

Evaluation of fungicide programs for control of powdery mildew on grapevines, 2022

Experimental and registered fungicides were tested in various combinations for the control of powdery mildew in a 11-yr-old 'Chenin Blanc' vineyard at the University of California Davis Plant Pathology Field Research Facility in Davis, CA. Rows were spaced 11 feet apart and vines 7 feet apart. Fungicide treatments were applied from mid-Apr until mid-Jul. The spray volume was gradually increased from 50 to 150 gal/A as the vines grew to ensure complete coverage. Treatments were applied to run-off using a mist blower backpack sprayer (Stihl SR 430). Treatments were performed in a complete randomized block design with four replicates of two vines each. Trial I consisted of synthetic fungicides and combinations of soft chemistry and synthetic products. Trial II consisted of soft chemistry products, including biologicals, sulfurs, nutrient applications, oils, and other materials. Spray frequencies varied from 7-day to 21-day intervals. During the spray period, vines were irrigated by drip irrigation. Sucker shoot removal and leafing were carried out on 21 Jun. Treatments were evaluated for disease incidence and severity on 23 Jul. A total of twenty-five random clusters were evaluated per replicate. Incidence was defined as the proportion of clusters in a plot showing symptoms and/or signs of powdery mildew. Severity was determined by estimating the percentage of the area of a cluster that was infected; the severity value of all clusters was then averaged to give a plot-wide estimate of disease severity. Mean incidence and severity values for each treatment were computed. Trials data were analyzed using ANOVA and means were compared using Fisher's LSD test ($\alpha=0.05$).

Temperatures were mild and dry throughout the growing season, nine precipitation events of 0.01 to 0.5 in. were recorded from Apr to Jul. First signs of powdery mildew were observed in mid-Jun on berries. Overall, the disease pressure was high. By the time of evaluation, disease incidence and severity in the untreated control had reached 85.6% and 40.7%, respectively. All treatments showed a significant reduction in disease incidence and severity compared to the untreated control in Trial I. Programs consisting of synthetic fungicides and combinations of soft chemistry alternated with synthetic products provided a satisfactory control and some programs completely controlled the disease. The experimental materials in rotation and combination with conventional fungicides also provided satisfactory disease control. The least effective programs were Gatten 6.4 fl oz and ReyZox 11.58 fl oz. In Trial II, all treatments showed a significant reduction in disease severity compared to the untreated control. Programs of sulfur in regular rotation with other soft chemistry products or experimental fungicides provided very good control. The least effective treatment was the experimental fungicide X7N68-R007 16 fl oz. Phytotoxicity was observed on berries and leaves for treatments Sulfur dry flowable 5lb + JMS Stylet 1% v/v + Serifel 10oz, and OxiDate 5.0 1.0% v/v + Kinetic 0.125% v/v +Sulfur DF 5 lb. Minor symptoms of phytotoxicity on leaves were observed for treatment BoostBiome BC18 70 oz.

Trial I

Treatment and rate/A ^z	Application date (Julian day)	Powdery mildew on the cluster ^y	
		Incidence, %	Severity, %
Abound 15.5 fl oz + Syl-Coat 4 fl oz	105	0.0 a	0.00 a
Proливо 5 fl oz + Syl-Coat 4 fl oz	119		
Kenja 22 fl oz + Rally 4 oz + Syl-Coat 4 fl oz	132		
Quintec 4 oz + Syl-Coat 4 fl oz	147		
Torino 3.4 oz + Syl-Coat 4 fl oz	161		
Merivon 4 oz + Syl-Coat 4 fl oz	178		
Vivando 15.4 oz + Syl-Coat 4 fl oz	193		
PureSpray Green 1 gal	103, 110, 117	0.0 a	0.00 a
Luna Experience 8.6 fl oz	124, 182		
Pristine 23 oz	138		
Elevate 16 oz	152		
Parade 3.1 fl oz	166		
Parade 3.1 fl oz + Dyne-Amic 0.25% v/v	108, 122, 136, 150, 165, 179, 194	0.0 a	0.00 a
Aprovia Top 13.3 fl oz +Syl-Coat 0.125% v/v	122, 179	0.0 a	0.00 a
Quintec 6.6 fl oz + Syl-Coat 0.125% v/v	136, 194		
Miravis Prime 13.4 fl oz +Syl-Coat 0.125% v/v	165		
Inspire Super 20 fl oz +Syl-Coat 0.125% v/v	150		
Aprovia Top 13.3 fl oz + A9180B 0.5 oz +Syl-Coat 0.125% v/v	122, 179	0.0 a	0.00 a
Quintec 6.6 fl oz + A9180B 0.5 oz + Syl-Coat 0.125% v/v	136, 194		
Miravis Prime 13.4 fl oz + A9180B 0.5 oz +Syl-Coat 0.125% v/v	165		
Inspire Super 20 fl oz + A9180B 0.5 oz + Syl-Coat 0.125% v/v	150		
Proливо 5 fl oz+ Dyn-Amic 0.125% v/v	105, 119, 132, 147, 178, 193	0.8 a	0.01 a
PureSpray Green 1 gal	108	0.8 a	0.01 a
Inspire Super 20.0 fl oz + Syl-Coat 0.125% v/v	122, 194		
Aprovia Top 13.3 fl oz + Syl-Coat 0.125% v/v	136, 165, 179		
Quintec 6.6 fl oz + Syl-Coat 0.125% v/v	150		
BTS-EXP-100 20.5 fl oz	108, 150	0.8 a	0.01 a
Quintec 5fl oz	122		
Mettle 4 fl oz	136		
Inspire Super 20 fl oz	165		
Luna Experience 8.6 fl oz	179		
Vivando 15 fl oz	194		

