

PEACH (*Prunus persica* 'Redhaven')  
Leaf curl; *Taphrina deformans*  
Scab; *Cladosporium carpophilum*  
Brown rot; *Monilinia fructicola*  
Leaf injury/defoliation

K. S. Yoder, A. E. Cochran II, W. S. Royston, Jr.,  
S. W. Kilmer, A. L. Kowalski  
Virginia Tech Ag. Research & Extension Center  
595 Laurel Grove Road  
Winchester, VA 22602

### **Disease control and phytotoxicity by treatments applied to Redhaven peach, 2017.**

Eleven treatments involving experimental and registered materials were compared to standard programs for broad-spectrum disease control on 6-yr-old trees. Test trees had been non-treated border trees in 2016 to allow the buildup of leaf curl and scab inoculum for the test in 2017. The test was set up in a randomized block design with four replications with non-treated in-row border trees between the test trees. Dilute treatments were applied to the point of run-off (approximately 200 gal/A) with a single nozzle handgun at 200-250 psi as follows: 24 Feb (BS, bud swell, trts #1 and 3-9 only); 9 Mar (pink, all trts); 30 Mar (full bloom); 11 Apr (PF, petal fall); 27 Apr (SS, shuck split); 10 May (1st cover); 24 May (2nd cover); 15 Jun (3rd cover); 28 Jun (15PH, 15 day pre-harvest); 10 Jul (3PH, 3 day pre-harvest). Actual harvest date was 13 Jul. Percentage of terminal buds infected with leaf curl were rated on 25 shoot tips per tree 24 Apr. Defoliation was rated on ten shoots per tree on 5 Jun. Commercial insecticides were applied to the entire test block at 1-2 week intervals with a commercial airblast sprayer. Samples of 40 apparently rot-free fruit per replicate tree were harvested 13 Jul, and rated for scab. Fruit were selected for uniform ripeness and placed on fiber trays. One set of 20 fruit was misted with de-ionized water, and another subsample was inoculated with a suspension containing 30,000 *M. fructicola* conidia/ml. All fruit were incubated in polyethylene bags at ambient temperatures 76-82°F (24-28°C) before rating rot development at the indicated intervals.

Early season rains favored heavy leaf curl infection. Bravo (Trt #1), showed the importance of the bud swell application 24 Feb, before extended wetting events 28 Feb and 6-8 Mar as compared to Trt #2, which was delayed until 9 Mar (pink). OSO and copper treatments (Trts #4-9), also applied at bud swell 24 Feb, gave significant control of leaf curl, but were less effective than Bravo (Table 1). Microthiol Disperss Sulfur (#3) and Captan (#11), applied at pink 9 Mar, gave good leaf curl suppression. In late spring, it became apparent that some treatments were causing shothole injury and defoliation of older leaves on the shoots, and this was confirmed by ratings conducted 5 Jun. Treatments #6-9 had similar amounts of injury, and rating of fruit from treatments #6-8 also had injury on fruit at harvest. (Treatment #9 did not have enough fruit to rate for injury after harvest). Some of the defoliation appeared to be related to leaf curl infection, as indicated by #1, which had good leaf curl control and minimal defoliation compared to non-treated trees. Following the shuck split application 27 Apr, seven infection periods resulted in heavy scab pressure prior to the second cover spray 24 May. Twenty to 28% of the fruit were infected on the best treatments, and better control is noted in lesions per fruit rather than incidence. The Bravo/sulfur, Captan/sulfur, and Pristine/sulfur treatments resulted in the fewest scab lesions. Brown rot pressure was moderately heavy on non-inoculated fruit (Table 2), and inoculation increased incidence on non-treated fruits and on weaker treatments (Table 3). *It should be noted that brown rot suppression in copper-related treatments #6-9 was probably related to delayed maturity and reduced sugar levels due to defoliation by the copper treatment.* Among other treatments, Pristine in the pre-harvest applications, 15 and 3 days to harvest (#1, 2, and 10) gave good brown rot control, but weaker treatments such as OSO (#4 and 5), sulfur (#3) and Captan (#11) also gave significant control. In general, inoculation increased the percent of fruit infected with brown rot after incubation, but treatment control patterns were similar. One exception was that in non-inoculated fruit, Captan (#11) gave significantly more control than Microthiol Disperss (#3) and OSO 6.5 fl oz (#4), but with inoculation, control by these three fungicides was similar. Surprisingly, the lower rate of OSO had significantly less fruit infected with brown rot than the higher rate on both inoculated and non-inoculated fruit. Effect of early season treatment by Pristine (#10) on number of fruit not rotted at 11 days was noted compared to (#2), which was treated with Bravo on the same schedule, and this effect was noted on both inoculated and non-inoculated fruits.

