

APPLE (*Malus domestica* 'Braeburn')
Scab; *Venturia inaequalis*
Powdery Mildew; *Podosphaera leucotricha*

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Evaluation of fungicides for management of apple diseases on Braeburn, 2016

Fungicide treatments were arranged in a randomized complete block design in an orchard of 'Braeburn' apples on ELMA-111 rootstock planted in 1995 on 20 x 20 ft spacing. Each treatment consisted of 4 single tree replicates. Fungicide treatments were applied using a hydraulic handgun sprayer at approximately 100 psi such that 5 gal of a spray suspension was applied per 4 trees (136 gal/A). Treatments were applied on 18 Mar (green tip to tight cluster), 31 Mar (pink), 11 Apr (full bloom to petal fall), 21 Apr (1st cover), 5 May (2nd cover), 18 May (3rd cover) and 1 Jun (4th cover). No fertilizer was spread within tree rows. Trees were pruned on 5 to 15 Jan. A dormant oil spray of Omni supreme-oil (1.5 gal/A) was applied on 9 Feb and Assana XL (7.5 fl oz/A) was applied 13 May for aphid management. Insecticide sprays were applied to the entire block using a Rear's air blast speed sprayer. Alion (4 fl oz/A) plus Makaze (16 fl oz/A) was applied on 9 Feb and Forefit 280 (1.5 qt/A) was applied on 19 Apr for weed management. Apple scab infection periods were monitored using an Adcon weather station equipped with standard sensors. Using a modified primary infection model (wet periods start with rain and end with 8 hr drying time), a total of 10 infection periods were detected from early Mar through Jun: 4 high infection periods (8, 11 and 20 Mar and 14 May); 1 moderate infection period (6 Mar); and 5 low infection periods (26 Mar, 3, 13, 21 and 23 Apr). The incidence of leaf scab and powdery mildew was determined on 12 to 15 Jul, by examining all leaves from 20 arbitrarily selected vegetative shoots (227 to 341 leaves with an average of 324) from each tree. Incidence of scab on fruit and fruit russet was determined on 18 to 22 Jul by examining 100 fruit arbitrarily selected from each tree.

Spring growing conditions were considered warmer and dryer than normal with several heat spikes including 83°F on 7 Apr, 85°F on 18 Apr, 87°F on 2 May, and 95°F on 4 Jun. Conditions resulted in accelerated tree growth 2 to 3 weeks ahead of average. Scab was first observed on crabapple pollenizers on 28 Mar and then on non-treated trees on 5 Apr. Shoots covered with powdery mildew due to infection the previous year were observed on 11 Apr. All trees treated with fungicide had significantly less apple scab on leaves or fruit, significantly less powdery mildew and significantly less fruit russet than non-treated trees. Lowest amount of leaf scab was found on trees treated with a program of Vanguard/Koverall+Captan/Aprovia/Inspire Super, however, many other programs were not significantly different. Similarly, many programs resulted in low fruit scab that was not significantly different from other programs. Although scab on trees treated with Luna Sensation alone was significantly lower than on non-treated trees, it was significantly higher than scab found on all other fungicide-treated trees. This indicates that *V. inaequalis* may have developed resistance to this fungicide since it has worked better in the recent past. Lowest amount of powdery mildew was found on trees treated with Viathon, however, powdery mildew found on most other fungicide-treated trees was not significantly different except for a program of Vanguard/Koverall+Captan/A19649B/Inspire Super. There were no significant differences in fruit russet found among the various fungicide treatments. No phytotoxicity was observed in trees treated with any of the various materials used.

Treatment & Rate/A or /100 gal as indicated below	Time of Application*	Apple Scab**		Powdery Mildew Leaves (%)**	Fruit Russet (%)**
		Leaves (%)	Fruit (%)		
Non-treated	None.....	87.6 a	92.5 a	27.3 a	44.3 a
Luna Sensation at 5 fl oz plus Nu-Film-P at 16 fl oz/100 gal	All.....	29.0 b	34.0 b	1.7 bc	5.8 b
Merivon SC at 5.5 fl oz.....	All.....	17.0 c	7.3 cd	1.2 bc	2.5 b
Luna Sensation at 5 fl oz plus Nu-Film-P at 16 fl oz/100 gal alternate with Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb	A, C, E, G B, D, F.....	8.5 cdef	0.8 d	1.1 bc	4.0 b
Merivon SC at 5.5 fl oz alternate with Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb	A, C, E, G B, D, F.....	10.3 cdef	3.8 d	1.7 bc	2.5 b
Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb alternate with Luna Sensation at 5 fl oz	A, C, E, G B, D, F.....	11.9 cde	5.0 cd	0.8 c	3.0 b
Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb alternate with Merivon SC at 5.5 fl oz.....	A, C, E, G B, D, F.....	9.2 cdef	1.8 d	1.4 bc	5.8 b
Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb alternate with Aprovia EC SC at 5.5 fl oz	A, C, E, G B, D, F.....	6.0 ef	1.5 d	1.6 bc	1.5 b
Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb alternate with A15457R EC at 5.5 fl oz.....	A, C, E, G B, D, F.....	7.1 def	1.3 d	1.3 bc	2.8 b
Procure 480 SC at 12 fl oz plus Koverall 75 DF at 3 lb alternate with A19649B SC at 2.74 fl oz.....	A, C, E, G B, D, F.....	3.9 ef	0.8 d	1.8 bc	4.3 b
Procure 480 SC at 12 fl oz plus Pro-Phyt 4.2 L at 4 pt alternate with Viathon 4.08 SC at 4 pt.....	A, C, E, G B, D, F.....	15.2 cd	13.3 c	0.6 c	6.3 b
Vanguard 75 WG at 5 oz then Koverall 75 DF at 3 lb plus Captan 80 WDG at 40 oz then Aprovia EC SC at 5.5 fl oz then Inspire Super EW at 12 fl oz.....	A B, C D, E F, G.....	3.0 f	0.8 d	2.9 bc	3.3 b
Vanguard 75 WG at 5 oz then Koverall 75 DF at 3 lb plus Captan 80 WDG at 40 oz then A19649B SC at 2.74 fl oz then Inspire Super EW at 12 fl oz.....	A B, C D, E F, G.....	4.1 ef	0.8 d	3.7 b	3.5 b

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Vangard 75 WG at 5 oz then	A						
Koverall 75 DF at 3 lb plus							
Captan 80 WDG at 40 oz then	B, C						
Aprovia EC SC at 5.5 fl oz plus							
Koverall 75 DF at 3 lb then	D, E						
Inspire Super EW at 12 fl oz.....	F, G.....	4.7	ef	3.0	d	2.9	bc 5.5 b

* Treatments were applied on A = 18 Mar (green tip to tight cluster), B = 31 Mar (pink), C = 11 Apr (full bloom to petal fall), D = 21 Apr (1st cover), E = 5 May (2nd cover), F = 18 May (3rd cover) and G = 1 Jun (4th cover).

**Means followed by the same letter do not differ significantly based on Fisher's protected LSD ($P=0.05$).