

APPLE (*Malus domestica* 'Ramey York')
Scab; *Venturia inaequalis*
Cedar-apple rust; *Gymnosporangium juniperi-virginianae*
Powdery mildew; *Podosphaera leucotricha*
Quince rust; *Gymnosporangium clavipes*
Sooty blotch; disease complex
Flyspeck; *Zygophiala jamaicensis*
Bitter rot; *Colletotrichum* spp.
White rot; *Botryosphaeria dothidea*
Fruit finish

K. S. Yoder, A. E. Cochran II, W. S. Royston, Jr.,
S. W. Kilmer, and A. L. Kowalski
Virginia Tech Agr. Res. & Ext. Center
595 Laurel Grove Road
Winchester, VA 22602

Evaluation of an experimental fungicide for full season disease control on York apple, 2017.

Five treatments involving an experimental fungicide were compared to Manzate and NU-COP XLR for season-long broad spectrum disease control on 17-yr-old trees. The test was conducted in a randomized block design with four single-tree replicates separated by in-row border trees. Dilute treatments were applied to runoff with a single nozzle handgun at 250 psi as first- seventh cover sprays: 5 Apr (TC, tight cluster); 26 Apr (PF, petal fall); 1C-7C, (1st - 7th covers): 9 May, 23 May, 8 Jun, 27 Jun, 19 Jul, 2 Aug, 16 Aug. All diseases developed from inoculum naturally present in the test area. Foliar data are based on ten shoots per rep 14 Jul. Fruit ratings are based on 25-fruit samples per replication picked 21 Sep and incubated in ambient warm temperatures (62-82° F, mean 71.9° F), first rated 17 Oct and final rating for rots 1 Nov after 19 days' incubation. Maintenance materials applied to the entire test block included: Altacor, Assail, Beleaf, Damoil, Danitol, Delegate, Imidan, Lannate LV, Sivanto Prime, and Voliam Flexi. Percentage data were converted by the square root arcsin transformation for statistical analysis.

Early season scab pressure was moderate. Under these conditions, several treatments gave significant control on leaves, but the best control was achieved by NU-COP (treatment #7, Table 1). On fruit, all treatments gave significant control with the two Manzate rates and the highest rate of experimental VA-2 giving the best control. Mildew pressure was moderate with 39 infection days through 21 Jun, and only NU-COP gave control under these conditions. Cedar rust pressure was heavy, with ten infection periods and heavy inoculum conditions through May. Under these conditions, only the high rate of Manzate (Trt #1), gave significant suppression (Table 27). The "leaf spots" on these treatments suggests that they may have been partially inhibited rust lesions. Under heavy disease pressure, all treatments gave significant control of sooty blotch and flyspeck (SBFS). The high rates of Manzate (Trt. #1) was especially effective, followed by VA-2 (Trt #2); lower rates were generally less effective (Table 2). NU-COP was least effective for SBFS control, but gave significant suppression compared to non-treated trees. Post-harvest rot control, primarily of bitter rot and white rot, was somewhat more variable, with the highest rate of VA-2 (Trt #2) giving the most rot control overall. The high rate of Manzate (Trt. #1) and NU-COP XLR (Trt #7) significantly increased russet compared to non-treated fruit. Most treatments significantly increased opalescence, with Manzate (Trt. #1) and NU-COP XLR (Trt #7) resulting in the highest opalescence ratings.

Table 1. Control of early season diseases.

Treatment and rate/100 gal dilute ^z	Timing	Scab		Mildew,	Cedar-apple rust			Quince rust,	“Leaf spots” ^{xx} ,
		% leaves infected	% fruit	% leaves infected	% leaves infected	lesions per leaf	% fruit	% fruit infected	% leaves affected
0No fungicide	---	19 C ^y	25 d	34 b	60 b	21.0 d	4 b	2 a	9 a
1Manzate Pro-Stick 75DF 1.5 lb	TC-7C	7 ab	1 a	28 ab	38 a	8.8 a	0 a	0 a	14 a
2VA-2 24 fl oz	TC-7C	11 bc	0 a	27 ab	52 ab	15.8 b-d	1 ab	0 a	12 a
3VA-2 19.2 fl oz	TC-7C	15 bc	10 c	29 ab	50 ab	13.2 ab	1 ab	0 a	13 a
4VA-2 14.4 fl oz	TC-7C	9 ab	4 bc	26 ab	47 ab	14.8 bc	1 ab	0 a	11 a
5VA-2 9.6 fl oz	TC-7C	10 b	8 bc	30 ab	50 ab	18.1 b-d	2 ab	0 a	11 a
6Manzate Pro-Stick 75DF 6.67 oz	TC-7C	13 bc	2 ab	30 ab	52 ab	17.5 b-d	0 a	0 a	10 a
7NU-COP XLR (10% Cu) 1 pt	TC-7C	3 a	5 bc	19 a	57 b	19.5 cd	0 a	0 a	12 a

^zDilute rates based on 400 gal/A equivalent.

^yMean separation by Waller-Duncan K-ratio t-test (p=0.05).

^x“Leaf spots” refers to an unidentified symptom; could be inhibited c-a rust, frog-eye leaf spot or an injury.

Table 2. Summer disease control and fruit finish.

Treatment and rate/100 gal dilute	Timing ^z	% fruit or fruit area inf. at harvest				% post-storage rots			Fruit finish rating (0-5)**	
		Sooty blotch		Flyspeck		Any	Bitter	White	Russet	Opalescence
		fruit	area	fruit	area	rots	rot	rot		
0No fungicide	---	100 g*	12.0 g	100 e	11.6 e	28 c	24 c	11 b	0.9 a	0.7 a
1Manzate Pro-Stick 75DF 1.5 lb	TC-7C	1 a	0.1 a	2 a	0.1 a	9 ab	3 ab	5 ab	1.5 b	1.7 d
2VA-2 24 fl oz	TC-7C	9 b	0.5 b	19 b	1.1 b	2 a	2 a	1 a	1.1 a	1.2 bc
3VA-2 19.2 fl oz	TC-7C	25 de	1.5 de	35 bc	2.1 bc	8 ab	5 ab	3 a	0.8 a	1.3 bc
4VA-2 14.4 fl oz	TC-7C	12 bc	0.6 bc	30 bc	1.5 b	11 ab	5 ab	7 ab	0.9 a	1.1 ab
5VA-2 9.6 fl oz	TC-7C	35 ef	2.2 ef	45 cd	3.1 cd	12 b	10 a-c	2 a	0.9 a	1.2 bc
6Manzate Pro-Stick 75DF 6.67 oz	TC-7C	20 cd	1.1 cd	35 bc	2.0 bc	9 ab	5 ab	5 ab	1.0 a	1.6 cd
7NU-COP XLR (10% Cu) 1 pt	TC-7C	50 f	2.9 f	61 d	3.9 d	18 bc	14 bc	6 ab	2.2 c	1.8 d

* Mean separation by Waller-Duncan K-ratio t-test (p=0.05).

** Fruit finish rated on a scale of 0-5 (0 = perfect finish, 5 = severe russet or opalescence).