



World Class. Face to Face.

Assessment of new pest management tools useful to BC growers

Funding for research provided by :

- BC Cranberry Marketing Commission
- Washington State Cranberry Commission
- Oregon Cranberry Growers Association
- The Cranberry Institute
- Ocean Spray
- PCCRF

Insects

Tipworm

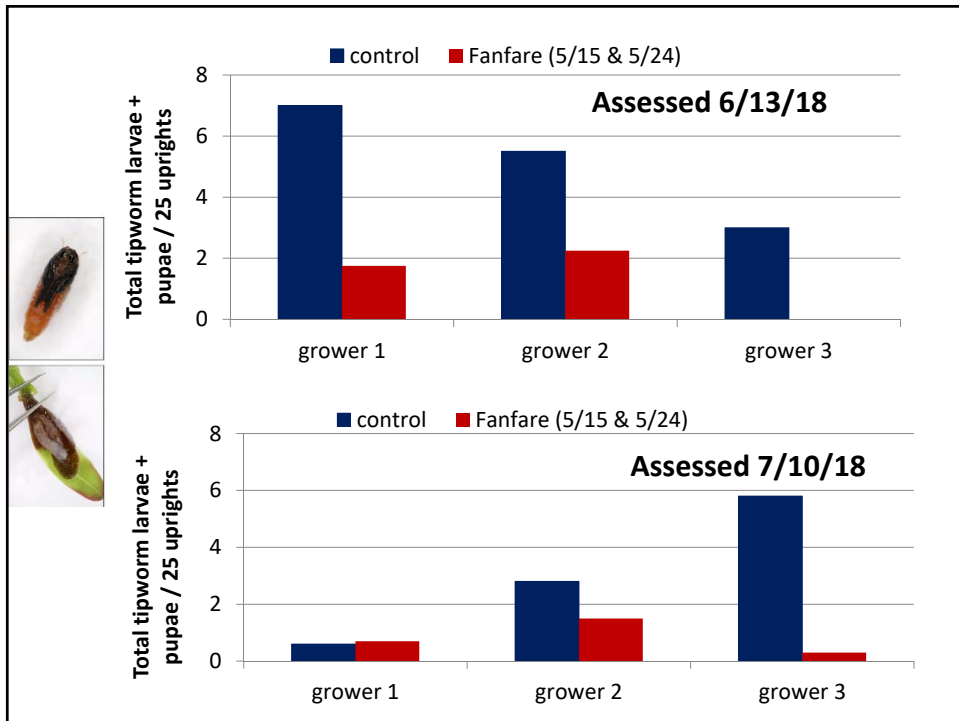
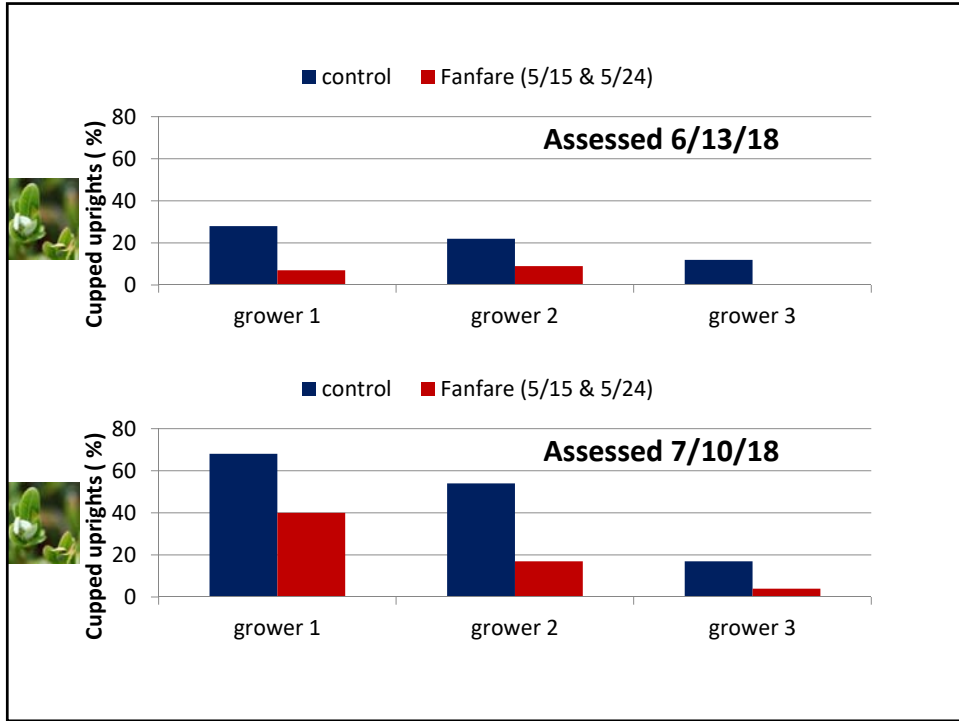
- US has a pending registration of Bifenthrin – Fanfare for cranberries.
- Status in BC is questionable.
- Is it worth considering in BC for resistance management or for control of other insects?



Does mid-May bifenthrin provide persistent control of tipworm?

Small plots within 3 farms severely infested with TW were treated May 15 and May 24.

Tipworm assessed 6/13/18 and 7/10/18



Did two mid-May bifenthrin applications provide persistent control of tipworm? yes

- There was significant reduction in cupping and tipworm counts in June and July.
 - Was the level of reduction enough to prevent any crop loss for current and next season? maybe
 - Would 3 application do a better job? yes

Fanfare is also very effective on Fireworm and Adult Weevil



Fanfare: very inexpensive and effective for a host of insects.
But!

- Canadian registration maybe problematic
- Resistance
- Water quality
- Pollinators and parasitoids

Summary – insecticide

- Fanfare has potential to be a good tool for insect management if used right.

