

GRAPE (*Vitis* interspecific hybrid 'Vignoles')
Botrytis fruit rot; *Botrytis cinerea*
Sour rot; *Saccharomyces* yeast, acetic acid bacteria
Powdery mildew; *Erysiphe necator*

K.A. Neugebauer, R.W. Sysak, R.L. Smith, and T.D. Miles
Department of Plant, Soil and Microbial Sciences
Michigan State University, East Lansing, MI 48824

Evaluation of fungicides for control of cluster rot and powdery mildew on wine grapes, 2024.

The experiment was conducted in a commercial vineyard in Berrien Springs, MI. Vines were spaced at 7 x 9 ft and were cordon-trained on a 2-wire trellis and hand pruned. Treatments were applied to 3-vine plots and were replicated four times in a randomized complete block design. Sprays were applied with a RYOBI ONE+ 18v Cordless Battery 4 Gallon Backpack Chemical Sprayer with the adjustable nozzle. Spray volume was 50 gpa. Spray dates and approximate phenological stages were as follows: 4 June (6-12" shoot), 10 June (bloom), 17 June (1st post bloom), 24 June (2nd post bloom), 1 July (3rd post bloom), 15 July (4th post bloom), 22 July (5th post bloom), 29 July (6th post bloom), 5 August (7th post bloom), 12 August (8th post bloom), 19 August (9th post bloom), and 26 August (10th post bloom). Cluster rot (consisting of botrytis fruit rot and sour rot) and powdery mildew on leaves were rated on 7 September. Both diseases were rated by visually assessing 25 randomly selected leaves or clusters taken from the center vine in each plot. Incidence was defined as the percent of clusters or leaves exhibiting disease and severity was defined as the percentage of diseased surface area on diseased samples only. Overall severity was calculated as (incidence x severity)/100. Vines were monitored for signs of phytotoxicity throughout the season and none was observed.

Cluster rot, rated 09/07/24

Treatment, rate/A	Application timing ^z	Incidence (%)	Severity (%)	Overall severity (%) ^x	Control [%] ^y
Untreated		81.0 a	73.2 a	51.9 a	
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
Armicarb O 5lbs/100gal + Entrust 6oz	10, 11, 12	62.0 b	33.5 c	21.1 c	[59]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
JMS Stylet Oil 2gal/100gal + Entrust 6oz	10, 11, 12	61.0 b	48.6 b	30.0 b	[42]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
Sonata 4 qt + Entrust 6oz	10, 11, 12	59.0 bc	20.2 d	12.0 d	[77]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
SilMatrix 1% + Entrust 6oz	10, 11, 12	53.0 cd	19.1 d	10.4 de	[80]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
PureSprayGreen 3gal/100 + Entrust 6oz	10, 11, 12	50.0 de	17.6 de	8.7 ef	[83]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
Oso 5% + Entrust 6oz	10, 11, 12	48.0 de	14.2 ef	6.9 fg	[87]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vanguard 10 oz	9,				
Actinovate 12 oz + Entrust 6oz	10, 11, 12	45.0 ef	12.0 fg	5.5 gh	[89]

Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Serifel 16 oz + Entrust 6oz	10, 11, 12	41.0	fg	8.8	g	3.8	i	[93]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
LifeGard 4.5oz/100gal + Entrust 6oz	10, 11, 12	39.0	fg	10.2	fg	4.1	hi	[92]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
ProBlad Verde 40floz + Entrust 6oz	10, 11, 12	37.0	g	9.4	fg	3.7	i	[93]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Stargus 2 qt + Entrust 6oz	10, 11, 12	36.0	g	8.1	gh	3.4	i	[93]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Switch 14 oz + NuFilmP 0.125%	10, 11, 12									
Mustang Maxx 6 oz	10, 11, 12	18.0	h	3.6	h	0.8	j	[99]		

^zSpray dates: 1 = 4 June (6-12in shoot), 2 = 10 June (bloom), 3 = 17 June (1st post bloom), 4 = 24 June (2nd post bloom), 5 = 1 July (3rd post bloom), 6 = 15 July (4th post bloom), 7 = 22 July (5th post bloom), 8 = 29 July (6th post bloom), 9 = 5 August (7th post bloom), 10 = 12 August (8th post bloom), 11 = 19 August (9th post bloom), and 12 = 26 August (10th post bloom).

^yBracketed values denote percent control relative to the untreated check.

^x Values shown are actual means; statistical analysis was performed on square-root(x) transformed data.

Powdery mildew, rated 09/07/24

Treatment, rate/A	Application timing ^z	Incidence (%) ^w	Severity (%)	Overall severity (%) ^x	Control [%] ^y
Untreated		82.0 a	62.0 a	50.8 a	
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
Armcarb O 5 lbs/100gal + Entrust 6oz	10, 11, 12	60.0 b	33.5 c	20.1 b	[60]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
SilMatrix 1% + Entrust 6oz	10, 11, 12	57.0 b	28.4 d	16.2 d	[68]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
Sonata 4 qt + Entrust 6oz	10, 11, 12	56.0 b	31.2 cd	17.5 cd	[65]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
JMS Stylet Oil 2gal/100 + Entrust 6oz	10, 11, 12	55.0 b	39.4 b	22.0 b	[57]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
Oso 5% + Entrust 6oz	10, 11, 12	45.0 c	11.4 e	5.2 e	[90]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
PureSpray Green 3gal/100 + Entrust 6oz	10, 11, 12	42.0 cd	11.4 e	4.9 ef	[90]
Manzate Max 0.56 gal	1, 2, 3,				
Abound 15.5 floz	4,				
Rhyme 5 floz	5, 7,				
Vivando 15.4 floz	6, 10,				
Pristine 23 oz	8,				
Vangard 10 oz	9,				
Actinovate 12 oz + Entrust 6oz	10, 11, 12	36.0 d	9.8 e	3.53 efg	[93]

Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
LifeGard 4.5oz/100gal + Entrust 6oz	10, 11, 12	36.0	d	9.2	ef	3.47	fgh	[93]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Serifel 16 oz + Entrust 6oz	10, 11, 12	28.0	e	7.8	ef	2.33	gh	[95]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
ProBlad Verde 40 floz + Entrust 6oz	10, 11, 12	28.0	e	7.5	ef	2.34	h	[95]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Stargus 2 qt + Entrust 6oz	10, 11, 12	22.0	e	4.6	fg	1.2	i	[97]		
Manzate Max 0.56 gal	1, 2, 3,									
Abound 15.5 floz	4,									
Rhyme 5 floz	5, 7,									
Vivando 15.4 floz	6, 10,									
Pristine 23 oz	8,									
Vanguard 10 oz	9,									
Switch 14 oz + NuFilmP 0.125%	10, 11, 12									
Mustang Maxx 6 oz	10, 11, 12	7.0	f	1.3	g	0.2	j	[99]		

^zSpray dates: 1 = 4 June (6-12in shoot), 2 = 10 June (bloom), 3 = 17 June (1st post bloom), 4 = 24 June (2nd post bloom), 5 = 1 July (3rd post bloom), 6 = 15 July (4th post bloom), 7 = 22 July (5th post bloom), 8 = 29 July (6th post bloom), 9 = 5 August (7th post bloom), 10 = 12 August (8th post bloom), 11 = 19 August (9th post bloom), and 12 = 26 August (10th post bloom).

^yBracketed values denote percent control relative to the untreated check.

^x Values shown are actual means; statistical analysis was performed on square-root(x) transformed data.

^w Data did not pass Bartlett's test for homogeneity of variance; some assumptions of the ANOVA may have been violated.