BLUEBERRY (*Vaccinium corymbosum* 'Bluetta')
Ripe Rot (Anthracnose); *Colletotrichum* sp.
Botrytis Blight; *Botrytis* sp.
Mummyberry; *Monilinia vaccinii-corymbosi*

J. W. Pscheidt and John P. Bassinette
Dept. of Botany and Plant Pathology
Oregon State University
Corvallis, OR 97331-2903

Fungicide control of blueberry diseases, 2005.

Fungicide treatments were arranged in a randomized complete block design in a block of 'Bluetta' blueberries planted in 1999 on 5 x 10 ft spacing. Each treatment consisted of 6 single bush replicates. Fungicide treatments were applied using a hydraulic handgun sprayer at approximately 150 psi at a rate of 109 to 290 gal water/A, depending on the amount of foliage present on bushes at time of application. Approximately 0.75 to 2.0 gal of a spray suspension were applied per 6 bushes. Treatments were applied on 7 Mar (Floral bud break), 23 Mar (early bloom), 5 Apr (full bloom), 20 Apr (late bloom), 7 May (post bloom), 20 May (green berry), 2 Jun and 15 Jun. A low rate of Funginex (12 fl oz/100 gal) was used on 20 Apr and 7 May but was then discontinued as it was not registered for use past bloom. Each fungicide treated bush was flanked on each side by nontreated bushes. Weeds were controlled using Roundup ULTRAMAX (2 qt/A) applied in the plant row on 18 Mar and Rely (3 qt/A) on 9 Jun. Bushes were pruned on 2 to 3 Feb by thinning out small and spindly shoots and removing older non-productive stems. Plots were fertilized on 31 Mar and 10 Jun with approximately 200 lb/A (based on in the bush row area) of Triple 16 (16-16-16-8). Due to extremely dry spring conditions, plants were overhead irrigated on 15 Mar and 27 Mar for 3 hours each to encourage apothecial development. Summer irrigation began on 3 Jun and was applied 2 times per week during the growing season. Cuprofix Disperss (8 lb/A) was applied on 11 Nov 04 (50% leaf drop) to help prevent bacterial blight. Nets were placed over bushes on 10 Jun to reduce bird damage prior to harvest. Evaluation of spring diseases was difficult due to weather favorable for a variety of pathogens at the same time. *Botrytis*, Mummyberry and ripe rot were all active and can cause floral blights and shoot diebacks. *Pseudomonas* infections may also have been a complicating factor but was never formally identified. Evaluations were based on symptoms and do not necessarily separate one disease from another. The number of blighted floral clusters was evaluated on 25 Apr by arbitrarily selecting and evaluating 100 floral clusters per bush. Shoot tip diebacks that cause flower trusses to collapse were evaluated separately on 23 May by arbitrarily selecting and evaluating 50 shoots per bush. The number of vegetative shoots per plant with symptoms of primary mummyberry was evaluated on 27 Apr. On 28 Jun, 100 healthy appearing berries were harvested from each Bluetta plant. Berries were weighed and placed on wire racks within moist chambers located in Cordley Hall. Each moist chamber contained two arbitrarily selected treatments separated by a wire mesh (200 berries or 100 berries per treatment). Berries were incubated at room temperature for 9 days. The number of berries with symptoms of ripe rot or *Botrytis* fruit rot were evaluated and removed each day. Berries rotting from other causes were noted and also removed from the moist chambers daily.

The early spring season through early bloom was characterized as extremely dry with below average rainfall, however, above average rainfall occurred from mid-Mar through Jun. Mummyberry disease pressure was considered low while *Botrytis* and anthracnose were considered high. Ripe rot, normally a post harvest disease, was observed in the field at harvest. Bushes treated with fungicides had significantly less floral blight than nontreated bushes except for bushes treated with Lime Sulfur or Serenade (Table 1). Pristine treated bushes had the lowest floral blight but bushes treated with CaptEvate, the high rate of V-10116, Scala or Kocide were not significantly different. Phytotoxicity was observed on 1 Apr on bushes treated with Pristine plus a high, 1% rate of Silwet L-77, which resulted in flowers with a necrotic vascular system. The rate of Silwet was reduced to the labeled rate of 0.01% and no other phytotoxicity problems were observed. There were no significant differences among any treatments with respect to shoots infected with the primary phase of mummyberry. Very few bushes treated with various fungicides had significantly less shoot tip diebacks than nontreated bushes. Pristine treated bushes had significantly less shoot tip diebacks than bushes treated with any other fungicide. CaptEvate treated bushes also had a low shoot tip dieback count but bushes treated with the high rate of V-10116 or Scala were not significantly different. Some leaf burning was observed on lime sulfur treated bushes on 6 Jun ten days after an abrupt period of hot weather.

