

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

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Organic fungicides for control of apple scab and powdery mildew, 2010.

Fungicide treatments were arranged in a randomized complete block design in a block of 'Rome' apples on M-7 rootstock planted in 1979 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 4 to 5 gal of a spray suspension were applied per 4 trees (109 to 136 gal/A) depending on the time of year. Treatments were applied on 6 to 14 day intervals depending on plant growth stage and weather forecasts. Treatments were applied on 16 Apr (tight cluster), 22 Apr (pink), 28 Apr (start of bloom), 6 May (king bloom), 12 May (50% bloom), 18 May (petal fall), 28 May (1st cover), 8 Jun (2nd cover) and 22 Jun (3rd cover) for a total of 9 applications. No fertilizer was spread within tree rows. Trees were not pruned during the dormant season. Insecticide sprays were applied to the entire block using a Rear's air blast speed sprayer. A dormant oil spray of Omni supreme-oil (5 gal/A) was applied on 17 Feb for aphid control. Acramite 50WS (1 lb/A) and Pravado 1.6F (8 fl oz/A) was applied on 8 Jun also for aphid control. No insecticides were applied for control of codding moth. No herbicides were applied, in season, for weed control. The entire block of trees was irrigated using low angle sprinkler heads for 8 hours on 9 Aug. Apple scab infection periods were monitored using an Adcon A730 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 12 infection periods were detected from early Apr through Jun: 2 high infection periods (28 Mar and 1 Jun); 5 moderate infection periods (2 and 27 Apr, 3 and 21 May and 3 Jun) and 5 low infection periods (19 and 26 Apr, and 19, 25 and 30 May). Defoliation was evaluated on 5 Jul by examining the total number of leaf scars and total number of attached leaves from 20 arbitrarily selected terminal shoots. A whole tree defoliation rating was conducted on 6 Jun where 0 = full canopy, 1 = less than 5% defoliation, 2 = 5 to 25% defoliation, 3 = 25 to 50%, 4 = 50 to 90%, and 5 = severe defoliation greater than 90%. Incidence of scab on fruit and fruit russet was determined on 7 Aug by examining 100 fruit arbitrarily selected from each tree. Due to high scab pressure there were not enough fruits to sample from all replicates of nontreated trees or trees treated with Serenade Max.

Western Oregon spring weather conditions were cold and wet during early shoot growth. Disease pressure from apple scab was considered severe. Scab was first observed on nontreated trees in a nearby block on 12 May and within this block on 26 May. Shoots covered with powdery mildew due to infection the previous year were easily observed on 26 May. Almost all the leaves on nontreated trees had scab, which began to fall off during the spring growing season. Nontreated trees had the highest amount of defoliation but defoliation on trees treated with Serenade was not significantly different. Lowest defoliation was on trees treated with Lime Sulfur at 2 gal/100 gal water. Lowering the rate of Lime Sulfur to 1 gal/100 gal water with the addition of either rate of Yucca Ag-Aide resulted in defoliation that was not significantly different from trees treated with 2 gal Lime Sulfur alone. Evaluation of the whole canopy correlated well with percent defoliation, however, the higher rate of Yucca Ag-aide resulted in a significantly better overall canopy rating than the lower rate when mixed with Lime Sulfur. Of the trees with enough fruit to evaluate, trees treated with Cueva had the highest amount of fruit with scab while the lowest amount of fruit scab was on trees treated with the 2 gal rate of Lime Sulfur. Trees treated with Cueva also had the highest amount of fruit russetting. Lowest fruit russetting was observed on tree treated with Lime Sulfur plus the high rate of Yucca Ag-Aide however, fruit russetting on trees treated with Lime Sulfur alone were not significantly different.

Slight marginal necrosis or spotting of flower petals was observed on trees treated with Cueva. Many of these flowers did not go on to set fruit. No other phytotoxicity was observed in trees treated with any of the other materials used.

Treatment & Rate/100 gal	Defoliation*		Apple Scab	Fruit Russet
	(%)	Whole Canopy Rating**	(% fruit)*	(%)*
Nontreated	36.5 a	4.1 a	---	---
Lime Sulfur (29%) at 2 gal.....	3.3 c	1.1 d	47.5 d	19.5 bc
Lime Sulfur (29%) at 1 gal plus				
Yucca Ag-Aide at 16 fl oz....	5.0 c	1.9 c	79.8 b	24.3 b
Lime Sulfur (29%) at 1 gal plus				
Yucca Ag-Aide at 1 gal.....	4.8 c	1.3 d	56.8 c	15.8 c
Cueva at 1 gal.....	16.0 b	3.0 b	90.1 a	58.8 a
Serenade MAX at 3 lb plus				
Nu-Film-P at 6 fl oz.....	36.3 a	4.0 a	---	---

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

** A whole tree defoliation rating was conducted on 6 Jun where 0 = full canopy, 1 = less than 5% defoliation, 2 = 5 to 25% defoliation, 3 = 25 to 50%, 4 = 50 to 90%, and 5 = severe defoliation greater than 90%.

--- There were not enough fruits to sample from all nontreated trees or trees treated with Yucca Ag-Aide.