Weeds





GROUP 14 HERBICIDE

VALENT

CHATEAU
HERBICIDE SW

FOR CONTROL AND/OR SUPPRESSION OF CERTAIN WEEDS IN ALFALFA, ARTICHOKe, ASPARAGUS, BUSHBERRIES, CELERY, COTTON, FIELD CORN, GARLIC, GRAPE, HOPS, MINT, NUT TREES (INCLUDING PISTACHIO), OLIVE, ONION (DRY BULB), POME FRUIT, POMEGRANATE, STONE FRUIT, STRAWBERRY, SWEET POTATO, NON-BEARING FRUIT TREES, FALLOW LAND AND TO MAINTAIN BARE GROUND ON NON-CROP AREAS OF FARMS, ORCHARDS AND VINEYARDS.

Active Ingredient	By Wt
Flumoxazin*	51%
Other Ingredients	49%
Total	100%

* 2-[7-fluoro-3,4-dihydro-3-oxo-4-(2-propenyl)-2H-1,4-benzoxazin-6-yl]-4,5,6,7-tetrahydro-1H-isindole-1,3(2H)-dione

Chateau® Herbicide SW is a water dispersible granule containing 51% active ingredient.

EPA Reg. No. 59639-99
EPA Est. 11773-IA-01® 39578-TX-01®
Superscript is the first letter in lot number.



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Moss Control w/ flumioxazin (Late November and Early February)

- Flumioxazin (Chateau) provides 80 to 100% permanent control of moss via chemigation or broadcast
- Application window is limited between Late November and Early February
- Recommended two applications at $\frac{1}{2}$ x to 1x
- No negative effects on crop

Moss Control – other options

- Fertilizer - Iron sulfate (Ferrous Sulfate Powder Heptahydrate)
 - Suppression of moss when used as a fertilizer in the winter.
- Fungicide – **Previsto** (copper hydroxide polymer by Gowan)
 - Data from WI suggests efficacy.
 - No idea about BC registration
- Herbicide – Aim (Carfentrazone-ethyl just obtained US label for subgroup 13-07G)
 - Data from East coast suggest efficacy on moss.

Loveland
PRODUCTS

Intensity

POST-EMERGENCE GRASS HERBICIDE

ACTIVE INGREDIENT	% BY WT.
Clethodim: (E)-2-[1-[(3-chloro-2-propenyl)oxy]imino]propyl-5-(2-ethylthio)propyl-3-hydroxy-2-cyclohexen-1-one	26.40%
OTHER INGREDIENTS	73.60%
TOTAL	100.00%

Contains petroleum distillate.
Contains 2.0 lbs clethodim per gallon.

KEEP OUT OF REACH OF CHILDREN
WARNING—AVISO
Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle. (If you do not understand the label, find someone to explain it to you in detail.)

EPA REG. NO. 34704-864

081910 Y1D 11G16

FORMULATED FOR
LOVELAND PRODUCTS, INC.®, P.O. BOX 1296, GREELEY, COLORADO 80632-1296

Special local
need label for
chemigation in
WA in 2018

2018 efficacy trials:
One chemigated applications
of Intensity (July)

Barnyard grass ~ 100%
control

2018 efficacy trials:

Grasses with excellent control

Sweet Vernal ~ 90 to 100 %

Barnyard grass ~ 100%

Velvet grass ~ 80 to 100%

Grasses with moderate control

Fescues ~ 10 to 40%

Reed Canary grass ~ 50 - 75%

Creeping Bent grass ~ 40 to 80%

Salt Grass ~ 10 to 40%

Grasses with no control

Fine Fescues

Cost per application:

~ 5-7\$/ac

May require >1 application

Timing:

Young actively growing

Early post-emergence

Two options – no differences

Intensity

Intensity One


Effect on Crop:

None noted

30 day PHI

Also highly recommend for new plantings with any grass problems




PEEL PLAM HERE →

Intensity

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Contains petroleum distillate.
Contains 2.0 lbs clethodim per gallon.

: Carfentrazone-ethyl 2

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FORMULATED FOR
LOVELAND PRODUCTS, INC.®, P.O. BOX 1296, GREELEY, COLORADO 80632-1296

BC should consider seeking a Special local need (SLN) label for chemigation for this or some other similar clethodim product.

Backpack spraying Roundup?

