

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

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Fungicides for grape powdery mildew management on Pinot noir, 2023.

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 11 to 12 Feb 2023. Shoot thinning and sucker removal by hand occurred on 14 to 16 May 2023. Suckers were also sprayed with Rely 280 at 1 fl oz/gal on 23 May and subsequent regrowth was removed periodically during the growing season. Canes were cut above the top wire on 17 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 22 May (BBCH 55), 9 Jun (bloom, BBCH 67), 23 Jun (BBCH 73), 7 Jul (BBCH 79), 21 Jul (BBCH 80), 4 Aug (BBCH 82), and 18 Aug (veraison, BBCH 84). Leaves were removed from the fruiting zone on the east side of all vines on 26 Jun. A 2% solution of Mad Dog (55 fl oz/A) was applied to all rows on 18 Mar for weed control. No fertilizer was applied to vines this year. According to the Gubler-Thomas powdery mildew forecasting model, there was 1 rain event favorable for ascospore release and infection between bud break and end of bloom that resulted in a low risk infection period (8 May). The powdery mildew risk index rose to high infection risk (0 to 60) on 21 May, dipped back to medium risk but back up to high risk on 27 May and remained high (above 60) all summer except for brief, one day periods down to medium risk (Figure 1). Incidence and severity of powdery mildew on leaves was evaluated on 6 and 19 Jul, 2 and 16 Aug while incidence and severity of powdery mildew on fruit was evaluated on 19 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 ($\sum [Y_{i+1} + Y_i]/2][X_{i+1} - X_i]$ where Y_i is incidence or severity of 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. The percentage of leaf damage (phytotoxicity) on treated vines was visually estimated on 1 Aug. Fruit russeting was determined on 1 Aug by arbitrarily examining 50 clusters from the middle 3 vines of each replicate. Brix readings were taken on 29 Sep.

Spring weather conditions were normal to dry in April and first week of May but then became very dry with little rainfall for the remainder of the season. Symptoms of powdery mildew were first found on 22 May as a few individual colonies on scattered vines. Flag shoots were not observed in this block. Highest incidence, severity or AUDPC of powdery mildew on leaves was found on non-treated vines which was significantly higher than all other treatments (Table 1). Lowest incidence, severity or AUDPC on leaves was found on vines treated with V6M-5-7, which was significantly lower than all other treatments except the AUDPC for leaf severity. Highest incidence of powdery mildew on clusters was found on non-treated vines but was not significantly different from powdery mildew found on clusters treated with the low rate of SP-2023 (Table 2). Highest severity of powdery mildew on clusters was found on non-treated vines, which was significantly higher than all other treatments. Lowest incidence and severity of powdery mildew on clusters was found on vines treated with V6M-5-7, which was significantly lower than all other treatments.

Phytotoxicity of leaves was first detected on 14 Jun for vines treated with SP-2023. After 4 applications, leaf necrosis and deformation occurred on young leaves while older leaves had marginal chlorosis and reddening. Significant russeting of fruit was also observed on vines treated with SP-2023 (Table 2). Leaf or fruit damage was significantly higher for the higher rate of SP-2023 (Tables 1 and 2). The product SP-2023 was also particularly prone to sticking to the tank and making clean out difficult.

Figure 1. Gubler-Thomas grape powdery mildew risk index for the 2023 growing season.

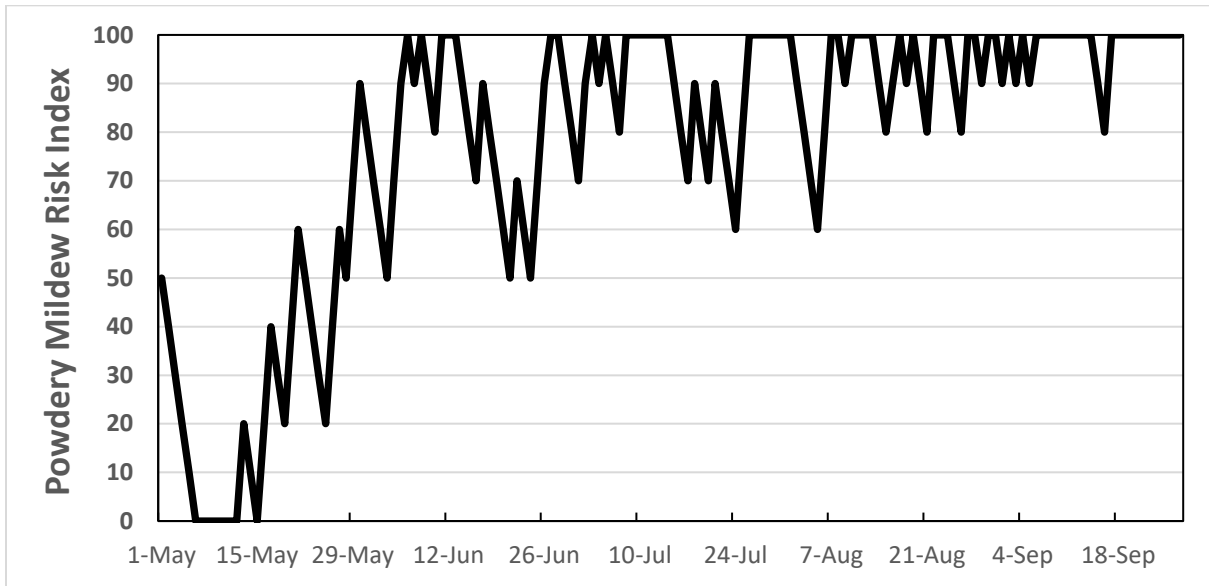


Table 1. Incidence and severity of grape powdery mildew on Pinot noir leaves.

Treatment & Rate/A or /100 gal water as indicated	Leaves with Powdery Mildew*				Phytotoxicity % (Aug 1)**
	Incidence % (16 Aug)	Incidence AUDPC	Severity % (16 Aug)	Severity AUDPC	
Non-treated.....	99.0 a	1834 a	55.7 a	1223 a	0.3 c
Ninja at 8 oz	76.5 c	1152 b	26.6 bc	254 bc	0.0 c
SP-2023 at 16 oz	84.0 b	1012 b	33.2 b	327 b	20.6 b
SP-2023 at 32 oz	56.0 d	544 c	21.2 c	182 bc	41.3 a
V6M-5-7 at 27.4 fl oz plus					
Dyne-amic at 8 fl oz/100 gal ..	12.5 e	150 d	0.7 d	8 c	1.3 c

* 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.).

** The percentage of leaf damage (phytotoxicity) on treated vines was visually estimated on 1 Aug.

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

Treatment & Rate/A or /100 gal water as indicated	Clusters with Powdery Mildew*			
	Incidence % (8 Aug)	Severity (8 Aug)	Fruit Russet Severity (%)*	Brix*
Non-treated.....	100 a	93.8 a	0.0 c	24.1 a
Ninja at 8 oz	76.6 b	34.6 c	0.3 c	23.1 b
SP-2023 at 16 oz	97.6 a	59.7 b	12.5 b	22.3 bc
SP-2023 at 32 oz	38.0 c	6.6 d	37.5 a	22.0 c
V6M-5-7 at 27.4 fl oz plus				
Dyne-amic at 8 fl oz/100 gal	2.5 d	0.1 d	0.5 c	22.3 bc

* 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.).