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

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Fungicides for grape powdery mildew management on Pinot noir, 2024.

Fungicide treatments were arranged in a randomized complete block design in a block of 'Pinot noir' planted in 1985 on 7x11 ft spacing. Pinot noir vines were trained to a Guyot (vertical shoot position) system and pruned from 3 to 5 Feb 2024. Shoot thinning and sucker removal by hand occurred on 10 May 2024 and continued through the rest of the growing season. Canes were cut above the top wire on 10 Jul and maintained at this height throughout the growing season. Each treatment was replicated on 4 sets of 5 vines. Treatments were applied using a hooded boom sprayer at 150 psi at a rate of 42 to 63 gal water/A depending on canopy growth such that 1.49 to 2.23 gal of spray suspension was used per 20 vines. Fungicide treatments were applied on 8 May (BBCH 55), 1 Jun (BBCH 57), 14 Jun (BBCH 64), 28 Jun (BBCH 71), 12 Jul (BBCH 80), 30 Jul (veraison, BBCH 81). Leaves were removed from the fruiting zone on the east side of all vines on 26 Jun. Casoron 4-G (150 lb/A; 30 lb/A in herbicide strip) was applied on 26 Mar for general pre-emergent weed management and GlyStar Plus was spot sprayed on 10 Apr for management of perennial weeds. Fertilizer (16-16-16 at 30 lb/A) was applied to vines on 9 Apr. According to the Gubler-Thomas powdery mildew forecasting model, there was 8 rain events favorable for ascospore release and infection between bud break and end of bloom: 5 severe infection periods (25 Apr, 1 and 3 May, 2 and 16 Jun), and 3 low infection periods (30 Apr, 6 and 7 May). The powdery mildew risk index rose to high infection risk (0 to $\geq$60) in mid-May for 11 days, dipped back to low risk but went back up to high risk on 9 Jun and generally remained high (above 60) all summer except for a 2 week heat wave in mid Jul where it was at a low risk (Figure 1). Incidence and severity of powdery mildew on leaves was evaluated on 2, 16 and 30 Jul, 12 Aug while incidence and severity of powdery mildew on fruit was evaluated on 18 Jul and 8 Aug. (Only the last rating date is presented in Tables 1 and 2.) Powdery mildew disease data was collected by arbitrarily examining 50 clusters or leaves from the middle 3 vines of each replicate. Treatments were also evaluated by calculating the area under disease progress curve (AUDPC) which was calculated by multiplying the mean incidence or severity from two observation dates by the number of days between observations ($\Sigma[Y_{i+1} + Y_i)/2][X_{i+1}-X_i]$ where Y_i is incidence or severity of powdery mildew in percent 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 were close to long term norms while summer was accented by a few high heat events. Symptoms of powdery mildew were first found on 9 May as a flag shoot in a nearby block and on 13 May as several individual colonies on scattered vines. Highest incidence, severity or AUDPC of powdery mildew on leaves or fruit was found on non-treated vines which was significantly higher than all other treatments (Tables 1 and 2). Lowest incidence, severity or AUDPC on leaves or fruit was found on vines treated with 4 applications of V6M-5-14, which was not significantly lower than all other treatments except the leaf incidence on 12 Aug, AUDPC for leaf incidence (Table 1), cluster incidence on 8 Aug, and AUDPC for cluster incidence (Table 2). No phytotoxicity was observed on vines treated with any fungicide.

Figure 1. Gubler-Thomas grape powdery mildew risk index for the 2024 growing season.