Label instructions

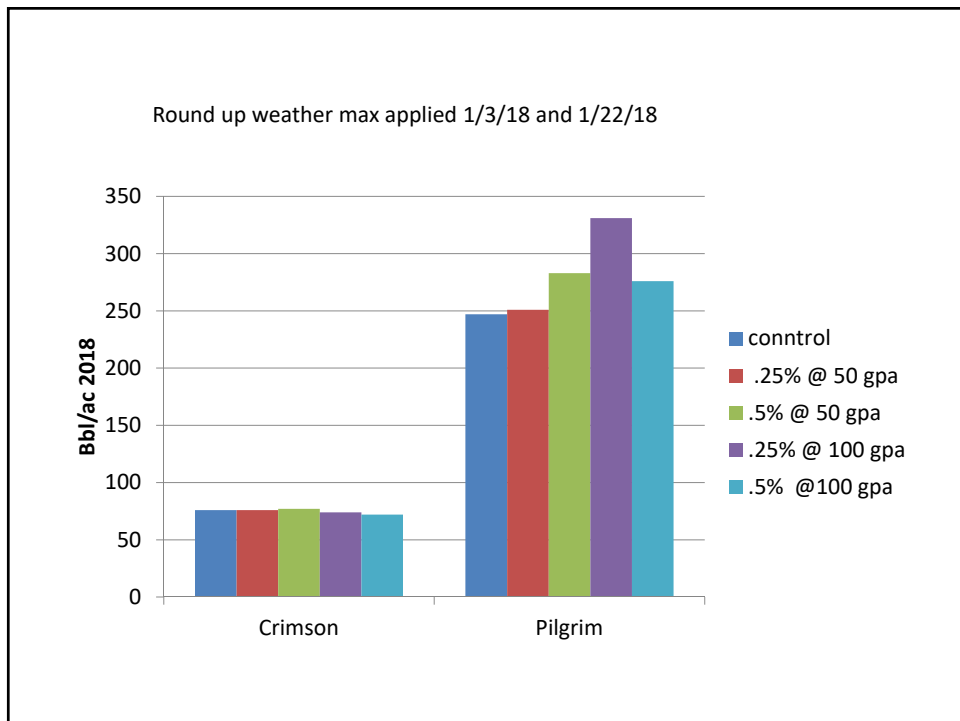
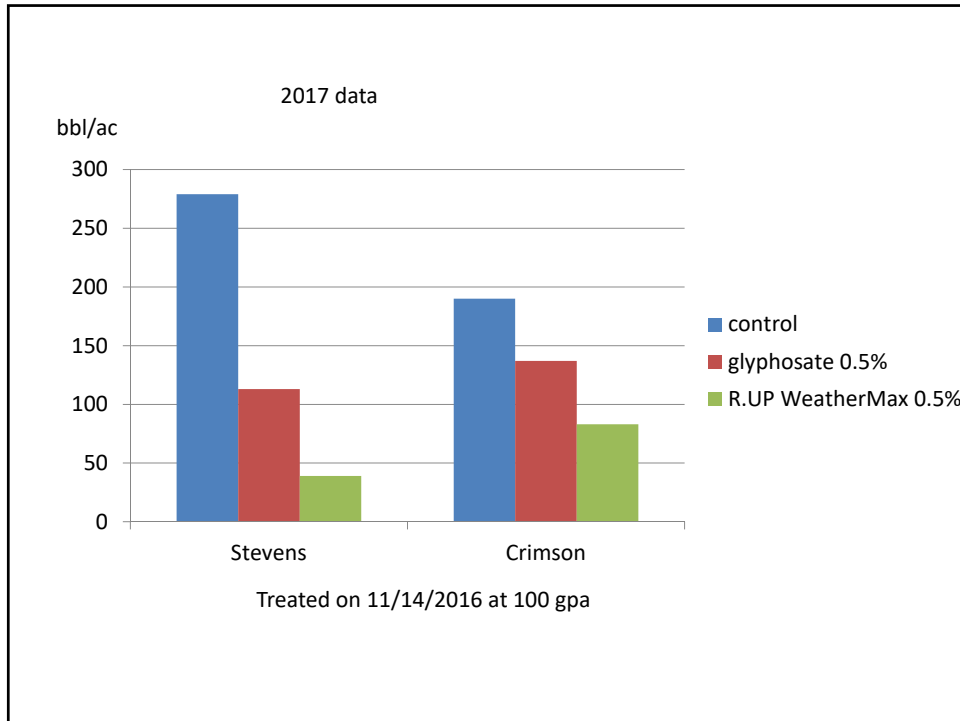


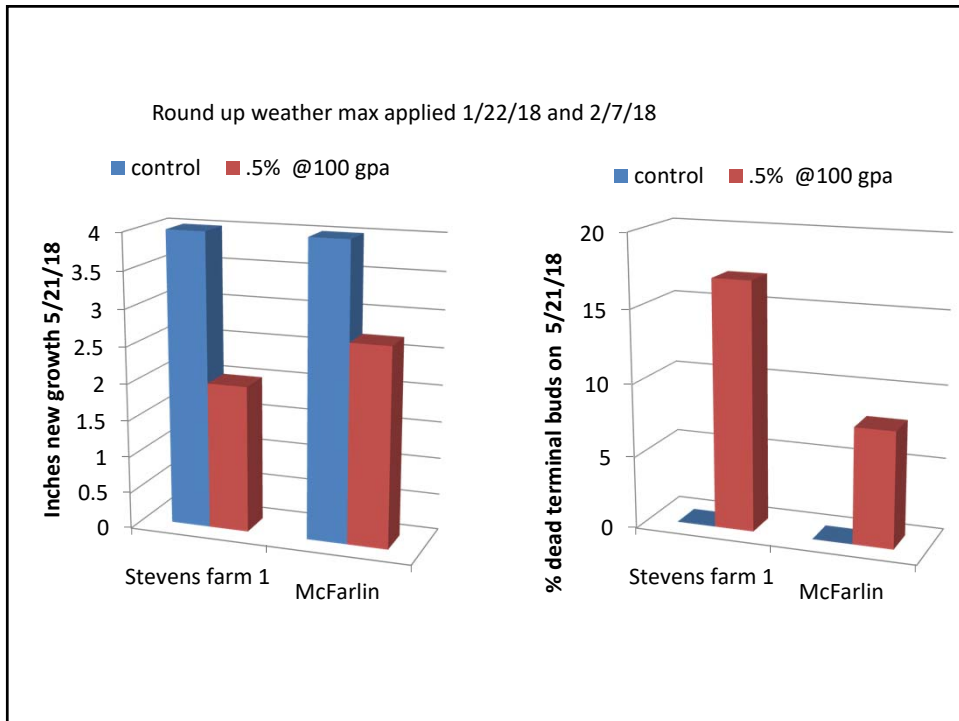
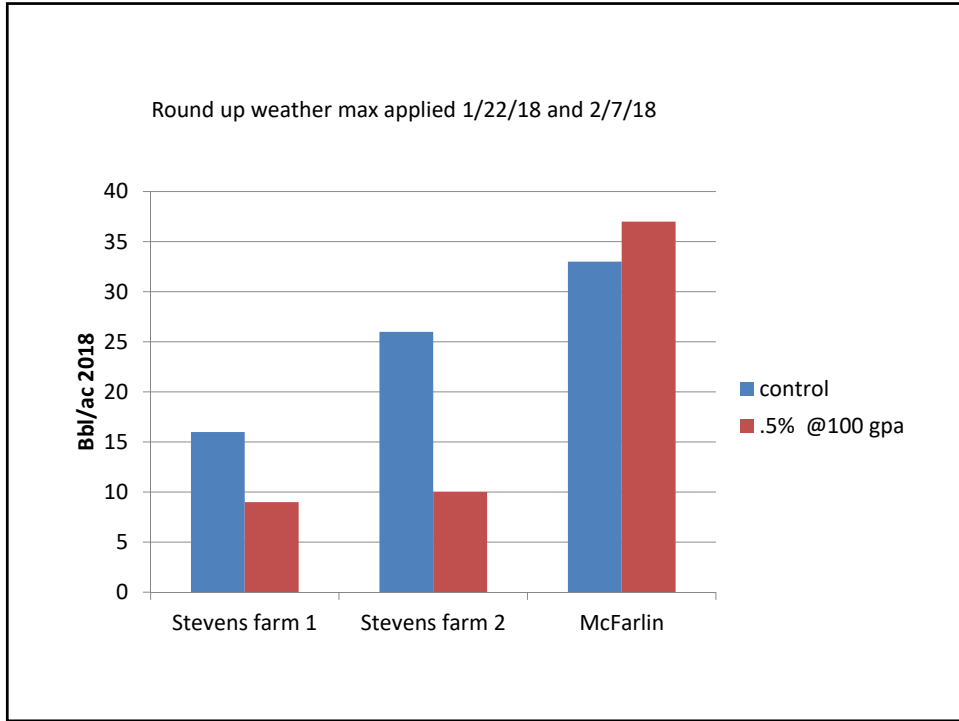
Post-Harvest Application in Cranberry Production
USE INSTRUCTIONS: In cranberry bogs, apply this product after cranberry vines are dormant with a handheld sprayer, @ 0.4- to 0.7% solution.