At harvest, there were no significant differences among any treatments with respect to berry weight (Table 2). After harvest, berries from nontreated bushes developed ripe rot rapidly. The number of berries that developed ripe rot from bushes treated with Indar, Funginex, Scala, or Serenade was not significantly different than the number from nontreated bushes. Lowest number of berries with ripe rot were from bushes treated with Abound alternated with Captan, however, the number of berries from bushes treated with CaptEvate, the middle and high rate of V-10116 or

Pristine were not significantly different. The number of berries with *Botrytis* rot was influenced by the large amount of ripe rot present. Kocide treated bushes had significantly more berries with *Botrytis* than nontreated bushes. Most all other fungicide treatments resulted in a similar number of berries with *Botrytis* rot as nontreated bushes. The total number of all rots was also influenced by the amount of ripe rot. The lowest number of rots was from bushes treated with Abound alternated with Captan, however, the number of berries from bushes treated with CaptEvate, the high rate of V-10116 or Pristine were not significantly different.

Major conclusions are hampered by higher than target chemical rates. Lime Sulfur and Serenade gave poor control of several diseases and do not seem to be an especially useful products in this cropping system. Kocide had some activity on floral blight and ripe rot but did a poor job overall. Although Pristine did well on many diseases the higher than label rates make this data misleading.

Note: Blueberry Shock Virus was confirmed in 2004 on one bush. All bushes were sampled this year at bud break (end of Feb) for the virus. Three bushes were confirmed positive for the virus. This will continue to be a problem for the next few growing seasons as the virus spreads to other plants.

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Table 1. Spring disease ratings for Bluetta.

Treatment & Rate/100 gal [z]	Time of Application [x]	Floral Blight [y] (%)	Primary Mummyberry Shoots/plant [y]	Shoot Tip Dieback [y] (%)
Nontreated ……..	None…….	26.3 a	1.5	64.7 a
Bravo Weatherstik at 32 fl oz then	A			
Indar 75 WSP at 2 oz plus				
Latron B1956 at 1 fl oz then ……..	B			
Abound at 6.2 fl oz alternate……	C, E, G			
Captan 80WDG at 2 lb/A plus				
Latron B1956 at 1 fl oz …….	D, F, H……..	8.5 cdef	1.8	43.7 bcd
Indar 75WP at 2oz plus				
Latron B1956 at 1 fl oz …….	All	13.3 cd	1.0	57.3 ab
Orbit EC at 6 fl oz ....……..……	All	14.7 bc	1.2	49.7 abcd
Funginex EC at 24 fl oz then ……..	A, B, C			
Funginex EC at 12 fl oz	D, E…….	13.3 cd	1.3	49.7 abcd
CaptEvate 68WDG at 4.7 lb……	All	4.3 fg	1.7	28.3 e
V-10116 at 1.75 oz .....……..……...	All	12.8 cde	2.2	45.7 bcd
V-10116 at 2.5 oz .....……...	All	11.2 cdef	1.5	52.3 abc
V-10116 at 3.5 oz .....……	All	6.7 defg	1.7	36.7 de
Pristine 38EG at 18.5 oz plus				
Silwet L-77 at 0.13 fl oz .....……	All	0.3 g	1.2	11.0 f
Bravo Weatherstik at 32 fl oz then	A			
Indar 75 WSP at 2 oz plus				
Latron B1956 at 1 fl oz then	B			
Scala 60SC at 18 fl oz.....	C, D, E, F, G, H.	6.2 efg	1.7	37.3 cde
Kocide 2000 at 5lb……	All	6.5 defg	1.7	50.0 abcd
Lime Sulfur EC (29%) at 2 gal…	All	21.2 ab	0.8	57.0 ab
Serenade SC at 2 gal……	All	22.7 a	0.7	64.3 a

[x] A= 7 Mar (Floral bud break), B = 23 Mar (early bloom), C = 5 Apr (full bloom), D = 20 Apr (late bloom), E = 7 May (post bloom), F = 20 May (green berry), G = 2 Jun and H = 15 Jun. Treatments of Funginex were not applied past 7 May as it was not registered for use past bloom.

