Reduced-risk Pest Management and New Herbicides for Cranberries in BC

Cranberry Congress 2014
Outline

• Variety data for 2014
• Fireworm control
• Tipworm control
• Weevil control
• Weed control
• Residue management
% fruit rot 2013 – Oregon data

- Crimson Queen
- Demoranville
- Grygleski 1
- Mullica Queen
- Pilgrim
- Scarlet Knight
- Stevens
- Willapa Red
- Yellow River
- Rutgers 1
- Rutgers 2

Legend:
- Blue: field rot
- Red: storage rot
<table>
<thead>
<tr>
<th>Variety</th>
<th>Least Rot</th>
<th>Middle</th>
<th>Most Rot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stevens</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>Pilgrim</td>
<td>25</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Grygleski 1</td>
<td>50</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Willapa Red</td>
<td></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Crimson Queen</td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Mullica Queen</td>
<td>25</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Demoranville</td>
<td>50</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Rutgers 2</td>
<td>33</td>
<td></td>
<td>66</td>
</tr>
<tr>
<td>Rutgers 1</td>
<td></td>
<td>33</td>
<td>66</td>
</tr>
</tbody>
</table>
Early maturity – cause for concern?

Fruit color on 8/12/13
## Important Harvest Sequence Recommendation *

<table>
<thead>
<tr>
<th>Variety</th>
<th>Harvest Sequence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crimson Queen</td>
<td>early harvest <em>highly</em> recommended</td>
</tr>
<tr>
<td>HyRed</td>
<td>early harvest <em>highly</em> recommended</td>
</tr>
<tr>
<td>Demoranville</td>
<td>early harvest recommended</td>
</tr>
<tr>
<td>Mullica Queen</td>
<td>early harvest recommended</td>
</tr>
<tr>
<td>Rutgers 1</td>
<td>early to mid harvest recommended</td>
</tr>
<tr>
<td>Rutgers 2</td>
<td>early to mid harvest recommended</td>
</tr>
<tr>
<td>Grygleski 1</td>
<td>early to mid harvest recommended</td>
</tr>
</tbody>
</table>

*Based on the occurrence of poor fruit condition in mid to late harvested beds BC or WA. Inadequate grower data on HyRed, Demoranville, Rutgers 1 & 2. Inference is a conjecture based on early maturity*
New registrations for 2014

- Herbicides
  - Nothing

- Insecticides
  - C- expected in 2014, doesn’t target PNW CB insects
  - E- expected in 2014, fair tipworm control

- Fungicides
  - P – Federal label Dec 2013
    - Superstar for fruit rot
Reduced Risk Insect Control
Traditional 1st generation fireworm timing - easy to miss early hatched larvae

Traditional 2nd generation fireworm timing - easy to get early damage
Traditional first generation fireworm timing
- easy to miss ideal window or early hatched larvae

For 1st generation:
How much earlier can we use reduced risk insecticides earlier (pre-hatch to first neonate)?
Is there any advantage to treating earlier?
Chemigated with Altacor or Intrepid before egg hatch

4/30 treated
5/6 swept
5/17 swept
Early timing for 1st generation provides superlative control, even under high pressure. At least 17 days of control.

<table>
<thead>
<tr>
<th></th>
<th>4/30 treat</th>
<th>5/6 swept</th>
<th>5/17 swept</th>
<th># larvae in 5 sweeps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>31</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Altacor</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intrepid</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Traditional 1st generation fireworm timing

OP ~ middle of significant hatch

Altacor Intrepid
~ 1/4” growth; no larvae present
~ 0 - 7 days after 1st larvae found
7-10 days before traditional timing

A second application of Altacor/Intrepid, Prebloom, if cleanup required
Traditional 2\textsuperscript{nd} generation fireworm timing - easy to get early damage

For 2nd generation:
How much earlier can we use reduced risk insecticides earlier (pre-hatch to first neonate)?
Is there any advantage to treating earlier?
Which application window is best?

Treatment window for Altacor or Intrepid
5/26  6/4  6/11  6/19  6/26

Sweep for efficacy 7/12 when first significant hatch of 2nd generation larvae occurred.

Severely infested field
Duration of field efficacy – fireworm 2\textsuperscript{nd} generation
5 different timings (5/27 to 6/26) – how long do they provide control?

Treatment date for Altacor or Intrepid

<table>
<thead>
<tr>
<th>Date</th>
<th>5/26</th>
<th>6/4</th>
<th>6/11</th>
<th>6/19</th>
<th>6/26</th>
</tr>
</thead>
<tbody>
<tr>
<td>27/05/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06/06/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>16/06/2013</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>26/06/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
<tr>
<td>06/07/2013</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

BHFW adults trap counts

- BHFW adults trap counts range from 0 to 250.
- The graph shows a trend in trap counts over the specified dates.
- The peak trap count is observed on 06/07/2013 with 16 traps.
- The lowest trap count is observed on 27/05/2013 with no traps.

Note: The graph illustrates the change in trap counts for BHFW adults over the specified dates and treatment periods.
Duration of field efficacy – fireworm 2nd generation
5 different timings (5/27 to 6/26) – how long do they provide control?

Treatment date for Altacor or Intrepid

- 5/26
- 6/4
- 6/11
- 6/19
- 6/26

38 & 42 days before major hatch
0 days & 10 after 1st sig. catch

Altacor – 0% control
Intrepid - 0% control

Sweep for efficacy
# of small larvae

BHFW adults trap counts

0 50 100 150 200 250

27/05/2013 06/06/2013 16/06/2013 26/06/2013 06/07/2013

1

Sweep for efficacy
# of small larvae

1 16
Duration of field efficacy – fireworm 2\textsuperscript{nd} generation
5 different timings (5/27 to 6/26) – how long do they provide control?

