Caneberry Insecticide/Miticide Decline Study - 2016
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Insecticide and Miticide Decline Study - 2016

Localities:
2 Raspberry Sites (Lynden, WA and Aurora, OR) - Gerdeman and DeFrancesco
1 Blackberry Site (Aurora, OR) - DeFrancesco

Treatments replicated 3X (WA) and 4X (OR)
WA declines carried out to 21 DAT, OR 21 DAT declines forthcoming
WA = over-the-row boom; OR = backpack sprayer
Analyses performed by Synergistic Pesticide Lab, Portland, OR
MRLs usually but not always the same for Raspberry and Blackberry

- Samples received in laboratory were frozen and in good condition.
- WA raspberry samples shipped overnight, OR samples hand delivered.
- Samples homogenized in a food processor and stored in freezer pending extraction.
- Extraction method – Int’l recognized QUick, Easy, Cheap, Effective, Rugged, Safe (QuEChERs) for extracting residue from food matrices (EU method 15662).
- Following extraction, dSPE was used to clean up the samples.
- Samples analyzed by a Varian 4000 GC/MS Ion Trap and Thermo Endura LC/MS/MS.

Acequinocyl did not work analytically; unable to obtain residues.
Replicate samples averaged for each DAT for each site.
Error bars represent a 95% Confidence Interval.
MRLs used are from www.globalmrl.com database and current as of 11/29/16.
## 2016 Caneberry Insecticide/Miticide Decline Study
### Product/treatment List

<table>
<thead>
<tr>
<th>Treatment #1 - A tank mix of the following products:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active ingredient</td>
<td>Trade name</td>
<td>IRAC</td>
<td>Rate (lb ai/A)</td>
<td>Rate (product/A)</td>
</tr>
<tr>
<td>acequinocyl</td>
<td>Kanemite® 15SC</td>
<td>20B</td>
<td>0.3</td>
<td>31.0 fl. oz.</td>
</tr>
<tr>
<td>bifenthrin</td>
<td>Brigade® 2EC</td>
<td>3A</td>
<td>0.1</td>
<td>6.4 fl. oz.</td>
</tr>
<tr>
<td>carbaryl</td>
<td>Sevin® 4F</td>
<td>1A</td>
<td>2</td>
<td>64 fl. oz.</td>
</tr>
<tr>
<td>Hexythiazox EC</td>
<td>GWN 10194*</td>
<td>10A</td>
<td>0.1875</td>
<td>24.0 fl. oz.</td>
</tr>
<tr>
<td>imidacloprid</td>
<td>Admire Pro®</td>
<td>4A</td>
<td>0.1</td>
<td>2.8 fl. oz.</td>
</tr>
<tr>
<td>spinetoram</td>
<td>Delegate® WG</td>
<td>5</td>
<td>0.09</td>
<td>6.0 oz.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Treatment #2 - A tank mix of the following products:</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active ingredient</td>
<td>Trade name</td>
<td>IRAC</td>
<td>Rate (lb ai/A)</td>
<td>Rate (product/A)</td>
</tr>
<tr>
<td>cyantraniliprole*</td>
<td>Exirel®</td>
<td>28</td>
<td>0.133</td>
<td>20.5 fl. oz.</td>
</tr>
<tr>
<td>fenpropathrin</td>
<td>Danitol® 2.4EC</td>
<td>3A</td>
<td>0.3</td>
<td>16.0 fl. oz.</td>
</tr>
<tr>
<td>Hexythiazox DF</td>
<td>Savey® 50DF</td>
<td>10A</td>
<td>0.1875</td>
<td>6.0 oz.</td>
</tr>
<tr>
<td>malathion</td>
<td>Malathion® 8F</td>
<td>1B</td>
<td>2</td>
<td>32.0 fl. oz.</td>
</tr>
<tr>
<td>spinosad</td>
<td>Success®</td>
<td>5</td>
<td>0.09</td>
<td>6.0 fl. oz.</td>
</tr>
<tr>
<td>zeta-cypermethrin</td>
<td>Mustang® MAXX</td>
<td>3A</td>
<td>0.025</td>
<td>4.0 fl. oz.</td>
</tr>
</tbody>
</table>

* Not registered in caneberries
2016 Caneberry Insecticide/Miticide Decline Study
Bifenthrin (Brigade 2EC)

3 PHI US 1ppm
All residues < 1 ppm at DAT 3
2016 Caneberry Insecticide/Miticide Decline Study
Carbaryl (Sevin 4F)

7 PHI US 12 ppm
Residues below US 12 ppm and MRLs of 10 ppm (CA, AU, BB) by DAT 7
Residues > 0.5 beyond 21 days (KO and TA 0.5)
Assume a 3-day PHI; No US tolerance set
Residues greater than 0.1 ppm past DAT 21 in WA Raspberries
Default tolerances for JA set at 0.01 ppm limit of quantitation (LOQ)
2016 Caneberry Insecticide/Miticide Decline Study
Cypermethrin and Zeta-cypermethrin (Mustang Maxx)

1 PHI US 0.8 ppm (Above domestic tolerance levels)
Residues at ~ 0.5 ppm (AU, JA, KO for RR) and (AU, JA for BB) at DAT 7 and remain at 0.1 through 21 DAT (CA = NT 0.1)
2016 Caneberry Insecticide/Miticide Decline Study
Fenpropoathrin (Danitol 2.4 EC)

3 PHI US 12 ppm
Residues < 3 ppm at DAT 3 (TA 3 ppm)
Residues 0.5 after 10 DAT for OR RR and 18 DAT for WA RR (KO 0.5); 14 + days for BB
Residues detectable past 21 DAT for WA RR (AU 0 NT)
Hexythiazox (Savey DF)

In this case WA red raspberry and OR blackberry were above domestic tolerances at 3 PHI.