[y] Means followed by same letter do not differ significantly based on Fisher's protected LSD (P=0.05). Means without letters were not significantly different.

[z] Original target application rate was to be 100 gal water solution/A for all treatments. Higher per gal rates resulted in higher per A rates than target for all chemical applications. Rates of water used were 109 gal/A (1st application), 218 gal/A (next three applications), 290 gal/A (next two applications), and 218 gal/A on all subsequent applications. Due to how the trial was implemented and growth of plants we suspect actual water rates may have been slightly lower than shown.

Table 2. Post harvest disease ratings for Bluetta.

Treatment & Rate/100 gal [w]	Time of Application [x]	Berry Weight 100 Fruit (Grams)	Ripe Rot (Anthracnose)[y] (%)	Botrytis Rot [y] (%)	All Fruit Rot [y z] (%)
Nontreated ……..	None…….	152	88.8 a	10.3 bc	98.3 a
Bravo Weatherstik at 32 fl oz then	A				
Indar 75 WSP at 2 oz plus					
Latron B1956 at 1 fl oz then ……..	B				
Abound at 6.2 fl oz alternate……	C, E, G				
Captan 80WDG at 2 lb plus					
Latron B1956 at 1 fl oz …….	D, F, H….	154	3.8 h	9.3 bc	14.8 d
Indar 75WP at 2oz plus					
Latron B1956 at 1 fl oz …….	All	163	66.2 abcd	19.2 abc	88.5 ab
Orbit EC at 6 fl oz .....……	All	159	45.8 cdef	20.7 ab	69.7 bc
Funginex EC at 24 fl oz then ……..	A, B, C				
Funginex EC at 12 fl oz	D, E	164	61.3 abcd	15.0 abc	83.3 ab
CaptEvate 68WDG at 4.7 lb……	All	167	12.3 gh	9.0 bc	21.7 d
V-10116 at 1.75 oz .....……...	All	165	49.2 cdef	22.2 ab	74.8 bc
V-10116 at 2.5 oz .....……...	All	150	20.2 fgh	25.2 a	58.7 c
V-10116 at 3.5 oz .....……	All	158	16.3 gh	14.2 abc	34.7 d
Pristine 38EG at 18.5 oz plus					
Silwet L-77 at 0.13 fl oz.....……	All	159	26.8 efgh	5.5 c	30.0 d
Bravo Weatherstik at 32 fl oz then	A				
Indar 75 WSP at 2 oz plus					
Latron B1956 at 1 fl oz then	B				
Scala 60SC at 18 fl oz.....	C, D, E, F, G, H	162	80.8 ab	5.7 c	87.7 ab
Kocide 2000 at 5lb……	All	162	37.3 defg	27.0 a	78.5 abc
Lime Sulfur EC (29%) at 2 gal…	All	174	54.5 bcde	20.7 ab	82.5 ab
Serenade SC at 2 gal……	All	157	67.5 abc	10.0 bc	77.2 abc

[w] Original target application rate was to be 100 gal water solution/A for all treatments. Higher per gal rates resulted in higher per A rates than target for all chemical applications. Rates of water used were 109 gal/A (1st application), 218 gal/A (next three applications), 290 gal/A (next two applications), and 218 gal/A on all subsequent applications. Due to how the trial was implemented and growth of plants we suspect actual water rates may have been slightly lower than shown.

[x] A= 7 Mar (50% floral bud break), B = 23 Mar (early bloom), C = 5 Apr (full bloom), D = 20 Apr (late bloom), E = 7 May (post bloom), F = 20 May (green berry), G = 2 Jun and H = 15 Jun. Funginex was not applied past 7 May as it was not registered for use past bloom.

[y] Means followed by same letter do not differ significantly based on Fisher's protected LSD (P=0.05). Means without letters were not significantly different.

[z] Data includes fruit rots due to both *Botrytis* and anthracnose as well as other unidentified fungi.