

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, 2014

Fungicide treatments were arranged in a randomized complete block design in a block 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 6 gal of a spray suspension was applied per 4 trees (163 gal/A). Treatments were applied on either a 7 or 14 day schedule on the following dates: 24 Mar (half-inch green), 1 Apr (tight cluster), 8 Apr (pink), 15 Apr (full bloom), 20 Apr (petal fall), 25 Apr, 29 Apr (fruit set), 2 May (1st cover), 9 May, 16 May (2nd cover) and 23 May (3rd cover). No fertilizer was spread within tree rows. Trees were pruned on 14 to 28 Jan. A dormant oil spray of Omni supreme-oil (2 gal/100 gal water) was applied on 26 Feb for aphid control. Success (8 fl oz/A) was applied on 20 May and 24 Jun for codling moth management. Insecticide sprays were applied to the entire block using a Rear's air blast speed sprayer. Makaze (64 fl oz/100 gal water) was applied 12 Mar, Alion (5 fl oz/A) plus Reckon (48 fl oz/A) were applied on 4 Apr and Reckon (82 fl oz/A) was applied on 14 May 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 15 infection periods were detected from late Mar through Jun: 6 high infection periods (25, 27 Mar, 17, 22 Apr, 8 May and 25 Jun); 0 moderate infection periods and 9 low infection periods (29 and 31 Mar, 5, 21, 24 and 26 Apr, 3 and 18 May and 26 Jun). The incidence of leaf scab and powdery mildew was determined on 17 Jul, by examining all leaves from 20 arbitrarily selected vegetative shoots (140 to 394 leaves with an average of 308) from each tree. Incidence of scab on fruit and fruit russet was determined on 1 Aug by examining 100 fruit arbitrarily selected from each tree. Nontreated trees had little to no fruit and were not included in the fruit analysis. The low rate of IP-EX LB80 only had 2 trees with over 100 fruit and one tree with 50 fruit; missing data analysis based on averaging these 3 trees.

Spring growing conditions had normal precipitation but warmer temperatures overall which resulted in an above average number of scab infection periods. Scab was first observed on crabapple pollenizers on 31 Mar and then on nontreated trees on 14 Apr. Shoots covered with powdery mildew due to infection the previous year were also observed on 14 Apr. All trees treated with fungicide had significantly less apple scab on leaves than nontreated trees except trees treated with the low rate of IP-EX LB80. The lowest amount of leaf scab was found on trees treated with Luna Sensation alone, however, scab on trees treated with any Luna Sensation program, Pristine or Inspire Super were not significantly different. Apple scab pressure was so high that nontreated trees had little to no fruit. Highest amount of fruit scab was found on trees treated with the low rate of IP-EX LB80. The lowest amount of fruit scab was found on trees treated with Pristine, however, fruit scab on trees treated with any Luna Sensation program or Inspire Super were not significantly different. All trees treated with fungicide had significantly less powdery mildew on leaves than nontreated trees except trees treated with the low rate of IP-EX LB80. There was no significant difference among treatments with regard to powdery mildew on leaves except powdery mildew was significantly higher on trees treated with either rate of IP-EX LB80 alone.

There are many reasons for fruit to russet including cool wet weather, frost, pesticides, viruses, fungi including powdery mildew or yeasts, and bacteria. We believe the high russet observed in this trial was due to the application of yeasts either in the current or previous growing season. Highest amount of russet was found on trees treated with Luna Sensation alone, however, when Luna Sensation was alternated with Procure plus Koverall it resulted in one of the lowest amounts of russet. Lowest fruit russet was found on trees treated with captan near bloom, however, the amount of russet on trees treated with the low rate of IP-EX LB80 (a copper-based pesticide) with or without Flint was not significantly different. The high rate of IP-EX LB80 may have caused some russet on its own while at the same time managing yeasts to lower russet. Trees treated with Pristine alternated with Procure plus Koverall resulted in significantly more russet than when Luna Sensation was alternated with Procure plus Koverall on the same schedule. No obvious phytotoxicity was observed in trees treated with any of the various materials used.

Treatment & Rate/A	Time of Application*	Apple Scab**		Powdery Mildew Leaves (%)**	Fruit Russet (%)**				
		Leaves (%)	Fruit (%)						
Nontreated	None.....	87.5	a	25.7	a				
Luna Sensation at 5 fl oz plus Induce at 32 fl oz/100 gal	A, C, E, H, J..	3.4	e	4.0	de	2.2	c	50.3	a
Luna Sensation 500 SC at 5 fl oz plus Induce at 32 fl oz/100 gal ALT Procure 480 SC at 12 fl oz plus Koverall 75 DF 48 oz plus Induce at 32 fl oz/100 gal	A, E, J C, H,	7.0	de	7.3	de	4.3	c	4.8	de
Luna Sensation at 5 fl oz plus Induce at 32 fl oz/100 gal ALT Sonata ASO at 32fl oz plus Induce at 32 fl oz/100 gal.....	A, D, I C, G, K.....	12.7	de	6.0	de	2.7	c	32.5	abc
Luna Sensation at 5 fl oz plus Induce at 32 fl oz/100 gal ALT Sonata ASO at 2 qt plus Induce at 32 fl oz/100 gal.....	A, D, I C, G, K.....	12.1	de	11.5	cde	3.6	c	44.3	a
Luna Sensation at 5 fl oz plus Induce at 32 fl oz/100 gal ALT Sonata ASO at 4 qt plus Induce at 32 fl oz/100 gal.....	A, D, I C, G, K.....	13.6	de	7.0	de	4.5	c	39.3	ab
Pristine 38 WDG at 18.5 oz plus Induce at 32 fl oz/100 gal ALT Procure 480 SC at 12 fl oz plus Koverall 75 DF 48 oz plus Induce at 32 fl oz/100 gal	A, E, J C, H,	7.7	de	1.3	e	2.9	c	32.0	abc
Vanguard 75 WG at 5 oz then Koverall 75 WG at 6 lb plus Captan 80 WP at 2.5 lb then Aprovia (15457) at 6.84 oz alternate Inspire Super 2.82 EW at 12 fl oz.	A C E, J H	8.2	de	1.5	e	6.9	c	1.3	e
IP-EX LB80 at 7 fl oz.....	A, B, C, D, F, H, I, J, and K..	82.3	a	68.0	a	22.2	a	7.7	de
IP-EX LB80 at 21 fl oz.....	A, B, C, D, F, H, I, J, and K..	65.2	b	39.0	b	14.8	b	21.0	bcd
IP-EX LB80 at 7 fl oz plus Flint 50 WG at 2.5 oz.....	A, B, C, D, F, H, I, J, and K..	31.2	c	24.3	c	6.4	c	11.3	de
IP-EX LB80 at 21 fl oz plus Flint 50 WG at 2.5 oz.....	A, B, C, D, F, H, I, J, and K..	16.1	d	17.0	cd	5.8	c	15.8	cde

* Treatments were applied on A = 24 Mar (half-inch green), B = 1 Apr (tight cluster), C = 8 Apr (pink), D = 15 Apr (full bloom), E = 20 Apr (petal fall), F = 25 Apr, G = 29 Apr (fruit set), H = 2 May(1st cover), I = 9 May, J = 16 May (2nd cover) and K = 23 May (3rd cover). In general any application of Sonata or IP-EX LB80 was followed in 7 to 10 days with another fungicide application. All other fungicide applications were followed in two weeks with another fungicide application.

**Means followed by the same letter do not differ significantly based on Fisher's protected LSD ($P=0.05$). Means without letters do not differ significantly.