FAP65 3 lb + Trionic 8 fl oz + Vacciplant 16 fl oz	108	0.1 a	0.04 a
Microthiol Disperss 3 lb + Quintec 4 fl oz + Vacciplant 16 fl oz	122		
Microthiol Disperss 3 lb + Tronic 8 fl oz + Vacciplant 16 fl oz	136		
Inspire Super 20 fl oz	150		
Torino 3.4 fl oz + PhD 6.2 fl oz	165		
Luna Experience 8.6 fl oz	179		
Vivando 15 fl oz	194		
Luna Experience 8.6 fl oz	105, 161	1.6 a	0.02 a
Pristine 23 oz	119, 178		
Elevate 16oz	132, 193		
Parade 3.1 oz	147		
Oxidate 5.0 1.0% v/v	105, 132, 161, 193	1.6 a	0.02 a
Luna Experience 8.6 fl oz	119, 147, 178		
Flint Extra 3.5 fl oz + Syl-Coat 4 fl oz	105	1.6 a	0.05 a
Proливо 5 fl oz + Syl-Coat 4 fl oz	119		
Luna Experince 6.4 fl oz + Syl-Coat 4 fl oz	132		
Quintec 4 fl oz + Syl-Coat 4 fl oz	147		
Torino 3.4 fl oz + Syl-Coat 4 fl oz	161		
Luna Sensation 5 fl oz + Syl-Coat 4 fl oz	178		
Vivando 15.4 fl oz + Syl-Coat 4 fl oz	193		
Sulfur dry flowable 5lb	103, 110, 117, 145, 152, 159, 173, 182, 192	1.6 a	0.05 a
Luna Sensation 2.7 fl oz	124		
Switch 17.13 oz	138		
Endura 4.5 fl oz	166		
BTS-EXP-100 27.4 fl oz	108, 150	2.4 a	0.02 a
Quintec 5fl oz	122		
Mettle 4 fl oz	136		
Inspire Super 20 fl oz	165		
Luna Experience 8.6 fl oz	179		
Vivando 15 fl oz	194		
Gatten 6.4 fl oz + Dyne-Amic 0.25% v/v	108, 122, 136, 150, 165, 179, 194	2.4 a	0.06 a
Regev 8.5 fl oz + Dyne-Amic 0.125% v/v	105, 119, 132, 147, 178, 193	2.4 a	0.10 a
Luna Experience 8.6 fl oz	105, 119, 132, 147, 161, 178, 193	3.2 a	0.08 a
Cevya 5 fl oz	105, 119, 132, 147, 161, 178, 193	4.0 a	0.07 a
LALSTOP-G46-WG 1.78oz + LALSTIM-OSMO 4.28 oz	103, 110, 173, 182	12.0 a	0.44 a
Sulfur dry flowable 5lb	117, 145, 192		
Luna sensation 2.7 fl oz	124		
Switch 17.13 oz	138		
LALSTOP-G46-WG 3.57 oz + LALSTIM-OSMO 4.28 oz	152, 159, 166		
Parade 3.2 fl oz + Dyne-Amic 12.8 fl oz	136, 159, 179	15.2 a	4.23 a
Gatten 6.4 fl oz	136, 159, 179	34.4 b	3.20 a
ReyZox 11.8 fl oz	105, 119, 132, 147, 161, 178, 193	39.2 b	6.73 a
Untreated Control	Not Applicable	85.6 c	40.7 b

^z Products with a '+' sign in between indicates a tank mix.

^y Means followed by the same letter within a column are not significantly different according to Fisher's LSD with $\alpha=0.05$.

Trial II

Treatment and rate/A ^z	Application date (Julian day)	Powdery mildew on the cluster ^y	
		Incidence, %	Severity, %
PureSpray Green 1 gal	103, 110, 117	2.4 a	0.1 a
Sulfur Dry Flowable 5 lb	124, 131, 138, 145, 152, 159, 166, 173, 182, 192		
P18-16 2 oz + Embreca-EA 16 fl oz	103, 117, 131, 145, 159, 173, 192	4.0 a	0.1 a
Sulfur Dry Flowable 5 lbs	110, 124, 138, 152, 166, 182		
Sulfur dry flowable 5lb	103, 110, 117, 124, 131, 138, 173, 182, 192	4.0 a	0.2 a
JMS Stylet 1% v/v	145, 152, 159		
Serifel 10oz	166		
P18-16 1 oz + Embreca-EA 16 fl oz	103, 117, 131, 145, 159, 173, 192	10.4 a	0.7 a
Sulfur Dry Flowable 5 lbs	110, 124, 138, 152, 166, 182		
OxiDate 5.0 1.0% v/v + Kinetic 0.125% v/v	117, 131, 145, 159, 173, 192	18.4 a	1.1 ab
Sulfur DF 5 lb	124, 138, 152, 166, 182		

