

World Class. Face to Face.

# **Oregon Cranberry School 2019**

### Funding for research provided by :

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



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### WSU Pesticide Policy

"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."

- Agenda
  - Insects
  - Fruit Rot
  - Variety trial results

# Insects

# Tipworm







Bayer CropScience LP P.O. Box 12014 2 T.W. Alexander Drive Ressearch Triangle Park, North Carolina 27709 1-866-998 AYE R (1-866-992-2937)

#### MOVENTO

#### EPA Reg. No. 264-1050

For Use On: Bushberry; Carrot; Stone Fruits; Sugar Beet, Tree Nuts

This supplemental label expires on 06/26/2020 and must not be used or distributed after this date. Supplemental Label

KEEP OUT OF REACH OF CHILDREN CAUTION

#### DIRECTIONS FOR USE

It is a violation of Federal lawto use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirements specific to your state or Tribe, consult the agency responsible for pesticide regulation. Read this label and the product package label before using this product. This Supplemental Label must be in the possession of the user at the time of pesticide application. Followall applicable directions, restrictions, Worker Protection Standard requirements, and precautions on the product label for MOVENTO® attached to the container.

#### BUSHBERRY SUBGROUP LOW GROWING BERRY SUBGROUP

Crops of Crop Subgroups 13:078 and 13:07H including: Aronia berry, Bearberry, Bilberry, Blueberry (highbush and lowbush), Chilean guava, Cloudberry, Cranberry, Currant (black, buffalo, native, and red), Elderberry, European barberry, Gooseberry, Edible honeysuckle, Jostaberry, Juneberry, Munthies, Lingonberry, Partridgeberry, Salal, Sea buckthorn, and cultivars, varieties, and/or hybrids of these.

Peets Controlled	Produc	t Rate
Anbide	(fl.oz(A)	(Ib si(A)
Bluebern: Gall Midde	(1 02A)	(10 0//A)
Crapherov Timeorm	80.100	0.13.0.16
Thrips (larvae)	0.0-10.0	0.10.10.10
Pests Suppressed	Produc	t Rate
Blueberry Maggot	(fl oz/A)	(Ibai/A)
Leafhoppers		
Foliar Application Restrictions:		
Pre-Harvest Interval (PHI): 7 days		\ \
Minimum interval between applications: 7 day		
Maximum MOVENTO allowed per calendar ye	BAYER	
nviaximum spirotetriamat per crop season: 0.47		
bo not apply until alter petal rail		
		l l l l l l l l l l l l l l l l l l l
Net Cont	ents:	
1 OT (32	FL. 0Z.)	
		GROUP 28 INSECTICIDE
		1-6
For Agric	cultural Use Univ: For contro	01 01
listed in	acts on cortain tree tropic	al
nsteu ms		ai
fruits, vi	ne, and vegetable crops	
	j. j. interciper	
		MOV/ENTO is a
@0017 D	CronColonce	WOVEINTO IS a
©ZU17 Bayer	UropScience	registered trademark of Baver
-		, ,

### Movento

- Pros
  - Good efficacy
- Cons
  - ~\$60/ac
- Uncertainties
  - No chemigation label yet (or anytime in 2019)
  - How many application do you need?
  - Best timing

## RESTRICTED USE PESTICIDE Toxic to fish and aquatic organisms

For retail sale to and use only by certified applicators or persons under their direct supervision and only for the uses covered by the certified applicator's certification.

## Fanfare<sup>®</sup> ES

#### INSECTICIDE/MITICIDE

ACTIVE INGREDIENT.

% BY WT

ACTIVE INOREDIENT.	/0 DI WI.
Bifenthrin: (2 methyl[1,1'-biphenyl]-3-yl)methyl	
3- (2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimeth	yl-
cyclopropanecarboxylate*	22.6%
OTHER INGREDIENTS:	<u>77.4%</u>
TOTAL:	100.0%
*Cis isomers 97% minimum, trans isomers 3% max	timum.
Fanfare ES is a suspension concentrate insecticide	containing

2 pounds of bifenthrin per gallon EPA Reg. No. 66222-236 EPA Est. No. 37429-GA-001BT; 37429-GA-002BO

Letter(s) in lot number correspond(s) to superscript in EPA Est. No.

#### 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).

For First Aid, Precautionary Statements, and Directions for Use, see inside of this booklet.

