

GRAPE (*Vitis vinifera* 'White Riesling')
Powdery Mildew; *Erysiphe necator*

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Efficacy of fungicides for management of grape powdery mildew, 2013.

Fungicide treatments were arranged in a randomized complete block design in a block of 'White Riesling' planted in 1995 on a 7x10 ft spacing. Vines were trained to a bilateral cordon with spur pruning. Vines were pruned from 22 to 27 Feb. Sucker removal and shoot thinning by hand, occurred from 6 to 13 May. Vines were pruned to approximately 60 spurs/vine and thinned to approximately 40 shoots/vine. Canes were cut above the top wire on 16 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 80 to 150 gal/A such that approximately 2.6 to 5 gal of spray suspension was used per 20 vines depending on amount of foliage present. Fungicides were applied on 14 May (BBCH 15), 30 May (BBCH 57), 11 Jun (BBCH 61), 25 Jun, 5 Jul (BBCH 77), 17 Jul (BBCH 79), and 31 Jul (BBCH 80). Aim (2 fl oz/A) was applied on 27 Feb, GoalTender (1 qt/A) plus Makaze (generic glyphosate at 1 qt/A) was applied on 13 Mar and Aim (2 fl oz/A) plus Rely (1.5 qt/A) was applied on 7 May for weed control. Fertilizer, 16-16-16-0 was applied at 87 lb/A on 24 May. No leaves were removed from the fruiting zone. According to the Gubler-Thomas powdery mildew forecasting model, there were 8 rain events between bud break and end of bloom that were favorable for ascospore release and infection: 2 severe infection periods (21 and 23 May), 3 moderate infection periods (16, 22 and 27 May), and 3 low infection periods (25 and 28 May and 13 Jun). The risk index shot up past 60 in early Jun and remained high throughout the rest of the summer except for a brief drop below 60 in late Jun to early July. The risk index dropped back down to zero in mid Sep (Figure 1). Incidence and severity of powdery mildew on leaves were evaluated on 8, 22 and 29 Jul and 13 Aug. Incidence and severity of powdery mildew on clusters were evaluated on 9, 23, and 30 Jul and 14 Aug. Powdery mildew disease data was collected by arbitrarily 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 ($\sum [Y_{i+1} + Y_i]/2][X_{i+1} - X_i]$ 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 growing conditions during early shoot growth were unusually dry with 3 weeks of warm, 80 F weather starting at the end of April. Symptoms of powdery mildew were first found on 9 May as flag shoots. Many individual colonies were observed by 13 May in several blocks. All fungicide-treated vines had significantly less powdery mildew on leaves when compared to non-treated vines. Lowest incidence, severity and AUDPC for powdery mildew on leaves was on vines treated with the Orius program, however, both incidence and severity on vines treated with most any other fungicide were not significantly different, except vines treated with GWN 10250, which had higher leaf incidence. Lowest incidence of powdery mildew on clusters was on vines treated with Torino, however, the incidence on clusters treated with the high rate of Inspire Super, Quadris Top, the Mettle program or the Orius program were not significantly different. Lowest severity of powdery mildew on clusters was on vines treated with Torino, however, the severity on clusters treated with most other fungicides were not significantly different, except for those treated with the lower rates of GWN 10250. Lowest AUDPC for powdery mildew on clusters was on vines treated with the Orius program, however, AUDPC on vines treated with most any other fungicide were not significantly different, except vines treated with the lower two rates of GWN 10250. No phytotoxicity was observed on any vines treated with any material.

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Treatment and Rate/A**	% Leaves with Powdery Mildew (13 Aug)*		AUDPC* (Leaves)	% Clusters with Powdery Mildew (14 Aug)*		AUDPC* (Clusters)
	Incidence	Severity		Incidence	Severity	
Non-treated.....	100 a	47.0 a	12.8 a	100 a	100 a	36.0 a
Torino at 3.4 fl oz	3.0 cd	0.0+ b	0.01 b	13.0 c	0.3 c	0.25 d
GWN 10250 at 8 fl oz plus						
Break-Thru at 4 fl oz/100 gal	13.0 b	0.3 b	0.09 b	98.0 a	31.7 b	11.4 b
GWN 10250 at 12 fl oz plus						
Break-Thru at 4 fl oz/100 gal	10.0 b	0.2 b	0.06 b	97.0 a	29.8 b	10.1 bc
GWN 10250 at 24 fl oz plus						
Break-Thru at 4 fl oz/100 gal	5.0 c	0.1 b	0.02 b	79.5 a	13.8 bc	4.70 cd
Inspire Super at 16 fl oz.....	1.5 cd	0.0+ b	0.01 b	41.0 b	1.4 c	0.94 d
Inspire Super at 20 fl oz.....	2.0 cd	0.0+ b	0.01 b	25.5 bc	0.6 c	0.26 d
Quadris Top at 14 fl oz.....	3.5 cd	0.0+ b	0.01 b	25.5 bc	0.7 c	0.30 d
Mettle at 5 fl oz plus						
Kumulus DF at 2 lb then						
Flint 50 WDG at 2 oz then						
Mettle at 5 fl oz plus						
Vangard at 10 oz then						
Quintec at 6 fl oz then						
Inspire Super at 20 fl oz then						
Abound at 15 fl oz then						
Quintec at 6 fl oz	2.0 cd	0.1 b	0.01 b	15.5 c	0.3 c	0.18 d
Orius 20 AQ at 8.6 fl oz plus						
Kumulus DF at 2 lb then						
Flint 50 WDG at 2 oz then						
Orius 20 AQ at 8.6 fl oz plus						
Vangard at 10 oz then						
Quintec at 6 fl oz then						
Inspire Super at 20 fl oz then						
Abound at 15 fl oz then						
Quintec at 6 fl oz	0.5 d	0.0+ b	0.0+ b	30.0 bc	0.7 c	0.17 d

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

** Fungicides were applied on 14 May (BBCH 15), 30 May (BBCH 57), 11 Jun (BBCH 61), 25 Jun, 5 Jul (BBCH 77), 17 Jul (BBCH 79), and 31 Jul (BBCH 80).

Figure 1. Grape powdery mildew risk index for the 2013 growing season.

