

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

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Efficacy of pesticides for management of grape powdery mildew and erineum mite on Riesling, 2018.

Fungicide treatments were arranged in a randomized complete block design in a vineyard of 'White Riesling' planted in 1995 on a 7x10 ft spacing. Vines were trained to a bilateral cordon with spur pruning. Vines were pruned on 5Apr. Sucker removal and shoot thinning by hand occurred 17 May. Canes were cut above the top wire on 12 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 80 to 147 gal water/A, depending on time of year, such that 2.5 to 4.9 gal of spray suspension was used per 20 vines, depending canopy growth. Fungicides and miticides were applied on 18 May (BBCH 15), 1 Jun (BBCH 55), 15 Jun (BBCH 61), 29 Jun (BBCH 73), 13 Jul (BBCH 77), 27 Jul (BBCH 79) and 10 Aug (BBCH 81, start of Veraison). No leaves were removed from the fruiting zone. Aim EC (2 fl oz/A) was applied on 18 Apr and Rely 280 (56 fl oz/A) was applied on 16 May for management of weeds. No fertilizer or insecticides were applied during the trial. According to the Gubler-Thomas powdery mildew forecasting model, there were 5 rain events between bud break and end of bloom that were favorable for ascospore release and infection: 3 severe infection periods (27 Apr and 8 and 10 Jun), 1 moderate infection period (8 May) and 1 low infection period (10 May). The risk index shot up from 0 to past 60 during bloom about mid to late June, remained high (above 60) until late July when it dropped below 60 for 3 weeks during a hot period in Aug, then back above 60 until mid Sep. Incidence of grape erineum mite on leaves was evaluated on 11 Jul and 17 Aug by randomly examining 50 leaves from the middle 3 vines of each replicate. Incidence and severity of powdery mildew on fruit was evaluated from 19 Jul to 17 Aug by randomly examining 50 clusters 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 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 for grapes were considered warm and dry with below normal rainfall. Symptoms of powdery mildew were first found on 14 May as a few individual colonies on scattered vines. (One flag shoot was also observed in a nearby Pinot Gris block.) All clusters on non-treated vines had powdery mildew but the incidence found on vines treated with the low rate of Magister was not significantly different (Table 1). Lowest incidence of powdery mildew on clusters or AUDPC was found on vines treated with Luna Sensation alternated with Vivando. There was no difference in AUDPC for incidence among pesticide treated vines. All fungicide or miticide-treated vines had significantly lower severity of powdery mildew on clusters and AUDPC than non-treated vines. Lowest severity of powdery mildew on clusters on 17 Aug or AUDPC was found on vines treated with Luna Sensation alternated with Vivando but the severity of powdery mildew on vines treated with BAS-75007 or the high rate of Magister were not significantly different. Lowest incidence of grape erineum mite was found on vines treated with Magister (Table 2). No phytotoxicity was observed on any vines treated with any material.

Table 1. Incidence and severity of grape powdery mildew on clusters.

Treatment & Rate/A or /100 gal water as indicated	Time of Application*	Clusters with Powdery Mildew**			
		Incidence (17 Aug)	Incidence AUDPC	Severity (17 Aug)	Severity AUDPC
Non-treated.....	None.....	100 a	29.0 a	100 a	28.9 a
Luna Sensation at 7.6 fl oz Alt Vivando at 15.4 fl oz.....	A, C, E, G B, D, F.....	14.0 c	9.8 b	0.5 c	0.1 c
Magister SC at 32 fl oz plus Stylet-Oil at 0.5 gal/100 gal ...	All.....	85.0 a	11.5 b	11.6 b	1.9 b
Magister SC at 36 fl oz plus Stylet-Oil at 0.5 gal/100 gal ...	All.....	42.0 b	13.4 b	3.0 c	0.5 c
BAS-75007 at 4 fl oz plus OVS 90 NIS at 16 fl oz/100 gal	All.....	41.5 b	10.3 b	1.6 c	0.4 c

* Pesticides were applied on A = 18 May (BBCH 15), B = 1 Jun (BBCH 55), C = 15 Jun (BBCH 61), D = 29 Jun (BBCH 73), E = 13 Jul (BBCH 77), F = 27 Jul (BBCH 79) and G = 10 Aug (BBCH 81, start of Veraison.

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

Table 2. Incidence of grape erineum mite on leaves.

Treatment & Rate/A or /100 gal water as indicated	Time of Application*	Leaves with mites**	
		Incidence (11 July)	Incidence (17 Aug)
Non-treated.....	None.....	21.0 a	28.8 a
Luna Sensation at 7.6 fl oz Alt Vivando at 15.4 fl oz.....	A, C, E, G B, D, F.....	21.0 a	22.0 b
Magister SC at 32 fl oz plus Stylet-Oil at 0.5 gal/100 gal ...	All.....	0.8 b	1.3 c
Magister SC at 36 fl oz plus Stylet-Oil at 0.5 gal/100 gal ...	All.....	0.8 b	0.3 c
BAS-75007 at 4 fl oz plus OVS 90 NIS at 16 fl oz/100 gal	All.....	26.8 a	25.5 ab

* Pesticides were applied on A = 18 May (BBCH 15), B = 1 Jun (BBCH 55), C = 15 Jun (BBCH 61), D = 29 Jun (BBCH 73), E = 13 Jul (BBCH 77), F = 27 Jul (BBCH 79) and G = 10 Aug (BBCH 81, start of Veraison.

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