

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. G. F. Engelman, 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, 2016.

Twelve treatments involving experimental materials were compared to standard programs for broad-spectrum disease control on 5-yr-old trees. Test trees had been non-treated border trees in 2015 to allow the buildup of leaf curl and scab inoculum for the test in 2016. The test was set up in a randomized block design with four replications with non-treated in-row border trees between the test trees. Three brown rot mummies were placed in each test tree at pink stage 24 Mar. 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: 11 Mar (BS, bud swell, treatments #1 and 3-5 only); 23 Mar (pink, all treatments); 30 Mar (full bloom); 13 Apr (PF, petal fall); 27 Apr (SS, shuck split); Covers (1C-4C): 16 May, 31 May, 14 Jun; 29 Jun; 7 Jul (2PH, 2-wk pre-harvest), 18 Jul (1PH, 3 days pre-harvest). Actual harvest date was 21 Jul. Percentage of terminal buds infected with leaf curl were rated on 25 shoot tips per tree 10 May. Defoliation was rated on ten shoots per tree on the east sides of the rows on 11 Jul. To increase brown rot pressure in the test block, on 14 Jul several fruit in each non-treated adjacent border tree were inoculated by dipping the point of a nail in a suspension containing 30,000 *M. fructicola* conidia/ml and puncturing the fruit. Commercial insecticides were applied to the entire test block at 1-2 week intervals with a commercial airblast sprayer. Samples of 5-20 apparently rot-free fruit per replicate tree were harvested 21 Jul, and rated for scab. Fruit were selected for uniform ripeness and placed on fiber trays. All fruit were incubated in polyethylene bags at ambient temperatures 76-86°F (24-30°C) before rating rot development at the indicated intervals.

Early season rains favored heavy leaf curl infection. Bravo (Treatment #1), showed the importance of the bud swell application 11 Mar, just before an extended wetting event 13-15 Mar as compared to Treatment #2, which was delayed until 23 Mar (pink). NU-COP (#3-5) was also applied at bud swell 11 Mar but did not effectively control leaf curl. In early summer 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 11 Jul. NU-COP (#3-5) had similar amounts of injury, which was not significantly reduced by including Double Nickel (#5). However, some of the defoliation appeared to be related to leaf curl as indicated by Treatment #9 and #2 vs. #1, which had good leaf curl control and minimal defoliation. Following the shuck split application 27 Apr, rains every day from 28 Apr-12 May resulted in heavy scab pressure prior to the first cover spray 16 May. More than half of the fruit were infected on the best treatments, and better evidence of control is noted in lesions per fruit rather than incidence. The Bravo/Sulfur treatments (#1 and #2) generally resulted in the fewest scab lesions, but one of the GWN-4617/Sulfur treatments also reduced scab lesions. *It should be noted that brown rot suppression in NU-COP (#3-5) was probably related to delayed maturity and reduced sugar levels due to defoliation by the copper treatment.* Among other treatments, the highest rates of GWN-4617 (#8) and GWN-10320 (#10) and OSO (#12) gave brown rot control similar to the Merivon standard (#1 and #2). Significant weaknesses were noted at reduced rates of GWN-4617 (#6) and GWN-10320 (#9).

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

Treatment and amount/100 gal dilute	Timing ^y	Leaf curl, %	%	Scab infection, %	
		terminal buds infected 10 May	defoliation 11 Jul	fruit	lesions/fruit
0 No fungicide	---	49 b ^z	4 a-d	100 b	56.7 c
1 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb Merivon 4.18SC 3.25 oz + Induce 8 fl oz	BS-PF SS-4C 2 & 1PH	18 a	1 a	52 a	2.5 a
2 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb Merivon 4.18SC 3.25 oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	41 ab	6 cd	85 ab	6.7 a
3 NU-COP HB 4 oz	BS-1PH	42 ab	19 e	74 ab	30.4 b
4 NU-COP HB 6 oz	BS-1PH	32 ab	35 f	89 ab	19.8 ab
5 NU-COP HB 6 oz+ Double Nickel LC 8 fl	BS-1PH	28 ab	35 f	70 ab	12.4 ab
6 GWN-4617 0.85SC 3 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 3 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	46 ab	5 b-d	66 a	7.6 a
7 GWN-4617 0.85SC 4.5 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 4.5 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	47 ab	3 a-d	92 ab	13.4 ab
8 GWN-4617 0.85SC 6 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 6 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	38 ab	3 a-d	80 ab	13.2 ab
9 GWN-10320 8 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-10320 8 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	57 b	7 d	83 ab	17.6 ab
10 GWN-10320 16 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-10320 16 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	40 ab	2 a-c	70 ab	21.5 ab
11 OSO 5% SC 3.25 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb OSO 5% SC 3.25 fl oz + Induce 8 fl oz	Pink-2C 3C-4C 2 & 1PH	40 ab	6 cd	91 ab	22.3 ab
12 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb OSO 5% SC 3.25 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	48 b	2 ab	72 ab	18.3 ab

