GRAPE (*Vitis vinifera* 'Pinot Noir')
Powdery Mildew; *Erysiphe necator*

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Efficacy of fungicides for management of grape powdery mildew on Pinot Noir, 2011.

Fungicide treatments were arranged in a randomized complete block design in a block of 'Pinot Noir' (on *V. rupestris* x *V. riparia* 101-14 rootstock) planted in 1998 on a 7x8 ft spacing. A single buffer rootstock plant was trained between each set of treatment vines and a buffer rootstock row separated each varietal row. Pinot Noir vines were trained to a Guyot system on 8 to 16 Mar. Shoot thinning and sucker removal by hand occurred on 26 May. Canes were cut above the top wire on 21 Jul and maintained at this height throughout the growing season. Each treatment was replicated on 4 sets of 5 vines. Treatments were applied approximately every 14 days using a hooded boom sprayer at 150 psi. The rate of water used was 96 to 103 gal/A depending on amount of foliage present. Approximately 2.5 to 2.6 gal of spray suspension was used per 20 vines depending on time of year. Fungicides were applied on 9 Jun (BBCH 15), 23 Jun (BBCH 57), 7 Jul (BBCH 61), 20 Jul (BBCH 73), 3 Aug (BBCH 76), 17 Aug (BBCH 79) and 31 Aug (BBCH 81, start of Veraison). No fertilizer or herbicide was applied this year. No leaves were removed from the fruiting zone. According to the Gubler-Thomas powdery mildew forecasting model, there were 9 rain events between budbreak and end of bloom that were favorable for ascospore release and infection: 2 severe infection periods (26 and 30 May), 3 moderate infection period (17 and 25 May and 12 Jun), and 4 low infection periods (11 and 28 May, 1 and 2 Jun). The risk index briefly climbed above 60 in early Jul, dropped back to zero by mid-Jul, then shot up past 60 again just before 1 Aug and remained high throughout Aug until dropping back down in early Sep (Figure 1). Incidence and severity of powdery mildew on leaves and clusters were evaluated on 1, 15 and 30 Aug and 8 Sep. Powdery mildew disease data was collected by randomly examining 50 leaves or clusters from the middle 3 vines of each replicate. Comparisons among treatments for severity of powdery mildew on leaves and clusters were evaluated by calculating the area under disease progress curves (AUDPC). AUDPC was calculated by multiplying the mean severity from two observation dates by the number of days between observations $(\Sigma[Y_{i+1} + Y_i)/2][X_{i+1}-X_i]$ where Y_i is severity of mildew at i*th* observation and X_i is the day of the i*th* observations). Values calculated between each pair of observations are added together to obtain a total AUDPC.

Spring weather conditions in Western Oregon were considered cool and wet resulting in slow crop development and a 2 to 3week delay in crop growth stages through the growing season. Symptoms of powdery mildew were first found on 6 Jun as flag shoots and individual colonies. Distribution of colonies suggested limited secondary spread by this date just prior to the first fungicide application. All fungicide treated vines had significantly reduced powdery mildew on leaves (table 1) and clusters (table 2) when compared to nontreated vines. Control of powdery mildew on Merivon treated vines was not significantly different from the control on Pristine treated vines. Vines treated with Quintec had significantly higher cluster incidence and severity than Merivon treated vines by the end of the season but all had similar AUDPC for clusters. Many leaves treated with either rate of Merivon developed numerous small necrotic spots along the leaf margin (table 1). Leaves with the most damage were deformed, smaller and with a slight downward cupping. The pattern of damage suggests that the youngest leaves at the time of application are most susceptible to damage.

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Table 1. Powdery mildew and phytotoxicity data on leaves.

Treatment and Rate/A	% Leaves with Powdery Mildew (8 Sep)*		AUDPC* (Leaves)	Leaves with phytoxicity damage (%)
	Incidence	Severity		
Nontreated…….	100 a	66.3 a	18.9 a	0.0 c
Merivon 500 SC at 4 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	5.5 bc	0.1 b	0.01 b	50.0 a
Merivon 500 SC at 5.5 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	4.0 bc	0.0+ b	0.01 b	38.5 b
Pristine 38 WDG at 12 oz plus Sylgard 309 at 42.6 fl oz/100 gal...	3.0 c	0.0+ b	0.01 b	0.0 c
Quintec at 6.6 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	9.5 b	0.1 b	0.02 b	0.0 c

* Means followed by the same letter do not differ significantly based on Fisher's protected LSD (P=0.05). The data represented as 0.0+ indicate the value was very low but not equal to zero.

Table 2. Powdery mildew data on clusters.

Treatment and Rate/A	% Clusters with Powdery Mildew (8 Sep)*		AUDPC* (Clusters)
	Incidence	Severity	
Nontreated…….	100 a	99.8 a	35.8 a
Merivon 500 SC at 4 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	5.0 c	0.1 c	0.01 b
Merivon 500 SC at 5.5 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	2.0 c	0.0+ c	0.01 b
Pristine 38 WDG at 12 oz plus Sylgard 309 at 42.6 fl oz/100 gal...	3.5 c	0.1 c	0.02 b
Quintec at 6.6 fl oz plus Sylgard 309 at 42.6 fl oz/100 gal...	73.0 b	3.7 b	0.88 b

* Means followed by the same letter do not differ significantly based on Fisher's protected LSD (P=0.05). The data represented as 0.0+ indicate the value was very low but not equal to zero.

Figure 1. Grape powdery mildew risk index 2011.