

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

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Evaluation of experimental and registered fungicides for broad spectrum disease control on York apple, 2017.

Seven treatments were compared by 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: 30 Mar (TC, tight cluster); 11 Apr (PK, pink); 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 11 Jul. Fruit ratings are based on 25-fruit samples per replication picked 21 Sep and incubated in ambient warm temperatures (55-82° F, mean 72.2° F), first rated 13 Oct and final rating for rots 23 Oct after 21 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, all treatments gave significant control on leaves and fruit, but the best control was achieved by Inspire Super + Ziram (treatment #7, Table 1). A significant rate effect on scab control was noted with KX-007 (#4 vs. #5). Mildew pressure was moderate with 39 infection days through 21 Jun, but no treatments gave significant control under these conditions. Cedar rust pressure was heavy, with ten infection periods and heavy inoculum conditions through May. Most treatments gave some suppression of rust lesions per leaf, but only Inspire Super in combination with Manzate or Ziram significantly reduced incidence on leaves (treatments #6 and 7, Table 1). The "leaf spots" on these treatments suggests that they were partially inhibited rust lesions. Under heavy disease pressure, all treatments gave significant control of sooty blotch and flyspeck (SBFS). Although all treatments ended with two applications of Captan + Ziram, there were significant differences in control related to the schedule through 5th cover (Table 2). Inspire Super in combination with Manzate or Ziram (treatments #6 and 7), and Manzate (Trt #1) gave the best control of sooty blotch; treatments #6 and 7 also gave excellent control of flyspeck while Manzate (Trt #1) was slightly less effective. Copper-related treatments (#2-5) were significantly less effective for SBFS than Inspire Super combinations (Trts #6 and 7) or Manzate alone (Trt #1). Post-harvest rot control, primarily of bitter rot and white rot, was somewhat more variable, with treatments #1, 3 and 5 giving the most rot control overall. All treatments except Manzate (Trt. #1) significantly increased russet or opalescence compared to non-treated fruit. Copper treatments #3-5 most severely increased russet. Treatments #3-7 increased opalescence more than Manzate (Trt. #1).

Table 1. Control of early season diseases.

Treatment and rate/100 gal dilute ^z	Timing	Scab		Mildew, % leaves infected	Cedar-apple rust			“Leaf spots” ^x ,	
		% leaves infected	% fruit		% leaves infected	lesions / leaf	% fruit	% leaves affected	
0 No fungicide	---	24 d ^y	30 b	26 a	65 b	21.0 c	1 a	10 ab	
1 Manzate Pro-Stick 75DF 12 oz	TC-5C	4 ab	0 a	21 a	53 b	14.3 b	0 a	9 ab	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
2 NU-Cop XLR 1 pt	TC-5C	6 bc	1 a	16 a	53 b	15.0 b	1 a	6 a	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
3 Kocide 2000 1.5 lb	TC								
Kocide 2000 3 oz	PK-5C	4 ab	0 a	16 a	61 b	17.7 bc	1 a	8 a	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
4 KX-007 50WP 16.8 oz	TC								
KX-007 50WP 2.1 oz	PK-5C	5 ab	0 a	17 a	61 b	15.5 b	0 a	7 a	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
5 KX-007 50WP 8.4 oz	TC								
KX-007 50WP 1.05 oz	PK-5C	10 c	1 a	26 a	62 b	15.6 b	1 a	8 ab	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
6 Inspire Super 2.82EW 3 fl oz + Manzate 75DF 12 oz	TC-5C	4 ab	0 a	19 a	8 a	0.4 a	0 a	25 c	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								
7 Inspire Super 3 fl oz + Ziram 76DF 12 oz	TC-5C	2 a	1 a	16 a	5 a	0.3 a	0 a	16 b	
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C								

^z Dilute rates based on 400 gal/A equivalent.^y Mean 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	% fruit or fruit area inf. at harvest				% post-storage rots			Fruit finish rating (0-5)**	
		Sooty blotch		Flyspeck		Any rots	Bitter rot	White rot	Russet	Opalescence
0 No fungicide	---	100 c*	10.2 c	100 d	9.8 d	32 b	18 b	15 a	0.8 a	0.4 a
1 Manzate Pro-Stick 75DF 12 oz	TC-5C								0.8 a	0.9 ab
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	7 a	0.4 a	15 b	0.9 b	5 a	2 a	3 a		
2 NU-Cop XLR 1 pt	TC-5C								1.9 b	1.5 bc
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	28 b	1.5 b	45 c	3.2 c	12 ab	11 ab	2 a		
3 Kocide 2000 1.5 lb	TC									
Kocide 2000 3 oz	PK-5C								3.3 c	1.8 c
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	22 b	1.3 b	38 c	2.6 c	4 a	2 a	2 a		
4 KX-007 50WP 16.8 oz	TC									
KX-007 50WP 2.1 oz	PK-5C								3.3 c	1.8 c
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	40 b	2.3 b	47 c	2.9 c	11 ab	4 ab	7 a		
5 KX-007 50WP 8.4 oz	TC									
KX-007 50WP 1.05 oz	PK-5C								2.9 c	1.6 c
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	20 b	1.4 b	33 c	2.5 c	8 ab	4 ab	4 a		
6 Inspire Super 3 fl oz + Manzate 75DF 12 oz	TC-5C				a				1.6 b	1.8 c
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	1 a	0.1 a	6 ab	0.3 b	16 ab	8 ab	8 a		
7 Inspire Super 3 fl oz + Ziram 76DF 12 oz	TC-5C								1.9 b	2.1 c
Captan 80WDG 7.5 oz + Ziram 76DF 12 oz	6C-7C	1 a	0.1 a	0 a	0 a	18 ab	12 ab	9 a		

* 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).