How can we help? 1-866-406-6262

### Not labelled yet!



GROUP 3 INSECTICIDE

INSECTICIDE/ MITICIDE

ADAMA

**FSSENTIALS** 

### Fanfare

Pros

۲

- Good efficacy early generation(s) ۲
- ~\$5/ac ۲
- Also control BHFW & BVW ۲

### Cons

- 2-3 application required ٠
- **Restricted Use** ۲
- Pre-bloom only ٠

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OTHER INGREDIENTS:
TOTAL:
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INSECTICIDE/ MITICIDE



- Uncertainties
  - Will we get a label in time? Likely not
  - Will Movento also be required? maybe
  - Chemigation on the label? unknown
  - # applications/yr? unknown
  - Last date of application? unknown

### **RESTRICTED USE PESTICIDE**

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ACTIVE INGREDIENT

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	/• D1 11 11
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3-(2-chloro-3,3,3-trifluoro-1-propenyl)-2,2-dimethy	yl-
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EPA Est. No. 37429-GA-001<sup>BT</sup>; 37429-GA-002<sup>BO</sup> Letter(s) in lot number correspond(s) to superscript in EPA Est. No.

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GROUP 3 INSECTICIDE

INSECTICIDE/ MITICIDE



### Fanfare

Pros

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- Good efficacy early generation(s)
- ~\$5/ac
- Also control BHFW & BVW

### Cons

- 2-3 application required
- Restricted Use
- Pre-bloom only
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Bifenthrin – EPA has statutory completion date of March 25, 2019. We will find out if it available then, but with the shutdown I am dubious. Does mid-May bifenthrin provide persistent control of tipworm?

Small plots within 4 farms severely infested with TW were treated May 15 and May 24.

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

■ control ■ Fanfare (5/15 & 5/24)



■ control ■ Fanfare (5/15 & 5/24)





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

- 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? Likely
  - Do you still need Movento? Maybe, but you will need to monitor for TW in July.
  - At \$5/ac why wouldn't you spray? Resistance management and pollinator protection









Blackvine Weevil control with Fanfare

Bifenthrin is extremely effective against BVW adults

- But it can not be used during bloom for newly emerged adults
- May timing will help kill overwintering adults
- July timing not recommended due to resistance management issues and potential to effect any residual pollinators in the field

# Movento

- Doesn't kill
  - Fireworm
  - Girdler
  - Fruitworm
  - Weevil (adult or larvae)
  - Beneficial insects (predator wasp)
- Does kill
  - Tipworm
  - Aphids
  - Some scales
- May impact
  - Honeybees

# Fanfare

- Doesn't kill
  - Weevil -larvae
- Does kill
  - Tipworm
  - Fireworm/Fruitworm
  - Weevil adults
  - Bees
  - Aquatic insects
  - Beneficial insects

# Fanfare: inexpensive and effective- what could possibility go wrong?

# Fanfare: inexpensive and effective- what could possibility go wrong?

- Resistance
- Water quality
- Native Pollinators
- Native insect parasitoids



## **Fungicides and Fruit rot**



# The newer cranberry fungicide

Trade Name	Active ingredient	FRAC group(s)
Indar	<u>fenbu</u> conazole	3
Abound	azoxystrobin	11
Proline	prothioconazole	3
Quadris Top	azoxystrobin + <u>difeno</u> conazole	11 & 3
QuiltXcel	azoxystrobin + propiconazole	11 & 3

#### SUPPLEMENTAL LABELING

DIRECTIONS FOR USE



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

Fungicide

#### Quadris Top® Fungicide

### syngenta.

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

\*CAS No. 131860-33-8 \*\*CAS No. 119446-68-3

Quadris Top SBX is formulated as a suspension concentrate (SC) containing 1.88 lb of acoxystrobin 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

			-	
			Use Rate	
			floz	
	Сгор	Target Diseases	product/A	Remarks
	Cranberry	Bitter rot	10 – 14*	For best activity, apply Quadris Top
		(Colletotrichum		Fungicide prior to or early in the disease
		gloeosporioides)		development. An adjuvant may be added
		Blotch rot		at specified rates. Apply on a 7-14 day
		(Physalospora		interval.
		vaccinia)		
		Cottonball		Do not apply more than two sequential
		(Monilinia oxycocci)		applications before alternating to a
		Fruit Rots		fungicide with a different mode of action.
		(Physalospora		5
		vaccinia)		
		(Glomerella		
		cingulata)		
		(Coleophoma		
1 A A A A A A A A A A A A A A A A A A A		empetri)		
		Leafrust		
		(Pucciniastrum		
		vaccinii)		
		Lophodermium Twig		
		Blight		
		(Lophodermium		
		(20phodornian		
		Ripe rot		
6		(Coleophoma		
		empetri)		
	*10-14 fl oz pro	oduct/A contains 0 082-0	0 115 lb difen	oconazole/A and 0 131-0 183 lb
	azovystrobin/A	Succer Contains 0.002-		0001a20107 ( and 0. 101-0. 100 lb
	azonyou opinin	1. ·		

