information on protecting bees and other insect pollinators may be found at the Pesticide Environmental Stewardship website at: http://pesticidestewardship.org/pollinatorprotection/Pages/default.aspx

Pesticide incidents (for example, bee kills) should immediately be reported to the state/tribe lead agency. For contact information for your state/tribe, go to: www.aipco.org. Pesticide incidents can also be reported to the National Pesticide Information Center at: www.npic.orst.edu or directly to EPA at: bee.ski@epa.gov

Alerts users to separate restrictions on the label. These prohibit certain pesticide use when bees are present.

The new bee icon helps signal the pesticide’s potential hazard to bees.

Makes clear that pesticide products can kill bees and pollinators.

Bees are often present and foraging when plants and trees flower. EPA’s new label makes it clear that pesticides cannot be applied until all petals have fallen.

Warms users that direct contact and ingestion could harm pollinators. EPA is working with beekeepers, growers, pesticide companies, and others to advance pesticide management practices.

Highlights the importance of avoiding drift. Sometimes, wind can cause pesticides to drift to new areas and can cause bee kills.

The science says that there are many causes for a decline in pollinator health, including pesticide exposure. EPA’s new label will help protect pollinators.

Read EPA’s new and strengthened label requirements: http://go.usa.gov/jHH4
Pollinator Protection Checklist

1. Read and follow the label.
2. Determine if the pesticide is toxic to pollinators.
3. Understand local pollinator visitation habits.
4. Use Integrated Pest Management.
5. Follow pesticide stewardship practices.
6. Cooperate and communicate with others.
7. Know symptoms of pesticide exposure to bees.
8. Check local ordinances pertaining to pollinators.
Just How Serious Is This Issue?

“Pollinator Health could be our LEGACY ISSUE.”

Quote from Jim Jones, Assistant Administrator of EPA’s Office of Chemical Safety and Pollution Prevention (nominated by President Obama), at the National Pesticide Applicator Certification and Training Workshop in St. Paul, MN on August 6, 2013.
Europe Bans Pesticides Thought Harmful to Bees

By DAVID JOLLY
Published April 29, 2013

Image of person working with bees.

The Save America’s Pollinators Act of 2013

Congressman Earl Blumenauer • Third District of Oregon • www.blumenauer.house.gov

Background

Pollinators—including honeybees, bumble bees, butterflies, and other insects—play an important role in our farms, flower gardens, and food. In fact, some of the crops most important to Oregon’s agricultural economy—blueberries, raspberries, cherries, apples, vegetable seed, squash—are reliant on bees for pollination and reproduction. More than 70% of America’s food sources are pollinated by bees and the worldwide economic value of these crops is as high as $200 billion a year.

America’s bee population is struggling. During the last five years, beekeepers have lost more than 30% of their hives annually. While many factors are believed to contribute to this die-off, significant evidence links the use of a certain class of nicotine-derived pesticides, neonicotinoids, with bee die-offs. In 2013, the European Union significantly limited the use of neonicotinoids, citing concern about their impact on honeybee populations. That ban took effect April 29th and is valid for two years.

EPA Review Process

In 2006, the Environmental Protection Agency (EPA) initiated a new process to reevaluate pesticides on a regular cycle. Each licensed pesticide is reviewed every fifteen years to confirm that it is being used safely and that its impacts on human health and the environment are properly assessed. Most neonicotinoids are scheduled to be reviewed in 2018.

Legislation

The Save America’s Pollinators Act of 2013 directs the Environmental Protection Agency to suspend use of the most bee-toxic neonicotinoids for use in seed treatment, soil application, or foliar treatment on bee attractive plants within 180 days, and to review these neonicotinoids and make a new determination about their proper application and safe use. EPA is required to take all peer reviewed data into account when reviewing the use of these neonicotinoids, and to specifically account for any potential impact on the health and viability of pollinator populations.

Given the recent bee dieoffs in Hillsboro, Oregon and Wilsonville, Oregon and disturbing preliminary research on the impact of these pesticides, it is clear that they must be evaluated to ensure that their use does not pose an immediate threat to bee populations and the long-term viability of our farms. Until those determinations are made, we cannot risk the potential of putting our farms, food, and families in danger.

The Save America’s Pollinators Act also instructs the Secretary of the Interior, in cooperation with the Environmental Protection Agency Administrator, to issue a report on the native bee populations in the United States, any decline in the population levels, and any potential causes of such decline.
Acknowledgements

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QUESTIONS