PRECAUTIONS: Contact of this product with desirable vegetation could result in damage or severe plant injury. Cranberry plants that are directly sprayed could be killed.

Useful or Bogus?

Does it damage cranberries?
It is useful for weed control?





Weeds control

Creeping blackberry) – moderate control, repeat annually for better control

Young Spruce – none

Sheep Sorrel – moderate early control, but control fades by mid-season

Lotus – good early suppression, but control fade by mid-season

Reedcanary grass – moderate early control, but control fades by mid-season

Slough sedge (cutgrass) – moderate to decent (depends on size)

Crop damage

Narrow window for acceptable treatment


Effects new growth and bloom, but cranberries recover OK.

Recommendations

- Acceptable if spot treating brambles or cutgrass on crappy vines
- Otherwise not worth the risk for the level of weed control obtained.


Wiping data Wisconsin for difficult to control tree/brush species

- Glyphosate (~30%):1 gallon in 2 gallon of water
- Nufarm 2,4-D (10 oz to above mix)
- Silicone surfactant (4 oz to above mix)
- Wipe in both directions



DEVRINOL[®]
2-XT
SELECTIVE HERBICIDE

For use on certain Nuts, Small Fruits, Vegetables and Tobacco

<p>ACTIVE INGREDIENT Clover (<i>Trifolium fimbriatum</i>) Aster (<i>Aster douglasii</i>) Silverweed Cinquefoil* (silverleaf) (<i>Potentilla anserina</i>) Red Sorrel (sheep sorrel) (<i>Rumex acetosella</i>) Birdsfoot Trefoil (<i>Lotus corniculatus</i>) *Suppression only</p>	<p>In Beds with Heavy Muck Soil: 18 quarts/A (9 lbs. a.i.)</p> <p>In Peat Beds: 12-18 quarts/A (6-9 lbs. a.i.)</p> <p>In Beds with Sandy Soils: 8-18 quarts/A (4-9 lbs. a.i.)</p>	<p>Apply DEVRINOL 2-XT before spring growth begins or through the overhead through sprinkler irrigation.</p> <p>In Beds with Heavy Muck Soil: Apply through the overhead through sprinkler irrigation.</p> <p>In Peat Beds: Apply through the overhead sprinkler system.</p> <p>In Beds with Sandy Soils: Apply through the sprinkler irrigation system.</p> <p>Restrictions: Do not apply in the spring to cranberry beds that do not have sprinkler systems for frost control. Do not apply more than 18 quarts DEVRINOL 2-XT acre per acre per year.</p>	
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Label also suggests beggarticks and nutsedge

Some other currently labelled product, that are not widely used, but worth considering

Poast[®]

Herbicide

For broad-spectrum, postemergence selective control of annual and perennial grass weeds in select crops and other use sites

Active Ingredient:
sethoxydim: 2-[1-(ethoxyimino)butyl]-5-[2-(ethylthio)propyl]-3-hydroxy-2-cyclohexen-1-one* 18.0%