Table 1. Control of leaf curl, scab, and defoliation.

Treatment and rate/100 gal dilute <sup>z</sup>	Timing <sup>y</sup>	Leaf curl, % infected <sup>x</sup>	Scab infection		% defoliation 5 Jun <sup>w</sup>	Copper injury, % infected	Fruit weight (grams/fruit)
			% fruit	les/fruit			
0 No fungicide	---	95 G <sup>v</sup>	99 d	46.4 f	8.4 d	0 a	136.7 cd
1 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-PF SS-3C 15 & 3PH	8 a	22 a	1.8 a	1.7 a	--	160.6 ab
2 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	33 bc	28 a	3.3 ab	2.2 ab	--	161.2 a
3 Microthiol Disperss 80% 3 lb	BS-3PH	33 bc	31 a	3.2 ab	5.9 b-d	--	146.3 a-c
4 OSO 5%SC 6.5 fl oz	BS-3PH	78 e-g	77 bc	16.9 de	5.9 b-d	--	153.1 a-c
5 OSO 5%SC 3.25 fl oz	BS-3PH	66 c-f	84 c	19.4 e	7.1 cd	0 a	145.5 a-c
6 Kocide 3000 28 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	45 b-d	72 bc	10.5 b-d	41.1 f	34 b	139.8 b-d
7 KX-007 50WP 16.8 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	47 b-d	70 b	8.7 a-c	41.4 f	43 b	139.7 b-d
8 KX-007 50WP 8.4 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	56 b-e	72 bc	14.1 c-e	35.2 ef	31 b	134.8 cd
9 NU-COP XLR 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	81 fg	86 bc	14.7 c-e	29.4 e	--	123.5 d
10 Pristine 38WDG 7.25 oz Microfine Sulfur 90W 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	68 d-g	24 a	1.0 a	5.4 a-d	0 a	146.7 a-c
11 Captan 80WDG 20 oz Microfine Sulfur 90W 3 lb Captan 80WDG 20 oz	Pink-PF SS-3C 15 & 3PH	28 ab	21 a	1.0 a	4.7 a-c	--	152.8 a-c

<sup>z</sup> Dilute application to run-off equivalent to 200 gpa.

<sup>y</sup> Applications: 24 Feb (BS, bud swell, trts #1 and 3-9 only); 9 Mar (pink, all trts); 30 Mar (full bloom); 11 Apr (PF, petal fall); 27 Apr (SS, shuck split); 10 May (1st cover); 24 May (2nd cover); 15 Jun (3rd cover); 28 Jun (15PH, 15 day pre-harvest); 10 Jul (3PH, 3 day pre-harvest).

<sup>x</sup> Leaf curl rated on 25 terminal shoots per tree 24 Apr.

<sup>w</sup> Defoliation rated on 10 shoots per tree 5 Jun. Defoliation may have been due to leaf curl infection or copper phytotoxicity.

<sup>v</sup> Column mean separation by Waller-Duncan K-ratio t-test (p=0.05). Four single tree reps with non-treated border trees in row.

Table 2. Post-harvest brown rot development on uninoculated peaches.

Treatment and rate/100 gal dilute <sup>z</sup>	Timing <sup>y</sup>	% fruit with brown rot after days incubation					Unrotted fruit, %, 11 days
		4 day	5 day	6 day	7 day	8 day	
0 No fungicide	---	15.0C <sup>x</sup>	18.8c	27.5e	48.8d	75.0e	0f
1 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-PF SS-3C 15 & 3PH	3.8 ab	6.3b	8.8 b-d	13.8bc	13.8bc	40.0c
2 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	1.3 ab	1.3 a	3.8 a-c	5.0a	6.3 ab	20.0de
3 Microthiol Disperss 80% 3 lb	BS-3PH	3.8b	8.8bc	15.0de	18.8c	30.0d	12.5e
4 OSO 5%SC 6.5 fl oz	BS-3PH	3.8b	6.3b	8.8cd	21.3c	28.8cd	15.0e
5 OSO 5%SC 3.25 fl oz	BS-3PH	0a	0a	0a	1.3a	6.3ab	28.8cd
6 Kocide 3000 28 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0a	0a	0a	1.3a	2.5a	81.3a
7 KX-007 50WP 16.8 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0a	1.3a	1.3 ab	1.3a	3.8a	82.5a
8 KX-007 50WP 8.4 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	1.3 ab	1.3a	5.0 a-c	5.0a	7.5 ab	85.0a
9 NU-COP XLR 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0a	1.3a	2.5 a-c	2.5a	6.3 ab	77.5 ab
10 Pristine 38WDG 7.25 oz Microfine Sulfur 90W 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	1.3 ab	1.3a	1.3 ab	5.0ab	6.3 ab	76.3 ab
11 Captan 80WDG 20 oz Microfine Sulfur 90W 3 lb Captan 80WDG 20 oz	Pink-PF SS-3C 15 & 3PH	0a	0a	1.3 ab	6.3 ab	15.0b	62.5 b

