Herbicide Testing in Red Raspberry

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WSU Mount Vernon, NWREC
Raspberry Herbicide Trials

- Two trials each in 2015 and 2016 were funded by the Washington Red Raspberry Commission and Washington State Commission for Pesticide Registration
  - Baby raspberry herbicide trial
  - Raspberry cane burning effects trial
- Two additional trials were conducted in 2015 and 2016
  - IR-4 trial
    - Treevix applied PRE, at cane burning, or one of two POST timings
  - Zeus Prime trial
Baby Raspberry Herbicide Trial
2015-16
Baby Raspberry Trial 2016

• Plugs from Northwest Plant Co.
  - ‘Meeker’, ‘Wakefield’, ‘Cascade Harvest’, and ‘Squamish’ were transplanted in mid-May

• Herbicides applied immediately post-transplant (PRE to weeds)

• Weed control, raspberry injury, and cane length measured
Weeds Present

• Ladysthumb
• Common chickweed
• Shepherd’s-purse
• Henbit
More Weeds

- Common Lambsquarters
- Common Groundsel
- Pineapple-weed
- Annual Sowthistle
Baby Raspberry Survival
September, 2016

Live Plants

- Zeus
- Chateau L
- Chateau H
- Fierce
- Devrinol
- Prowl H2O
- Surflan
- Trellis
- Matrix
- Sandea
- Simazine
- None
Baby Raspberry Cane Length
September, 2016
Baby Raspberry Injury
June, 2016

%
Baby Raspberry Cane Length
September, 2016

cm

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<tr>
<th></th>
<th>Cas Harv</th>
<th>Meeker</th>
<th>Squamish</th>
<th>Wakefield</th>
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Legend:
- Cas Harv
- Meeker
- Squamish
- Wakefield
Raspberry Cane Burning Trial
2015-16
Cane Burning Effects on Raspberry

• Working with WSU scientists Lisa Wasko DeVetter and Joan Davenport
• Trials conducted at Mount Vernon NWREC and Prosser IAREC
• ‘Meeker’, ‘Chemainus’, ‘Saanich’, ‘Cascade Bounty’, and ‘Wakefield’
• Raspberry plants treated with Goal, Aim (applied once or twice), or Treevix at cane burning time
• Canes clipped prior to harvest for carbohydrate analysis (floricanes, primocanes, fruiting laterals)
• Fruit analyzed for fruit quality factors
Raspberry Primocane Biomass
By Cultivar, June, 2016

![Bar graph showing biomass by cultivar.]

- Cascade Bounty
- Chemainus
- Meeker
- Saanich
- Wakefield

Legend:
- a
- b
Raspberry Floricane Biomass
By Cultivar, June, 2016

![Bar graph showing biomass by cultivar in June 2016.]

- **Cascade Bounty** in yellow
- **Chemainus** in green
- **Meeker** in blue
- **Saanich** in red
- **Wakefield** in purple

Y-axis: g/cane

Legend:
- a
- b
Raspberry Fruiting Lateral Biomass
By Cultivar, June, 2016

![Bar graph showing the biomass of different cultivars of raspberries. The x-axis represents different cultivars (Cascade Bounty, Chemainus, Meeker, Saanich, Wakefield), and the y-axis represents biomass in grams. The graph indicates that Saanich has the highest biomass, followed by Wakefield, with other cultivars having lower biomass. The bars are labeled with letters indicating significant differences in biomass between cultivars.]
Raspberry Floricane Biomass
By Herbicide, June, 2016

![Bar chart showing biomass by herbicide]

- **g/cane**
- **abc**
- **bc**
- **ab**

Legend:
- **Aim 1**
- **Aim 2**
- **Goal**
- **Treevix**
- **None**
Raspberry Fruiting Lateral Biomass By Herbicide, June, 2016

g
80
70
60
50
40
30
20
10
0
ns

Aim 1
Aim 2
Goal
Treevix
None
Raspberry Fruit Quality
Anthocyanin, 2015

mg/g

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<thead>
<tr>
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<th>NWREC</th>
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<tr>
<td>None</td>
<td>0.6</td>
<td>0.7</td>
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<tr>
<td>Goal</td>
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<tr>
<td>Treevix</td>
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<tr>
<td>Aim 1</td>
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<tr>
<td>Aim 2</td>
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ns
Raspberry Fruit Quality
°Brix, 2015

IAREC
NWREC

IAREC

NWREC

Chemainus
Meeker
Wakefield
Saanich
Bounty

Legend:

- yellow: Chemainus
- green: Meeker
- blue: Wakefield
- red: Saanich
- cyan: Bounty
Raspberry Fruit Quality
Juice pH, 2015

IAREC
NWREC

Chemainus
Meeker
Wakefield
Saanich
Bounty
Raspberry Fruit Quality
Anthocyanin, 2015

mg/g

I AREC

NWREC

Chemainus
Meeker
Wakefield
Saanich
Bounty
Total Carbohydrate Content
By Cultivar, 2015

- Primocanes
- Laterals

- Chemainus
- Meeker
Total Carbohydrate Content
By Location, 2015

Primocanes
Laterals

IAREC
NWREC
Total Carbohydrate Content
Primocanes, 2015

IAREC  
NWREC
Total Carbohydrate Content
Primocanes, 2015

IAREC

NWREC
Red Raspberry Herbicide Trials
Raspberry Herbicide Trials

- Herbicides applied at **three timings**
  - Dormant-season treatments applied **March 3**
  - Cane burning treatments applied **April 7**
  - Post-budbreak treatments applied **May 18** and **June 3**
- Weed control estimated **April to July**
- Berries sampled **June 20**
Herbicide Trial Observations

- Treevix at 4x rate did not reduce berry yield or fruit size compared to nontreated raspberry.
- Wild buckwheat was present in the Zeus Prime trial both years.
Wild Buckwheat

• Control in April/May exceeded 90% with Zeus Prime, whether applied in late dormancy or as a cane burner.

• Control with paraquat alone was 75% by April and 33% by May.

• In 2015
  - Mid-August cover was 37 to 38% in nontreated plots or when treated with paraquat alone.
  - Cover was about 15% with Zeus Prime + Surflan + Paraquat, Zeus Prime + Matrix, or Zeus Prime at cane burning time.

• In 2016, control was still 80 to 98%.
Conclusions

• New products remain a high priority for registration in caneberries
  – Alion and Treevix in IR-4 testing during 2014 and 2015
  – FMC has registered Zeus and Zeus Prime
  – Clopyralid and Trellis were included in IR-4 in 2015
Many Thanks

• **Funding** for all my berry trials was provided by:
  - Washington *Blueberry, Red Raspberry and Strawberry* Commissions
  - BC Raspberry Industry Development Council
  - Washington State Commission for *Pesticide Registration*

• **Norcal Nursery** for plant material

• **Cooperators and herbicide manufacturers**

• **Carl Libbey, Yushan Duan**, and the gang at **WSU Mount Vernon NWREC**