Other Ingredients: 82.0%

Total: 100.0%

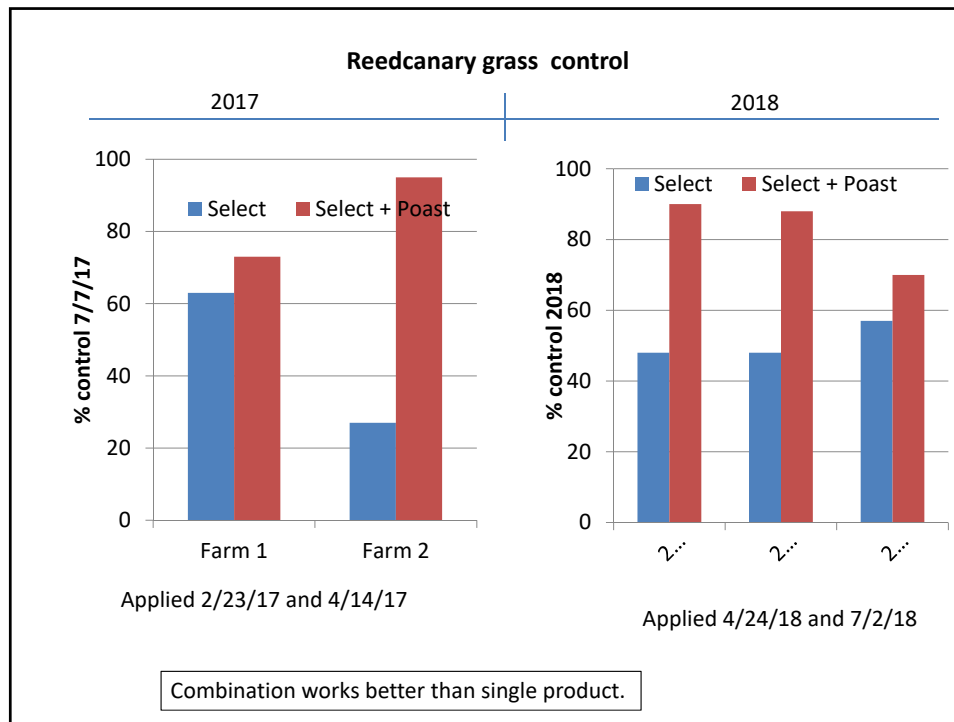
* Equivalent to 1.5 pounds of sethoxydim per gallon formulated as an emulsifiable concentrate
Contains petroleum distillate

EPA Reg. No. 7969-58

Group 1 Herbicide

+

clethodim herbicide – like Select or Centurion



Summary – Herbicides

- Chateau for moss control - future registration
- Chemigation of clethodim - very effective for control of some grasses. BC should seek special local need.
- Backpacking of dormant Roundup – mixed results, not overly impressive.
- Devrinol – worked well on Lotus
- Poast + Select – more effective for control of tough grasses.


Fungicides and Fruit rot

2018 studies on fungicide effects on fruit rot & yield

- Continued screening of different fungicides
- Comparison of different copper fungicides
- Do fungicide affect pollination and bee foraging



Lab studies		Inhibition of spore germination				
	Allantophomopsis	Colletotrichum	Physalospora	Fusicoccum	Phyllastucta	
Bravo	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
copper	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
Indar	Dark Green	Light Green	Light Green	Dark Green	Bright Green	
Proline	Dark Green	Dark Green	Bright Green	Dark Green	Bright Green	
Quadris Top	Dark Green	Dark Green	Bright Green	Dark Green	Dark Green	
Abound	Light Green	Light Green	Light Green	Light Green	Light Green	
		Inhibition of mycelial growth				
	Allantophomo..	Coleophoma	Colletotrichum	Physalospora	Fusicoccum	
Bravo	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
copper	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
Indar	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
Proline	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
Quadris Top	Dark Green	Dark Green	Dark Green	Dark Green	Dark Green	
Abound	Bright Green	Light Green	Light Green	Bright Green	Light Green	
From: Sarabaratnam et al. 2017		Highly effective	Dark Green			
		Moderately effective	Bright Green			
		Less effective	Light Green			



Active Ingredients:

Azoxystrobin*	19.8%
Difenoconazole**	19.8%
Other Ingredients	60.4%
Total:	100.0%

*CAS No. 131660-33-8
**CAS No. 119440-59-3

Quadris Top SBX is formulated as a suspension concentrate (SC) containing 1.88 lb of azoxystrobin active ingredient and 1.88 lb of difenoconazole active ingredient per gallon.

**KEEP OUT OF REACH OF CHILDREN.
WARNING/AVISO**

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See additional precautionary statements and directions for use inside booklet.

See First Aid statement inside booklet or on container label.

EPA Reg. No. 100-1554
EPA Est. 100-NE-001
SCP 1554A-L1B 0218
4091767

2.5 gallons
Net Contents

SUPPLEMENTAL LABELING

Syngenta Crop Protection, LLC
P. O. Box 18300
Greensboro, North Carolina 27419-8300
SCP 1313A-S10 0218