<sup>z</sup> Dilute application to run-off equivalent to 200 gpa. Brown Rot rated on 20 fruit per replication.

<sup>y</sup> Applications: 24 Feb (BS, bud swell, trts #1 and 3-9 only); 9 Mar (pink, all trts); 30 Mar (full bloom); 11 Apr (PF, petal fall); 27 Apr (SS, shuck split); 10 May (1st cover); 24 May (2nd cover); 15 Jun (3rd cover); 28 Jun (15PH, 15 day pre-harvest); 10 Jul (3PH, 3 day pre-harvest).

<sup>x</sup> Column mean separation by Waller-Duncan K-ratio t-test (p=0.05). Four single tree reps with non-treated border trees in row.

Table 3. Post-harvest brown rot development on inoculated peaches.

Treatment and rate/100 gal dilute <sup>z</sup>	Timing <sup>y</sup>	% fruit with brown rot after days incubation					Unrotted fruit, %, 11 days
		4 day	5 day	6 day	7 day	8 day	
0 No fungicide	---	36.3E <sup>x</sup>	50.0f	73.8d	86.3e	92.5e	0f
1 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-PF SS-3C 15 & 3PH	3.8 ab	5.0bc	10.0b	22.5 b	22.5 ab	41.3 bc
2 Bravo Weather Stik 6F 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	6.3 ab	11.3cd	17.5 b	18.8 ab	20.0 ab	28.8 c
3 Microthiol Disperss 80% 3 lb	BS-3PH	18.8c-e	31.3e	47.5 c	63.8cd	73.8cd	7.5 e
4 OSO 5%SC 6.5 fl oz	BS-3PH	31.3de	37.5ef	65.0cd	75.0de	77.5 d	0f
5 OSO 5%SC 3.25 fl oz	BS-3PH	16.3cd	25.0de	45.0c	52.5 c	60.0c	16.3d
6 Kocide 3000 28 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0 a	2.0ab	8.8 ab	10.0 a	12.5 a	76.3 a
7 KX-007 50WP 16.8 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	3.8 a	3.8 a-c	7.5 ab	8.8 ab	18.8 ab	68.8 a
8 KX-007 50WP 8.4 oz Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0 a	3.8 a-c	5.0 ab	13.8 ab	17.5 ab	70.0 a
9 NU-COP XLR 1 pt Microthiol Disperss 80% 3 lb Pristine 38WDG 7.25 oz	BS-2C 3C 15 & 3PH	0 a	0 a	1.3 a	7.5 a	12.5 a	70.0 a
10 Pristine 38WDG 7.25 oz Microfine Sulfur 90W 3 lb Pristine 38WDG 7.25 oz	Pink-PF SS-3C 15 & 3PH	6.3 ab	7.5bc	15.0b	22.5 b	27.5 b	48.8 b
11 Captan 80WDG 20 oz Microfine Sulfur 90W 3 lb Captan 80WDG 20 oz	Pink-PF SS-3C 15 & 3PH	13.8 bc	27.5 e	45.0c	62.5 cd	70.0cd	10.0 de

<sup>z</sup> Dilute application to run-off equivalent to 200 gpa. Brown Rot rated on 20 fruit per replication.

<sup>y</sup> Applications: 24 Feb (BS, bud swell, trts #1 and 3-9 only); 9 Mar (pink, all trts); 30 Mar (full bloom); 11 Apr (PF, petal fall); 27 Apr (SS, shuck split); 10 May (1st cover); 24 May (2nd cover); 15 Jun (3rd cover); 28 Jun (15PH, 15 day pre-harvest); 10 Jul (3PH, 3 day pre-harvest).

<sup>x</sup> Column mean separation by Waller-Duncan K-ratio t-test (p=0.05). Four single tree reps with non-treated border trees in row.