LALSTOP-G46-WG 1.78 oz + LALSTIM-OSMO 4.28 oz	103, 166	28.8 b	2.0 a-c
Prev AM Ultra 50 fl oz	110		
Sulfur Dry Flowable 5 lb	117, 124, 131, 138, 182, 192		
JMS Stylet 1% v/v	173		
LALSTOP-G46 WG 3.57 oz + LALSTIM-OSMO 4.25 oz	145, 159		
Serifel 10 oz	152		
Berezi 5 lb	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182	30.4 b	2.1 a-c
JMS Stylet-oil 1% v/v	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182, 192	33.6 b	3.8 a-d
Regalia 2 qt + CS-2005 1 qt	108, 122, 136, 150, 165, 179, 194	37.6 b	4.1 a-d
Regalia 2 qt	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182, 192	39.2 b	6.1 a-f
Esendo 2.8lb + Kinetic 0.125% v/v	105, 119, 132, 147, 161, 178, 193	40.8 b	6.9 a-f
Sulfur Dry Flowable 5 lb	103, 110, 117	42.4 b	4.9 a-e
BTS-EXP-100 27.4 fl oz	124, 131, 138, 145, 152, 159, 166, 173, 182, 192		
CS-2005 32 fl oz	108, 122, 136, 150, 165, 179, 194	44.0 b	18.3 d-g
Ninja 8 fl oz	105, 119, 132, 147, 161, 178, 193	47.2 b	5.0 a-e
PureSpray Green 1 gal	103, 110, 124, 138, 159, 166, 182	47.2 b	15.9 c-g
Sulfur Dry Flowable 5 lb	103, 110, 117,	52.0 b	5.9 a-f
BTS-EXP-100 20.5 fl oz	124, 131, 138, 145, 152, 159, 166, 173, 182, 192		
Vintre 48 fl oz	108, 122, 136, 150, 165, 179, 194	52.0 b	20.4 fg
AGS-FunThyme 0.5% v/v + Dyne-Amic 0.1% v/v	103, 110, 124, 138, 152, 166	52.8 b	6.9 a-f
Berezi 3 lb	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182, 192	52.8 b	9.1 a-f
microSURE 4.36 gal	105, 119, 132, 147, 161, 178, 193	56.8 b	15.6 b-g
Cinnaction 50 fl oz + Vintre 32 fl oz	105, 119, 132, 147, 161, 178, 193	57.6 b	9.9 a-f
P18-16 1 oz + Embrece-EA 16 fl oz	105, 119, 132, 147, 161, 178, 193	57.6 b	12.1 a-g
AGS-Fun-2 0.5% v/v + Dyne-Amic 0.1% v/v	103, 110, 124, 138, 152, 166	57.6 b	13.2 a-g
LALSTOP-G46 3.5 oz + LALSTIM-OSMO 4.5 oz	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182, 192	58.4 b	11.5 a-g
X7N68-R007 16 fl oz+ Dyne-Amic 0.25% v/v	108, 122, 136, 150, 179, 194	60.8 b	9.7 a-f
Serifel 6 oz	103, 110, 117, 124, 131, 138, 145, 152, 159, 166, 173, 182, 192	61.6 b	11.0 a-f
BoostBiome BC18 70 oz	105, 119, 132, 147, 161, 178, 193	61.6 b	11.1 a-f
LPI-6724 12.8 fl oz + LI700 0.250 % v/v	105, 117, 138, 159, 166, 182	64.0 b	9.0 a-f
Theia 3 lb + Kinetic 0.125% v/v	105, 119, 132, 147, 161, 178, 193	64.8 b	5.7 a-e
Regalia 2qt	105, 119, 132, 147, 161, 178, 193	65.6 b	6.25 a-f
Vintre 32 fl oz	108, 122, 136, 150, 165, 179, 194	66.4 b	11.9 a-g
Milagrums plus 40 fl oz/100 gal + Oroboost 32 fl oz/100 gal	108, 122, 136, 150, 165, 179, 194	67.2 b	10.3 a-f
Howler 2.5 lb + Theia 1.5 lb + Kinetic 0.125% v/v	105, 119, 132, 147, 161, 178, 193	73.6 b	10.5 a-f
X7N68-R007 16 fl oz	108, 122, 136, 150, 179, 194	76.8 b	26.0 g
Howler 5lb + Kinetic 0.125% v/v	105, 119, 132, 147, 161, 178, 193	78.4 b	10.5 a-f
P18-16 2 oz + Embrece-EA 16 fl oz	105, 119, 132, 147, 161, 178, 193	80.0 b	19.2 e-g
Untreated Control	Not Applicable	85.6 b	40.7 h

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