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>5/26</td>
<td>50</td>
</tr>
<tr>
<td>6/4</td>
<td>100</td>
</tr>
<tr>
<td>6/11</td>
<td>150</td>
</tr>
<tr>
<td>6/19</td>
<td>200</td>
</tr>
<tr>
<td>6/26</td>
<td>250</td>
</tr>
</tbody>
</table>

- **Altacor** – 74% control
- **Intrepid** - 0% control

- 33 days before major hatch
- 12 days after 1\textsuperscript{st} sig. catch

Sweep for efficacy
- # of small larvae
- 1
- 1
- 16

27/05/2013 to 06/07/2013
Duration of field efficacy – fireworm 2\textsuperscript{nd} generation
5 different timings (5/27 to 6/26) – how long do they provide control?

<table>
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<tr>
<th>Treatment date for Altacor or Intrepid</th>
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<tbody>
<tr>
<td>5/26</td>
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<tr>
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<tr>
<td>6/11</td>
<td>BHFW adults trap counts</td>
</tr>
<tr>
<td>6/19</td>
<td>BHFW adults trap counts</td>
</tr>
<tr>
<td>6/26</td>
<td>BHFW adults trap counts</td>
</tr>
</tbody>
</table>

19 days before major hatch
20 days after 1\textsuperscript{st} sig. catch

Altacor – 84% control
Intrepid - 84% control

Sweep for efficacy
# of small larvae
Duration of field efficacy – fireworm 2\textsuperscript{nd} generation

5 different timings (5/27 to 6/26)

Treatment date for Altacor or Intrepid

5/26 6/4 6/11 6/19 6/26

Sweep for efficacy

# of small larvae

12 days before major hatch,

1\textsuperscript{st} larvae

Altacor – 98% control

Intrepid - 96% control

Sweep for efficacy

# of small larvae

27/05/2013 06/06/2013 16/06/2013 26/06/2013 06/07/2013
% control vs days after 1st trap count (~5/27/14)

days after 1st trap count (~5/27/14)

- Altacor
- Intrepid
% control vs days before 1\textsuperscript{st} larvae noted (6/25/13) (date of traditional treatment w/ OP)
% control vs days before 1\textsuperscript{st} significant larvae in sweep nets (7/8/13) (date of traditional treatment w/OP)
Traditional 2\textsuperscript{nd} generation fireworm timing

- OP $\sim$ 1\textsuperscript{st} sig. hatch
- "bees removed"
- "Altacor Intrepid"
- $\sim$ 14-18 days after 1\textsuperscript{st} sig. trap count
- $\sim$ 0 - 7 days after 1\textsuperscript{st} larvae found
- $\sim$ 12-14 days before conventional spray
Next steps??
Spraying based on weather station alerts using base 10C degree days
• 15 to 30 dd for season for 1st spray
• 110 to 150 dd after 1st trap count for 2nd spray
Summary

Recommend treatment at the very 1\textsuperscript{st} larvae stage for each generation. This could be 7 to 10 days before traditional treatment windows.
We can dig ourselves into a hole if we don’t use resistance management.

Alternate between Altacor and Intrepid or something else.
Movento is great for tipworm – but you need alternative controls!
1) Resistance is likely over time
2) All new neonicotinoids registrations are under review at EPA. Movento may be a nonstarter.

S. Fitzpatrick 2013
# of tipworm larvae / 25 uprights on 2 Grayland farms on 6/11/13

Farms treated 5/15 and 6/3

Both C & E are in the registration queue and expected in 2014/2015. E appears to have good potential for suppressing tipworm populations.
Blackvine weevil larvae control on Grayland farm treated with MET52 on 11/20/13 and assessed 1/7/14

MET52 is Metarhizium anisopliae strain F52
100 lbs/ac MET52

Dissolve rice granules in water w/ 0.05% Silwet surfactant

Let set 1 hour, filter and spray, and wash-in in with at least an inch/ac

0 day PHI, Tolerance exempt for cranberry in US (labelled for cranberries in US);

No label in Canada

Expensive - $1800/ac, but you can spot treat 100 - 20’ by 20’ hot spots for $18/each
No data for girdler, but field trials using new protocol is suggested.
Lotus control with Herbicide I - 2013

% coverage

control  1.2 oz - Feb  2.5 oz - Feb  1.2 oz - Mar  2.5 oz - Mar
Barnyard Grass control with Herbicide I - 2013

% control

control | 1.2 oz - Feb | 2.5 oz - Feb | 1.2 oz - Mar | 2.5 oz - Mar
Crop effect of Herbicide I - 2013

Herbicide I applied 3/20/13 to three farms - 2013
Herbicide I – control weeds, no crop effect
The next cranberry herbicide superhero?
Herbicide I – the next cranberry pesticide superhero!

Not! – Bayer pulled support late summer 2013
We will revisit at a later date.
Pesticide residue management

• WSU screened 23 pesticides for residue applied at three different dates (their PHI and two longer dates).
• Only Bravo and Lorsban were above EU or US tolerance
What level of residue occurs with one application of Bravo to fresh fruit via chemigation as a function of PHI (52, 61 or 77 days)?

Bravo Residue (ppm) as a function of spray date

OS code book – no use >7/15 for fresh export
Bravo residue management

• What else do we know
  – Delay harvest: Bravo residues drop by 50% with a two week delay in harvest.

• What we don’t know
  – Chemigation vs Broadcast
  – One vs two applications of Bravo
  – Bravo formulation
  – Full residue vs application date curve (front end)
  – Full decay curve (back end)
  – Residue level vs weather (amount of sunny days)
  – Residue level vs fruit size (variety)
  – Harvest method (dry vs wet)
Question?

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