

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, 2019

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 110 psi such that 3 to 4 gal of a spray suspension was applied per 4 trees (82 to 109 gal/A). Treatments were applied on 3 Apr (tight cluster), 9 Apr (tight cluster), 17 Apr (pink), 25 Apr (30% bloom), 1 May, 8 May (petal fall), 15 May (fruit set, traditional 1<sup>st</sup> cover), 23 May, 29 May (2<sup>st</sup> cover), 4 Jun, and 12 Jun (3<sup>rd</sup> cover). No fertilizer was spread within tree rows. Trees were pruned on 15 to 21 Jan. A dormant oil spray of Omni supreme-oil (1.3 gal/A) was applied on 13 Feb and Assail 70 WP (4 oz/A) was applied on 5 Jun for aphid (and some codling moth) management. Insecticide sprays were applied to the entire block using a Rear's air blast speed sprayer. Makaze (16 fl oz/A) plus Goal 2XL (16 fl oz/A) was applied on 30 Jan for weed control. 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 9 infection periods were detected from Apr through Jun: 4 high infection periods (1, 4, 6 and 11 Apr), 1 moderate infection period (14 Apr) and 4 low infection periods (19 Apr, 18, 21 and 25 May). The incidence of leaf scab and powdery mildew was determined on 11 to 12 Jul, by examining all leaves from 20 arbitrarily selected vegetative shoots (189 to 303 leaves with an average of 252) from each tree. Incidence of scab on fruit and fruit russet was determined on 5 to 6 Aug by examining 100 fruit arbitrarily selected from each tree.

Rainfall for the growing season (Oct 2018 to Sep 2019) was approximately 5 inches below the 115 yr average but temperatures were at the average of 59.2°F. March precipitation was 3 in below normal while April was 3 in above normal which led to localized flooding from April 9 to 11 in parts of the orchard. Apple growth started later than normal but unusually warm and dry weather at the end of April through mid-May accelerated tree growth. Scab was first observed on crabapple pollenizers on 15 Apr and then on non-treated trees on 22 Apr. Shoots covered with powdery mildew due to infection the previous year were not noted in this block but were observed in a nearby block of Rome apples on 6 May. Based on past observations this would indicate powdery mildew could have been observed in this Braeburn block at an earlier date. All trees treated with fungicide had significantly less apple scab on leaves and fruit and significantly less powdery mildew than non-treated trees. Lowest level of apple scab on leaves was found in trees treated with Aprovia during bloom, however, leaf scab on trees treated with Excalia (S-2399) during bloom were not significantly different. Lowest level of apple scab on fruit was found on trees treated with low rate of Excalia (S-2399) during bloom, however, fruit scab on trees treated with the high rate of Excalia (S-2399), Aprovia or Sercadis during bloom or combination of Koverall/Luna Sensation/Inspire Super/Captan were not significantly different. Lowest level of powdery mildew on leaves was found in trees treated with Sercadis during bloom, however, powdery mildew on trees treated with Excalia (S-2399), Aprovia, or Luna Sensation during bloom were not significantly different. Highest level of fruit russet was found on trees treated with the high rate XF-17001 and it was significantly higher than all other treatments. Lowest level of fruit russet was found in trees treated with the high rate of Excalia (S-2399) during bloom, however, fruit russet on trees treated with Luna Sensation, Aprovia or Sercadis at bloom were not significantly different.

Phytotoxicity of flowers and leaves was observed on trees treated with XF-17001, especially with the high rate, on 6 May after 5 applications. Some petals and leaves developed a marginal burn while others were completely necrotic. The most severely affected tissues appeared to be the youngest at the time of application. Treated trees appeared to have a lower fruit set (data not taken). No phytotoxicity was observed in trees treated with any of the other 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 .....	43.5	a	87.0	a	19.2	a	41.0	c
XF – 17001 at 32 fl oz/100 gal.....	All.....	34.8	b	58.3	b	13.0	b	67.5	b
XF – 17001 at 44.8 fl oz/100 gal.....	All.....	29.5	b	37.0	d	5.3	c	85.8	a
Luna Sensation at 5 fl oz plus OVS 90 NIS at 16 fl oz/100 gal .....	A, C, E, G, I, and K.....	26.5	bc	46.3	c	1.2	d	17.5	de
Koverall 75 WG at 6 lb then Luna Sensation at 5 fl oz plus Syl-Coat at 8 fl oz/100 gal alternate Inspire Super at 12 fl oz then Captan 80 WDG at 5 lb.....	A C and G E I and K.....	19.8	cde	8.5	e	2.3	cd	19.8	de
Koverall 75 WG at 6 lb then Aprovia at 5.54 fl oz plus Syl-Coat at 8 fl oz/100 gal alternate Inspire Super at 12 fl oz then Captan 80 WDG at 5 lb.....	A C and G E I and K.....	5.8	f	2.5	e	4.6	cd	14.5	de
Koverall 75 WG at 6 lb then Sercadis at 3.5 fl oz plus Syl-Coat at 8 fl oz/100 gal alternate Inspire Super at 12 fl oz then Captan 80 WDG at 5 lb.....	A C and G E I and K.....	20.8	cd	8.0	e	1.1	d	15.5	de
Koverall 75 WG at 6 lb then Excalia (S-2399) at 3 fl oz plus Syl-Coat at 8 fl oz/100 gal alternate Inspire Super at 12 fl oz then Captan 80 WDG at 5 lb.....	A C and G E I and K.....	13.3	def	2.3	e	3.1	cd	20.8	d
Koverall 75 WG at 6 lb then Excalia (S-2399) at 4 fl oz plus Syl-Coat at 8 fl oz/100 gal alternate Inspire Super at 12 fl oz then Captan 80 WDG at 5 lb.....	A C and G E I and K.....	11.8	ef	5.5	e	1.6	d	9.3	e

\* Treatments were applied on A = 3 Apr (tight cluster), B = 9 Apr (tight cluster), C = 17 Apr (pink), D = 25 Apr (30% bloom), E = 1 May, F = 8 May (petal fall), G = 15 May (fruit set, traditional 1<sup>st</sup> cover), H = 23 May, I = 29 May (2<sup>nd</sup> cover), J = 4 Jun, and K = 12 Jun (3<sup>rd</sup> cover).

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