New Herbicides for Weed Management of Berry Crops

Tim Miller
WSU Mount Vernon, NWREC
Selected Berry Trials, 2012

- Raspberry
  - Cane Burning Trial
  - IR-4 Trials
- Blueberry
- Strawberry
  - Established
Red Raspberry Trials
Cane Burning in Red Raspberry

Yushan Duan
M.S., 2011
Cane Burning Trial
Trial 1, Commercial Fields

- Treatments were Aim, Goal, Sinbar, Aim + Sinbar, Goal + Sinbar, and nontreated
  - 2010 ‘Meeker’ and ‘Coho’
  - 2011-12 ‘Meeker’ and ‘Cascade Bounty’

- Measurements included primocane growth, berry yield, and weed control
Cane Burning Trial
Trial 2, On-Station Fields

- Treatments were **Aim**, **Goal**, and nontreated
  - 2010-12 ‘Meeker’ and ‘Cascade Bounty’
- Measurements included primocane growth, floricane fruiting, berry yield, and time for pruning/trimming
Trial 1 ‘Meeker’ Berry Yield
Three-year Average

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Three-year Average (lbs/acre)</th>
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<tbody>
<tr>
<td>Nontreated</td>
<td>ab</td>
</tr>
<tr>
<td>Aim</td>
<td>a</td>
</tr>
<tr>
<td>Goal + Sinbar</td>
<td>a</td>
</tr>
<tr>
<td>Goal + Sinbar</td>
<td>a</td>
</tr>
<tr>
<td>Aim + Sinbar</td>
<td>c</td>
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</table>

Notes:
- Different letters (a, b, c) indicate significant differences at the 0.05 probability level.
Trial 1 ‘Coho’ Berry Yield 2010

lbs/acre

Aim
Goal
Sinbar
Aim + Sinbar
Goal + Sinbar
Nontreated

NS
Trial 1 ‘Cascade Bounty’ Berry Yield
Two-Year Average

lbs/acre

- Aim
- Goal
- Sinbar
- Nontreated
Trial 1 Weed Control
August, 2010-12

lbs/acre

2010 | 2011 | 2012
--- | --- | ---
Aim  | a    | a    | a    | a    | a    | a
Goal | c    | b    | c    | b    | b    | b
Sinbar | a    | a    | a    | a    | a    | a
Aim + Sinbar | a    | a    | a    | a    | a    |
Goal + Sinbar | a    | a    | a    | a    | a    |

Legend:
- Aim
- Goal
- Sinbar
- Aim + Sinbar
- Goal + Sinbar
Trial 2 Raspberry Yield
Three-Year Average

<table>
<thead>
<tr>
<th></th>
<th>Aim</th>
<th>Goal</th>
<th>Nontreated</th>
<th>Cascade Bounty</th>
<th>Meeker</th>
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</tbody>
</table>

lbserv/acre
Trial 2 Pruning/Training Time
2010-11

hours/person/acre

- Meeker
- Cascade Bounty

NS

- Aim
- Goal
- Nontreated

a, b, b

0 20 40 60 80 100 120
Trial 2 Pruning/Training Time
2011-12

hours/person/acre

<table>
<thead>
<tr>
<th></th>
<th>Meeker</th>
<th>Cascade Bounty</th>
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<tbody>
<tr>
<td>Aim</td>
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<td>NS</td>
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<tr>
<td>Goal</td>
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<td>NS</td>
</tr>
<tr>
<td>Nontreated</td>
<td>NS</td>
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</table>

Aim, Goal, Nontreated
Preliminary Conclusions

• Cane burning increased yield of Meeker, but not Coho and Cascade Bounty
  – Nonsignificant increase in Coho, less with Cascade Bounty

• Weed control by August was poor when only cane burning herbicides were used
  – Weed control was progressively worse each year that only cane burning products were used

• Training efficiency was far better with cane burning for Meeker in 2010-11, but not for Cascade Bounty
  – No difference in 2011-12
IR-4 Trials

- Crop injury and efficacy trials were conducted for potential registration in raspberry (2011-12)
  - **Prowl H2O** (will assist in control of many annual weed species)
  - **Quali-Pro Quinclorac** (assist with field and hedge bindweed)

- No crop injury noted and no negative effects on yield

Note: **Dual Magnum** was included as a treatment, registration was gained in 2012
Blueberry Herbicide Trial
2011-12
Blueberry Herbicide Trial

• Testing of dormant and POST herbicides for perennial weed control
  – Conducted in 2011 in Mount Vernon on established ‘Duke’
  – Conducted in 2012 in Lynden on newly-planted ‘Draper’
Blueberry Herbicide Trial 2011

- Dormant-season products tested were Sinbar, Karmex, Callisto, Matrix, Velpar, Sandea, and Stinger
  - Also tested Lorox (NovaSource, not registered)
  - Treatments were applied March 24, 2011