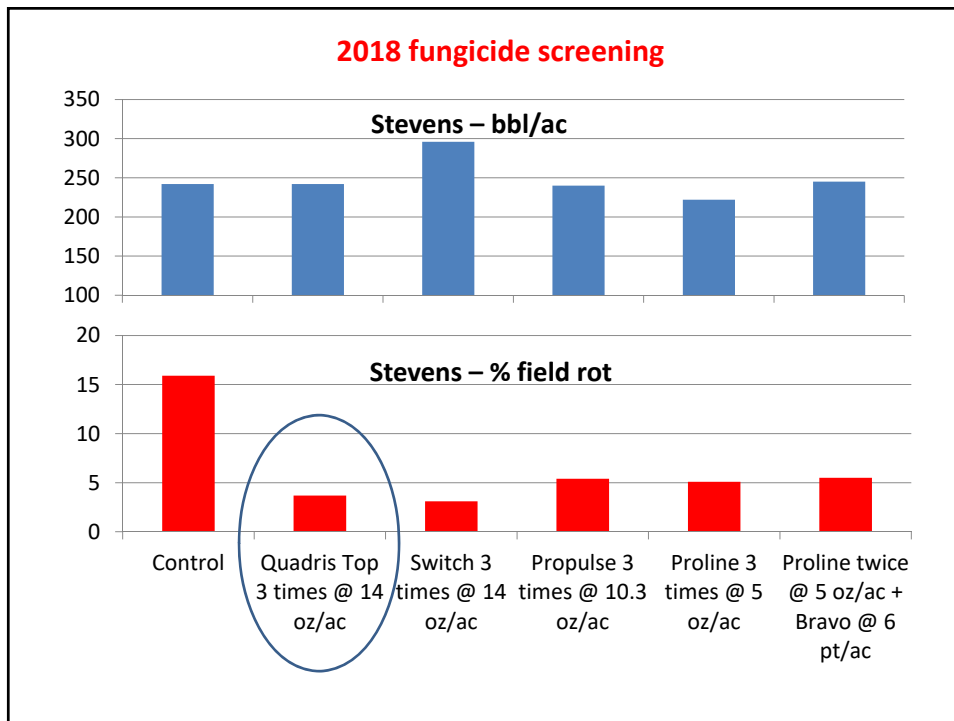
AZOXYSTROBIN	GROUP 11	FUNGICIDE
DIFENOCONAZOLE	GROUP 3	FUNGICIDE

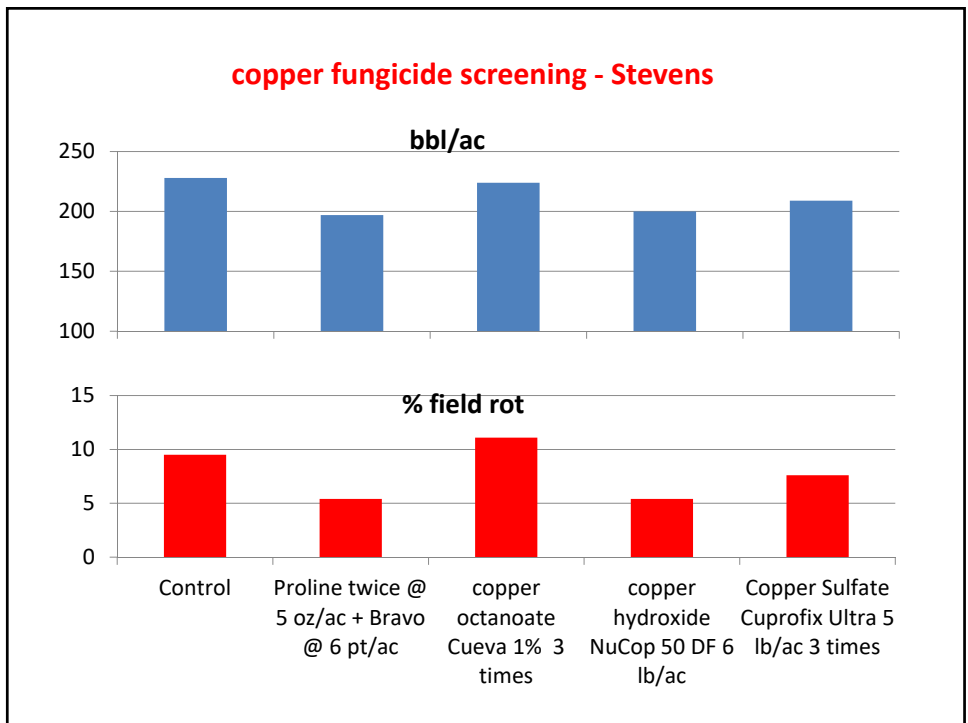
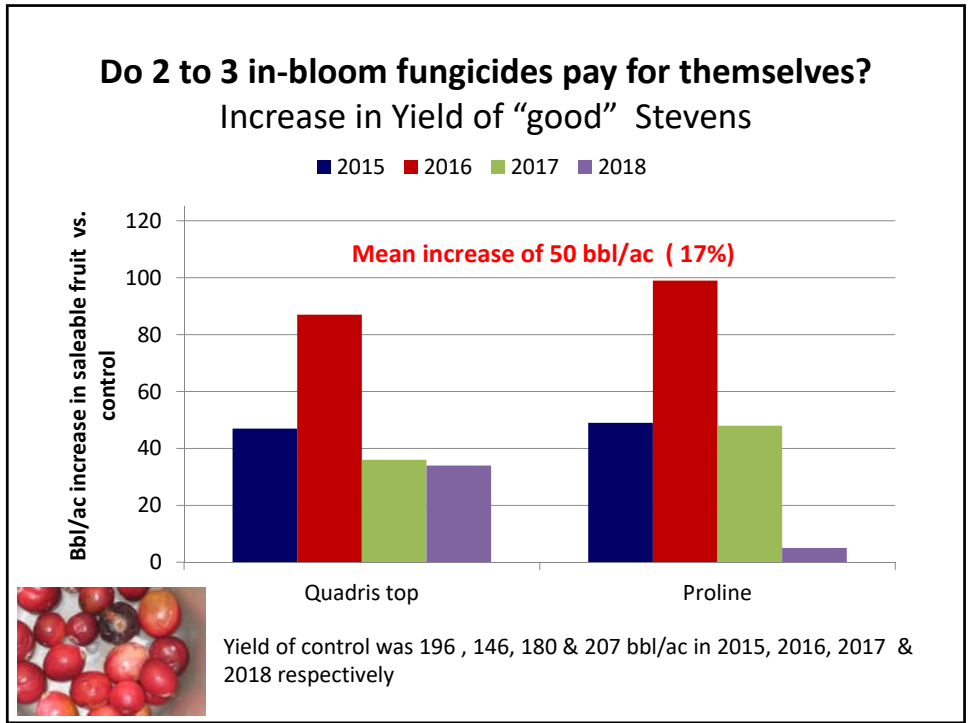
Quadris Top® Fungicide