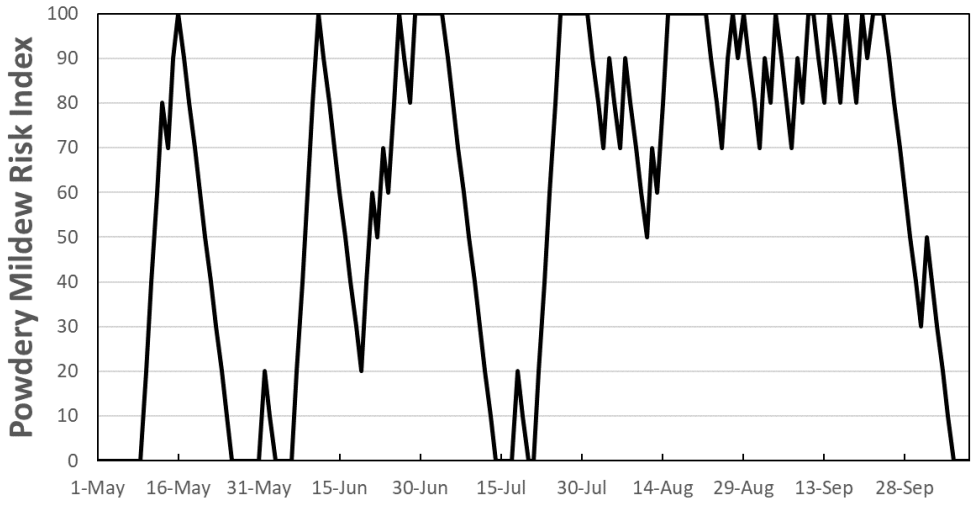

Table 1. Incidence and severity of grape powdery mildew on Pinot noir leaves.

Treatment & Rate/A or /100 gal water as indicated	Time of Application*	Leaves with Powdery Mildew**			
		Incidence (12 Aug)	Incidence AUDPC	Severity (12 Aug)	Severity AUDPC
Non-treated…….……..	None……	100.0 a	3842 a	60.7 a	1182 a
Microthiol Disperss at 6 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb then Gatten at 6.4 fl oz plus Microthiol Disperss at 5 lb then Vivando at 15.4 fl oz plus Microthiol Disperss at 5 lb then Quintec at 4 fl oz plus Microthiol Disperss at 5 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb ….	A B C D E F……..	36.5 b	883 b	3.2 b	45 b
Microthiol Disperss at 6 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal then Vivando at 15.4 fl oz plus Microthiol Disperss at 5 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal then Torino at 3.4 oz plus Microthiol Disperss at 5 lb ….	A B C D E F……..	24.0 c	664 b	1.6 b	26 b
Microthiol Disperss at 6 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal	A C, D, E, & F.	20.8 c	337 c	1.6 b	17 b
Microthiol Disperss at 6 lb then Miravis Prime at 13.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal	A C, D, E, & F.	35.5 b	799 b	2.5 b	38 b

* Treatments were applied on A = 8 May (BBCH 55), B = 1 Jun (BBCH 57), C = 14 Jun (BBCH 64), D = 28 Jun (BBCH 71), E = 12 Jul (BBCH 80), and F = 30 Jul (veraison, BBCH 81).

** Means followed by the same letter do not differ significantly based on Fisher's protected LSD ($P \leq 0.05$) using Agricultural Research Manager (GDM Solutions, Inc.).

Table 2. Incidence and severity of grape powdery mildew on Pinot noir clusters.

Treatment & Rate/A or /100 gal water as indicated	Time of Application*	Clusters with Powdery Mildew**			
		Incidence (8 Aug)	Incidence AUDPC	Severity (8 Aug)	Severity AUDPC
Non-treated…….……..	None……	100.0 a	2100 a	78.8 a	1215 a
Microthiol Disperss at 6 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb then Gatten at 6.4 fl oz plus Microthiol Disperss at 5 lb then Vivando at 15.4 fl oz plus Microthiol Disperss at 5 lb then Quintec at 4 fl oz plus Microthiol Disperss at 5 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb ….	A B C D E F……..	23.3 b	375 b	1.9 b	27 b
Microthiol Disperss at 6 lb then Torino at 3.4 oz plus Microthiol Disperss at 5 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal then Vivando at 15.4 fl oz plus Microthiol Disperss at 5 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal then Torino at 3.4 oz plus Microthiol Disperss at 5 lb ….	A B C D E F……..	26.3 b	480 b	1.1 b	17 b
Microthiol Disperss at 6 lb then V6M-5-14 at 27.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal	A C, D, E, & F.	11.5 c	137 c	0.3 b	3 b
Microthiol Disperss at 6 lb then Miravis Prime at 13.4 fl oz plus Dyne-Amic at 6.4 fl oz/100 gal	A C, D, E, & F.	29.3 b	507 b	2.2 b	29 b

* Treatments were applied on A = 8 May (BBCH 55), B = 1 Jun (BBCH 57), C = 14 Jun (BBCH 64), D = 28 Jun (BBCH 71), E = 12 Jul (BBCH 80), and F = 30 Jul (veraison, BBCH 81).

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