- Post-budbreak products tested were Sandea, Matrix, Callisto, and Stinger
  - Treatments were applied June 17, 2011
Weed Control in Blueberry Dormant, 2011

Callisto
Matrix
Sin + Lor
Sin + Kar + Lor
Sin + Cal
Sin + Mat
Vel + Sin + Kar

%
Weed Control in Blueberry
POST, 2011

Percentage (%)

Matrix
San + Mat
San + Cal
San + Stin
Mat + Cal
San + Mat + Cal
San + Mat + Stin
San + Cal + Stin
Mat + Cal + Stin

NS
Blueberry Herbicide Trial 2011

- No observable crop injury
- Weed control ranged from 50 to 90% in August
- Yield parameters did not differ significantly
- All these herbicides look good for perennial weed control, particularly when used in combination
Blueberry Herbicide Trial
2012

• Herbicides expanded to include three other non-registered products Alion (indaziflam, new from Bayer), Reflex (fomesafen, old from Syngenta), and Treevix (saflufenacil, new from BASF)
  – Dormant-season treatments were applied March 8-9, 2012
  – Post-budbreak treatments were applied May 2, 2012
Weed Control in Blueberry
Single Products

% NS May 23 September 14

- Sandea
- Stinger
- Callisto
- Matrix
Weed Control in Blueberry
Two-way Tank Mixtures

May 23
September 14

NS

San + Mat
San + Cal
San + Sting
Sting + Mat
Sting + Cal
Mat + Cal

%
Weed Control in Blueberry
Three-way Tank Mixtures

![Bar chart showing weed control percentages for different tank mixtures on May 23 and September 14. The percentages are not statistically significant (NS) for all mixtures.](chart.png)
Weed Control in Blueberry Mixes with Sinbar (2 lbs/a)

- Lorox 1
- Lorox 2
- Kar1 + Lor1
- Kar2 + Lor2
- Callisto
- Matrix

May 23

- NS

September 14

- NS

%
Blueberry Herbicide Trial 2012

• No observable crop injury, good news for newly-planted blueberry

• Weed control ranged from 48 to 83% in September

• New herbicides looked good, and testing will be expanded in 2013
Established Strawberry Trial
Established Strawberry Trial

- ‘Totem’ strawberry transplanted in June, 2011
  - Treated with Spartan and Prowl H2O shortly after transplanting, and with Poast in October, 2011
  - Roto-tilled several times during establishment, and once more prior to dormancy
- Split-block simazine was applied in November, 2011 and herbicide combinations were applied in March, 2012
- Tested herbicides included:
  - Registered: Chateau, Devrinol, Sinbar, and Spartan
  - Nonregistered: Alion, Callisto, Dual Magnum, Fierce, Gallery, Prowl H2O*, Reflex, and Treevix
Established Strawberry Trial

Results

• Crop injury was very low, with one exception: Callisto (94% injury by May and it didn’t get any better)
  – Newly-planted strawberry was also killed by Callisto (don’t even think about it!)

• Weed control with Gallery, Alion, and Fierce was similar to handweeded strawberry

• Differences in weed control due to simazine were small
  – 84 and 78% (with/without) in May and 64 and 61% in June
Established Strawberry Trial

Results

- **Berry yield** was not affected by simazine
  - Yield with Gallery + Spartan and Alion exceeded handweeded strawberry

- **Average fruit weight** increased from 13.5 g/fruit to 14.8 g/fruit when simazine was used
  - Average fruit weights after herbicide treatments did not differ from handweeded strawberry
Established Strawberry Trial
Weed Control in June, Nonregistered Products

![Bar graph showing weed control in June with nonregistered products. The graph compares different products: Hand, Alion, Gallery, Reflex (5), Treevix, and Fierce. The y-axis represents %, and the x-axis represents the products. The graph shows that Alion has the highest control, followed by Hand, Gallery, Reflex (5), Treevix, and Fierce. The NS (not significant) label indicates that there is no significant difference among the products.]
Conclusions

Established Strawberry Trial

- Weed control was excellent through harvest with most combinations
  - Simazine increased weed control in 2009 and 2011, but not in 2010
- Crop injury was often high in March, but less than 10% by April, with or without simazine
- Berry size and yield not reduced by any treatments
Many Thanks

- **Funding** for these trials was provided by:
  - Washington State Blueberry, Red Raspberry and Strawberry Commissions
  - Washington State Department of Agriculture
  - Western Region IR-4
  - Industry support
- **Sakuma Brothers Farms** for plant material
- **Erickson Farms, South Alder Farms, Sakuma Brothers Farms, and Sterk Farms**, cooperators
- **Herbicide manufacturers** for products
- **Carl Libbey, Yushan Duan**, and the gang at WSU Mount Vernon NWREC