DIRECTIONS FOR USE

Crop	Target Diseases	Use Rate fl oz product/A	Remarks
Cranberry	Bitter rot (Colletotrichum gloeosporioides)	10 – 14*	For best activity, apply Quadris Top Fungicide prior to or early in the disease development. An adjuvant may be added at specified rates. Apply on a 7-14 day interval. Do not apply more than two sequential applications before alternating to a fungicide with a different mode of action.
	Blotch rot (Phytophthora vasinaria)		
	Cottonball (Monilinia oxycocco)		
	Fruit Rots (Phytophthora vasinaria)		
	(Glomerella cingulata)		
	(Coleophoma empetri)		
	Leaf rust (Pucciniastrum vacciniae)		
	Lophodermium Twig Blight (Lophodermium spp.)		
	Ripe rot (Coleophoma empetri)		
	*10-14 fl oz product/A contains 0.082-0.115 lb difenoconazole/A and 0.131-0.183 lb azoxystrobin/A.		

How good a fungicide is it for cranberry fruit rot?

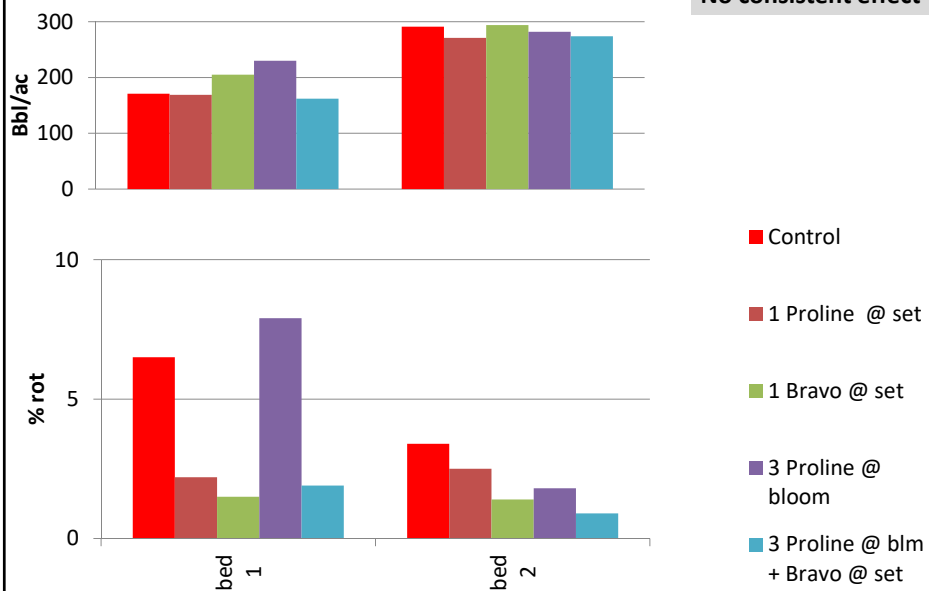


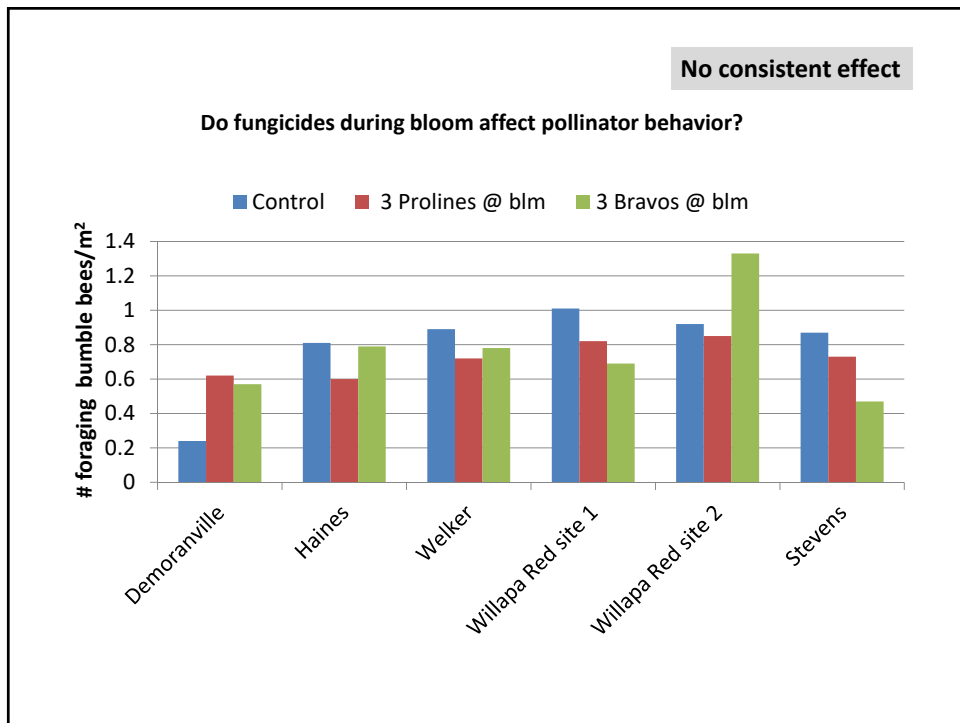
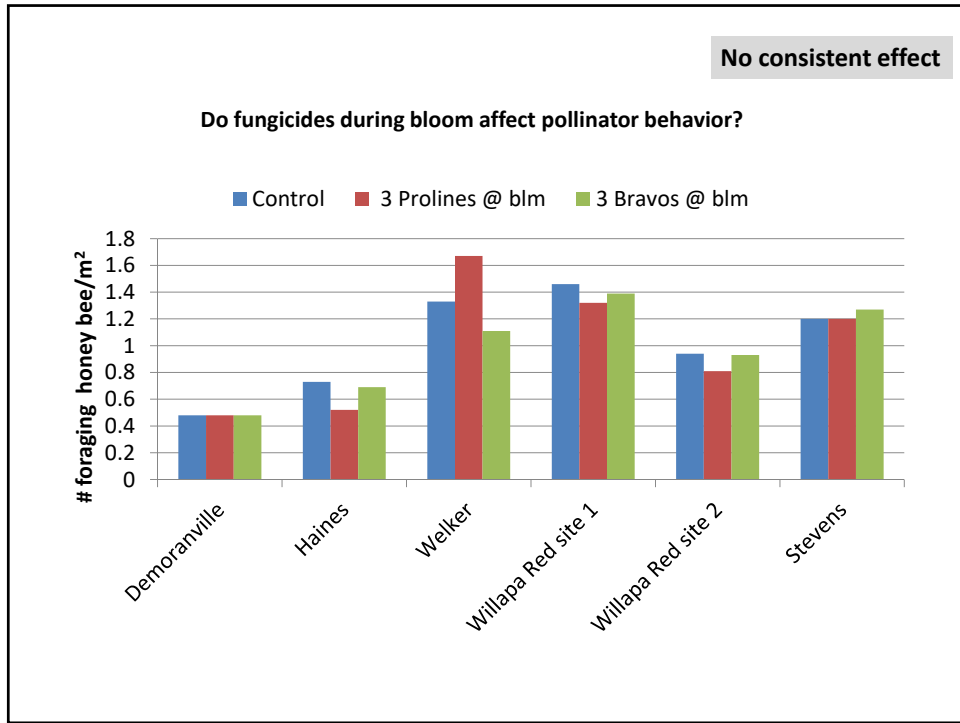


