

GRAPE (*Vitis vinifera* 'White Riesling')
Powdery Mildew; *Erysiphe necator*
Botrytis Bunch Rot; *Botrytis cinerea*

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Efficacy of fungicide for management of grape diseases on Riesling, 2018.

Fungicide treatments were arranged in a randomized complete block design in a block of 'White Riesling' planted in 1985 on a 8x10 ft spacing. Vines were trained to a bilateral cordon with spur pruning. Vines were pruned 27 to 28 Mar. Sucker removal and shoot thinning by hand occurred 3 to 4 May. Canes were cut above the top wire on 29 Jun 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 on canopy growth. The preharvest application was at a rate of 80 gal water/A and directed at the fruiting zone. Fungicides were applied on 16 May (BBCH 15), 25 May (BBCH 54), 30 May (BBCH 55), 7 Jun (BBCH 56), 15 Jun (BBCH 61), 19 Jun, 29 Jun (BBCH 73), 13 Jul (BBCH 77), 27 Jul (BBCH 79), 10 Aug (BBCH 81, start of Veraison) and 14 Sep (preharvest). Leaves were removed from the east side fruiting zone on 11 Jul. 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 and severity of powdery mildew on fruit was evaluated on 15 Aug. Incidence and severity of powdery mildew on leaves was evaluated on 23 Aug. Powdery mildew disease data was collected by randomly examining 50 leaves or clusters from the middle 3 vines of each replicate. Nets were placed over rows on 17 Sep to prevent bird damage. Incidence and severity of bunch rot was determined on 11 Oct by harvesting and examining 50 clusters (average 19.1° Brix) from the center of each set of vines.

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.) Highest incidence and severity of powdery mildew was found on vines treated with Microthiol Disperss since the retreatment intervals were much long, especially at bloom, for adequate control (Table 1). Sulfur was selected to minimize powdery mildew and have clusters to be used for bunch rot evaluations. This treatment is in essence a non-treated control for bunch rot evaluations. Lowest incidence of powdery mildew on leaves was found on vines treated with TopGuard alone but was not significantly different from vines treated with either a Inspire Super/Torino/Luna Experience alternation or Inspire Super/Torino/F-4406-3 alternation. Lowest severity of powdery mildew on leaves was found on vines treated with the Inspire Super/Torino/Luna Experience alternation but was not significantly different from vines treated with TopGuard alone or other alternation programs. Lowest incidence of powdery mildew on clusters was found on vines treated with the Inspire Super/Torino/Luna Experience alternation. Lowest severity of powdery mildew on clusters was found on vines treated with the Inspire Super/Torino/Luna Experience alternation but was not significantly different from vines treated with TopGuard alone or other alternation programs. Bunch rot symptoms were first observed sporadically throughout the vineyard on 11 Sep and confirmed on 24 Sep. Incidence and severity of bunch rot was not significant different between any treatments including non-treated vines. Incidence was high but severity had not increased to a point where differences might have been determined. Although no necrotic phytotoxicity was observed on any vines treated with any material, there was a subtle discolored "ring" found on the bottom of some fruit treated with Induce. The ring was not necrotic, confined to the epidermis, had a cinnamon brown margin that could be lightly scraped off and the area inside the ring lacked normal whitish epicuticular wax.

Table 1. Incidence and severity of powdery mildew on leaves and fruit.

Treatment & Rate/A or /100 gal water as indicated	Time of Application*	% Leaves with Powdery Mildew (23 Aug)**		% Clusters with Powdery Mildew (15 Aug)**	
		Incidence	Severity	Incidence	Severity
Microthiol Disperss at 5 lb	A, B, D, F, G, H, I and J	86.5 a	5.7 a	100 a	55.9 a
TopGuard at 10 fl oz	A, C, E, G, H, I and J	11.5 c	0.4 b	27.5 b	0.5 b
Inspire Super at 20 fl oz then Torino SC at 3. 4 fl oz then Luna Experince at 8.6 fl oz.....	A, C E, G H, I, J.....	12.5 c	0.2 b	2.5 c	0.0+ b
TopGuard at 10 fl oz then Torino SC at 3. 4 fl oz then F-4406-3 at 6 fl oz plus Induce at 16 fl oz/100 gal	A, C E, G H, I, J.....	34.5 b	1.0 b	32.5 b	1.1 b
Inspire Super at 20 fl oz then Torino SC at 3. 4 fl oz then F-4406-3 at 6 fl oz plus Induce at 16 fl oz/100 gal	A, C E, G H, I, J.....	27.5 bc	1.0 b	24.0 b	0.5 b

* Fungicides were applied on A = 16 May (BBCH 15), B = 25 May (BBCH 54), C = 30 May (BBCH 55), D = 7 Jun (BBCH 56), E = 15 Jun (BBCH 61), F = 19 Jun, G = 29 Jun (BBCH 73), H = 13 Jul (BBCH 77), I = 27 Jul (BBCH 79), and J = 10 Aug (BBCH 81, start of Veraison).

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

Table 2. Incidence and severity of bunch rot.

Treatment & Rate/A or /100 gal as indicated below	Time of application*	% Bunch Rot**	
		Incidence (11 Oct)	Severity (11 Oct)
Microthiol Disperss at 5 lb ...	A, B, D, F, G, H, I, J & K	67.0	3.8
TopGuard at 10 fl oz	A, C, E, G, H, I, J & K	54.0	4.9
Inspire Super at 20 fl oz then Torino SC at 3. 4 fl oz then Luna Experince at 8.6 fl oz	A, C E, G H, I, J & K	58.5	2.1
TopGuard at 10 fl oz then Torino SC at 3. 4 fl oz then F-4406-3 at 6 fl oz plus Induce at 16 fl oz/100 gal	A, C E, G H, I, J & K ...	45.0	1.9
Inspire Super at 20 fl oz then Torino SC at 3. 4 fl oz then F-4406-3 at 6 fl oz plus Induce at 16 fl oz/100 gal	A, C E, G H, I, J & K ...	51.5	4.0

* Treatments were applied on A = 16 May (BBCH 15), B = 25 May (BBCH 54), C = 30 May (BBCH 55), D = 7 Jun (BBCH 56), E = 15 Jun (BBCH 61), F = 19 Jun, G = 29 Jun (BBCH 73), H = 13 Jul (BBCH 77), I = 27 Jul (BBCH 79), J = 10 Aug (BBCH 81, start of Veraison) and K = 14 Sep (preharvest).

** Means without letters do not differ significantly based on Fisher's protected LSD ($P=0.05$).