^zColumn mean separation by Waller-Duncan K-ratio t-test (p=0.05). Four single tree replications.

Four single tree reps with non-treated border trees in row. Dilute application to run-off.

^yApplication dates: 11 Mar (BS, bud swell, trts #1 and 3-5 only); 23 Mar (pink, all trts); 30 Mar (full bloom); 13 Apr (PF, petal fall); 27 Apr (SS, shuck split); Covers (1C-4C): 16 May, 31 May, 14 Jun, 29 Jun, 7 Jul (2PH, 2-wk pre-harvest), 18 Jul (1PH, 3 days pre-harvest). Actual harvest date: 21 Jul.

Leaf curl counted 10 May; defoliation rated on ten shoots, 10 shoots on east side of rows, on 11 Jul.

^xHarvest ratings of 5-20 fruit per replication, 21 Jul.

Table 2. Post-harvest brown rot development.

Treatment and amount/100 gal dilute	Timing ^y	% fruit with brown rot after days incubation			Unrotted fruit, %
		2 day	4 day	6 day	6 days
0 No fungicide	---	51 d ^z	61 e	82 f	5 e
1 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb Merivon 4.18SC 3.25 oz + Induce 8 fl oz	BS-PF SS-4C 2 & 1PH	12 bc	14 d	15 cd	25 c-e
2 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb Merivon 4.18SC 3.25 oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	5 a-c	9 d	9 c-e	13 cd
3 NU-COP HB 4 oz	BS-1PH	2 ab	2 ab	2 ab	48 ab
4 NU-COP HB 6 oz	BS-1PH	0 a	0 a	0 a	85 a
5 NU-COP HB 6 oz+ Double Nickel LC 8 fl	BS-1PH	0 a	0 a	1 a	89 a
6 GWN-4617 0.85SC 3 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 3 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	16 bc	19 d	37 e	17 de
7 GWN-4617 0.85SC 4.5 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 4.5 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	12 bc	16 d	23 c-e	38 b-d
8 GWN-4617 0.85SC 6 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-4617 0.85SC 6 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	6 ab	12 cd	12 bc	30 c-e
9 GWN-10320 8 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-10320 8 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	16 c	16 d	26 de	38 b-d
10 GWN-10320 16 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb GWN-10320 16 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	4 ab	4 a-c	10 c	39 b-d
11 OSO 5% SC 3.25 fl oz + Induce 8 fl oz Microfine Sulfur 90W 3 lb OSO 5% SC 3.25 fl oz + Induce 8 fl oz	Pink-2C 3C-4C 2 & 1PH	8 a-c	15 d	22 c-e	49 bc
12 Bravo Weather Stik 6F 1 pt Microfine Sulfur 90W 3 lb OSO 5% SC 3.25 fl oz + Induce 8 fl oz	Pink-PF SS-4C 2 & 1PH	0 a	11 b-d	16 c	43 b-d

^zColumn mean separation by Waller-Duncan K-ratio t-test (p=0.05). Four single tree reps with non-treated border trees in row. Dilute application to run-off.

^yApplication dates: 11 Mar (BS, bud swell, trts #1 and 3-5 only); 23 Mar (pink, all trts); 30 Mar (full bloom); 13 Apr (PF, petal fall); 27 Apr (SS, shuck split); Covers (1C-4C): 16 May, 31 May, 14 Jun, 29 Jun, 7 Jul (2PH, 2-wk pre-harvest), 18 Jul (1PH, 3 days pre-harvest). Actual harvest date: 21 Jul.