Full label rate used: 6 oz. product per acre

3 PHI US 1 ppm  Residues ~ 1 ppm at 5 DAT

In this case WA red raspberry and OR blackberry were above domestic tolerances at 3 PHI.

Full label rate used: 6 oz. product per acre
2016 Caneberry Insecticide/Miticide Decline Study
Hexythiazox EC (GWN 10194)

3 PHI US 1 ppm
Residues ~ 1 ppm 5 DAT
OR applied 24 fl. oz. (high field rate)
WA used 16.8 fl. oz. (mid-field rate)
Residues ~ 1 ppm 5 DAT
No difference in residue declines between formulations.
Comparison between 2 WA RR. DF = field rate and EC 70% field rate (lower residues)
2016 Caneberry Insecticide/Miticide Decline Study
Imidacloprid (Admire Pro)

3 PHI US 2.5 ppm
All residues < 1 ppm (KO 0.5 RR, 0.3 BB)
BB Residues < 0.3 ppm by 3 - 4 DAT (KO 0.3 BB)
2016 Caneberry Insecticide/Miticide Decline Study
Malathion (Malathion 8F)

<table>
<thead>
<tr>
<th>RR</th>
<th>BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>8</td>
</tr>
<tr>
<td>AU</td>
<td>10</td>
</tr>
<tr>
<td>CA</td>
<td>8</td>
</tr>
<tr>
<td>JA</td>
<td>8</td>
</tr>
<tr>
<td>KO</td>
<td>0.5</td>
</tr>
<tr>
<td>TA</td>
<td>0.01</td>
</tr>
</tbody>
</table>

1 PHI US 8 ppm
Residues < 0.5 ppm (KO) by 4-5 DAT
Residues detected above 0.01 ppm past DAT 21 (TA 0.01)

Days After Treatment

<table>
<thead>
<tr>
<th>Days After Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>----------------------</td>
</tr>
<tr>
<td>9.0</td>
</tr>
</tbody>
</table>

Amount Detected (ppm)

- WA Raspberries
- OR Raspberries
- OR Blackberries
2016 Caneberry Insecticide/Miticide Decline Study
Spinetoram (Delegate WG)

Amount Detected (ppm)

Days After Treatment

RR  BB
US  0.8  0.8
AU  0.5  0.5
CA  0.5  0.5
JA  0.8  0.7
KO  0.05 0.05
TA  0.5  0.01

1 PHI US 0.8 ppm
All residues < 0.5 ppm (TA RR)
Residues < 0.05 after 10-DAT (KO/RR); <0.01 after 14 days (TA/BB)
2016 Caneberry Insecticide/Miticide Decline Study
Spinosad (Success)

<table>
<thead>
<tr>
<th>Country</th>
<th>RR</th>
<th>BB</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>AU</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>CA</td>
<td>0.5</td>
<td>0.5</td>
</tr>
<tr>
<td>JA</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>KO</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td>TA</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

1 PHI US 1 ppm
All residues within MRLs for all countries after 1 day
SUMMARY

THESE RESULTS ARE BASED ON A SINGLE YEAR FROM 3 TRIALS AT 2 LOCATIONS

• Bifenthrin (3) and Spinosad (1): Meets MRLs for US and all other countries.

• Carbaryl (7): Meets MRLs for all countries except KO and TA; need to wait 21 days for KO & TA.

• Spinetoram (1): Meets MRLs for all countries except KO & TA; for KO wait 10+ days, TA wait 14 days.

• Malathion (1): Meets MRLs for all countries except KO & TA; for KO wait 5 days, TA wait 21 days.

• Imidacloprid (3): Meets MRLs for all countries except blackberry in KO; need to wait 4 days instead of 3.

• Residue declines for the two formulations of hexythiazox (Savey) did not differ.
  • Both formulations OK for CA but excessive residues for US and all other countries – WHY?

• Cypermethrin (1): OK for TA but excessive residues for US & other countries; need to wait 5 days - WHY?

• Fenpropathrin (3): Meets MRLs for all countries except AU (0 ppm) and KO; wait 18 days for KO.

• Cyantraniliprole (?): Not registered, no MRL set. Blueberry MRL = 4.0. Caneberry < 0.6 ppm.

• Continue study with TASC funding; 3 years of data should provide better representation of degradation curves.
  • Carefully study residue levels for hexythiazox and zeta-cypermethrin, which were both above US tolerances.

(US PHI in parentheses)
Thank you

- Washington Red Raspberry Commission
- Oregon Raspberry and Blackberry Commission
- Randy Honcoop
- Camille Holladay – Synergistic Pesticide Lab

Some of the pesticides discussed in this presentation were tested under an experimental use permit granted by WSDA. Application of a pesticide to a crop or site that is not on the label is a violation of pesticide law and may subject the applicator to civil penalties up to $7,500. In addition, such an application may also result in illegal residues that could subject the crop to seizure or embargo action by WSDA and/or the U.S. Food and Drug Administration. It is your responsibility to check the label before using the product to ensure lawful use and obtain all necessary permits in advance.