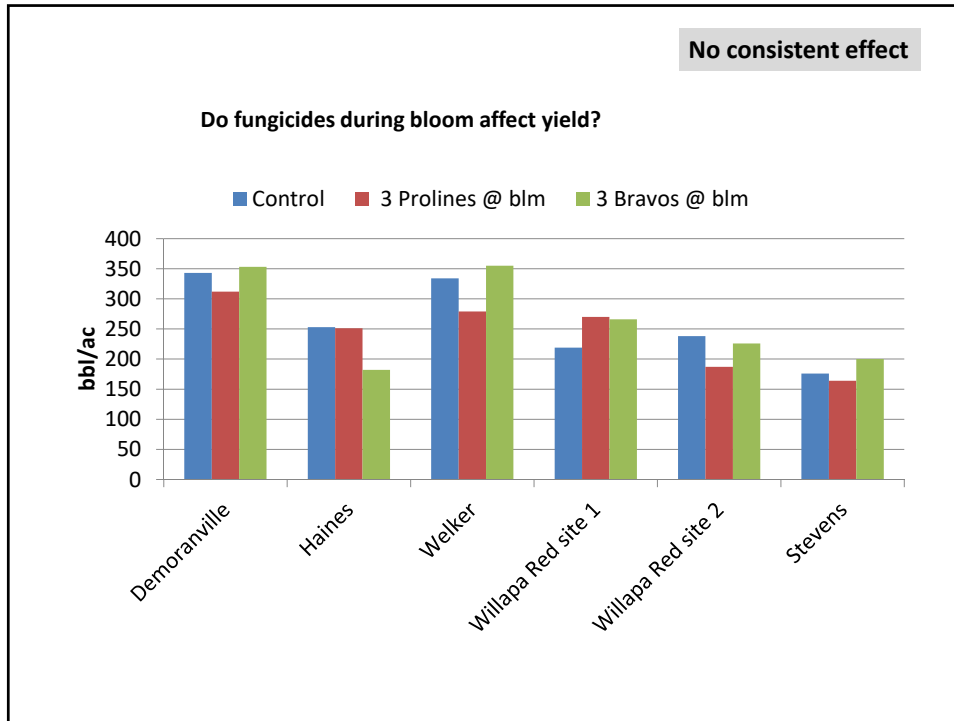
Different Fungicide Combinations

Treatment	10 -20% Bloom	40 - 60 % bloom	70 – 80 % bloom	Fruit Set
control				
1	Proline	Proline	Proline	
2	Proline	Proline	Proline	Bravo
3				Bravo
4				Proline

**Fungicide screening
Willapa Red**







In the future -resistance management without Bravo

Trade Name	Active ingredient	FRAC
Kocide	copper	M
Indar	fenbuconazole	3
Abound	azoxystrobin	11
Proline	prothioconazole	3
Quadris Top	azoxystrobin + difenoconazole	11 & 3
QuiltXcel	azoxystrobin + propiconazole	11 & 3

Rotate your fungicide FRAC

Summary - Fungicide screening

- Quadris Top – very effective for field rot
- Quadris Top or Proline during bloom may significantly increase marketable yield in years with high rot.
- No exciting results from field trials of different copper formulations on fruit rot.
- No deleterious effects of fungicides on honey bee or bumble foraging behavior
- Resistance management!

Questions



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Acknowledgements

This project was funded in part by Agriculture and Agri-Food Canada and the Government of British Columbia through programs delivered by the Investment Agriculture Foundation of B.C.

Agriculture and Agri-Food Canada, the Government of British Columbia and the Investment Agriculture Foundation of BC, are pleased to participate in the delivery of this project. We are committed to working with our industry partners to address issues of importance to the agriculture and agri-food industry in British Columbia. Opinions expressed in this presentation are those of the researchers and not necessarily those of the Investment Agriculture Foundation, the Government of British Columbia or Agriculture and Agri-Food Canada.

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