## Inhibition of spore germination

	Allantophomopsis	Colletotrichum	Physalospora	Fusicoccum	Phyllastucta
Bravo					
copper					
Indar					
Proline					
Quadris Top					
Abound					

### Inhibition of mycelial growth

	Allanto	phomo	Coleophoma	Colletotrichum	Physalospora	Fusicoccum
Bravo						
copper						
Indar						
Proline						
Quadris Top						
Abound						
From		Highly e	effective			
Sarabaratnam		Modera	ately effective			
et al. 2017		Less eff	ective			

## 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

## 2018 fungicide screening



## Do 2 to 3 in-bloom fungicides pay for themselves?

Increase in Yield of "good" Stevens

■ 2015 **■** 2016 **■** 2017 **■** 2018



Yield of control was 196 , 146, 180 & 207 bbl/ac in 2015, 2016, 2017 & 2018 respectively

### **copper fungicide screening - Stevens**



### **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	Bravo	Bravo	
4	Bravo	Bravo	Bravo	Proline
5				Bravo
6				Proline

## Fungicide screening Willapa Red



### Do fungicides during bloom affect pollinator behavior?



### Do fungicides during bloom affect pollinator behavior?



### Do fungicides during bloom affect yield?



## **Summary - Fungicide screening**

- New fungicide are very effective
- Use of Quadris Top or Proline during bloom may increase marketable yield in years with high rot. Averaged over time ~ 17% increase in yield over no fungicides.
- No deleterious effects of any of the fungicides applied during bloom on yield.
- Didn't see any deleterious or positive effects of fungicides on honey bee or bumble foraging behavior

# Changes in fungicide status

## Fungici**des**

Domestic use only, MRL in EU for azoxystrobin but not difenconazole. Check with handler.

Prop 65 in Calif, and No MRL in EU after 2020. Check handler for restrictions. This will be a big deal for 2019.

Product under review could have MRL issues in Canada and EU in 2020, don't over-stock.



# Resistance management without Bravo

Trade Name	Active ingredient	FRAC
Dithane/ Mancozide	mancozeb	М
Kocide	copper	Μ
Indar	<u>fenbu</u> conazole	3
Abound	azoxystrobin	11
Proline	<u>prothio</u> conazole	3
Quadris Top	azoxystrobin + <u>difeno</u> conazole	11 & 3
QuiltXcel	azoxystrobin + <u>propi</u> conazole	11 & 3

Rotate your FRAC, last application should be with a broad-spectrum fungicide (FRAC M)



### Washington



### Washington

### Five year mean - Total bbl/ac





Five year mean - % Storage rot



Oregon

bbl/ac



### **Oregon - Mean 8 years - Total bbl/ac**





# Take home Message

- Adjustment to nutrition, pest management, and irrigation will make 'incremental' increases in yield (10 to 50 bbl/acre)
- Changing out old varieties with high yield Hybrid will make 'step' increases in yield (100 to 400 bbl/ac)
- It has been until the 'Norm Borlaug and Green Revolution' that agriculture has opportunity to make 'step' increases in production.

# What would I plant?

Based on overall data from Oregon, Washington, BC plots and grower beds:

- Most confident
  - Mullica Queen: best of Rutgers' early releases
  - Welker: best of Rutgers' later releases
  - Pilgrim: = to Rutgers' best
- Very promising
  - CNJ 99-9-25: best of potential new releases, but no grower bed data
  - 98-11: good data, no grower data.
  - BG's: no Oregon data, good production, but rot concerns

## **Top tier - processed**

Selections	Pros	Cons
Pilgrim	400+ bbl/ac, no patent \$, low color good for OS	Finding enough 'true' Pilgrim
Welker	400 + bbl/a	\$ for vines, Too dark, hi rot if picked too late
Mullica Q	Excellent track record, 350 to 400 + bbl/a, low rot, vines available	\$ for vine, Too dark
BG's	300 to 400 bbl/a, size	Hi rot, \$ for vines, limited production data
G1	200 to 300 + bbl/a vine availability, good track record in WA, not OR or BC	Production good, but not top tier
99-9-25	400+ bbl/a, hands down best looking of all in BC, average in OR & WA	Limited production data, not released yet, \$\$

# Questions

![](_page_47_Picture_1.jpeg)

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