

**Powdery Mildew Trial 3----Demonstration of effectiveness of Sonata, Bacillus subtilis strain 2802, in a wine grape IPM program to control powdery mildew. Herzog Ranch, Courtland, CA.**

Trial name .....	<b>Grape powdery mildew fungicide trial 3 2005</b>		Update: 31 May 05
Location .....	Courtland, Sacramento Co. (Herzog Ranch)		
Investigators .....	Doug Gubler, 530.752.0304		
Cooperators .....	John, Cathy, Randy Baranek, Tom Herzog, Herzog Ranch		
Crop.....	Grape 'Chardonnay'		
Disease .....	Powdery mildew, <i>Erysiphe necator</i>		
<b>Method</b>			
Objective .....	Efficacy of fungicides for control of powdery mildew		
Experimental design	Treatments are field applications to 3 vine plots, in a randomized complete block design, with 5 replications.		
Application method.....	high pressure hand gun sprayer		
Vine spacing.....	7'	Row spacing .....	12'
Treatment unit.....	3 vines	Treatment unit area...	252 ft <sup>2</sup>
Area/Treatment, sq .....	1260	Area/Treatment, acre	0.0289256
Vol. Water/acre, gal	138	Vol. water/trt, gal .....	4-5.25 (6.25-7.5 gal tank)
Apps timing.....	A=budbreak; B = pre-bloom; C=bloom, D=berry set, E=pre-close, F=close, G=veraison		
		Evaluation stage .....	1 week after final app.

Treatment	Code	Product	Rate/A	Interval
1. Control <b>W</b>	-----	-----	-----	-----
2. Chemical based program <b>RDT</b>	A Budbreak	Sulfur	5 #	14 day
	B Prebloom	Sulfur	5#	14 day
	C Prebloom	Sulfur	5#	14 day
	D Bloom	Pristine	10.5 oz	21 day
	E Berry Set	Quintec 250SC	6 fl oz	21 day
	F Pea Sized	Flint 50DF	2 oz	21 day
3. Integrated Program <b>YWS</b>	A Budbreak	Sulfur	5#	14
	B Prebloom	Sulfur	5#	14
	C Prebloom	Sulfur	5#	14
	D Bloom	Pristine	10.5 oz	21
	E Berry Set	Sonata+Nufilm	4 qts+0.03%	14
	F Pea Sized	Sonata+Nufilm	4 qts+0.03%	14
4. Integrated Program <b>RWS</b>	A Budbreak	Sulfur	5#	14
	B Prebloom	Sulfur	5#	14
	C Prebloom	JMS Stylet Oil	1.5%	14
	D Bloom	Pristine	10.5 oz	21
	E. Berry Set	Sonata+Nufilm	4 qts+0.03%NF	14
	F Pea Sized	Quintec	6 oz	21
5. Organic Program	A Budbreak	Sulfur	5#	14
	B Prebloom	Sonata+Nufilm	4 qts+0.03%	14

<b>GWS</b>	C Prebloom	JMS Stylet Oil	1.5%	14
	D Bloom	Sonata+Nufilm	4 qts+0.03%	14
	E Berry Set	Kaligreen	3 lbs	7
	F Pea Size	JMS Stylet Oil	1.5%	14
	G Preclose	Sonata+Nufilm	4 qts+Nufilm	14
	H Closure	Kaligreen	3 lbs	7
I Veraison				
96. Sonata Program <b>BDT</b>	A-H	Sonata	4 q ts+0.03% Nufilm	RAI
7. Integrated Program <b>BWS</b>	A Budbreak	Sulfur	5#	RAI
	B Prebloom	Sulfur	5#	RAI
	C Prebloom	Quintec	6 oz	RAI
	D Bloom	Sonata	4 qts+0.03% Nf	RAI
	E Berry Set	Pristine	10.5 oz	RAI
	F Pea Size	Sonata	4 qts+0.03% Nf	RAI
	G Preclose	Quintec	6 oz	RAI
	H Closure	Sonata	4 qts+0,03% Nf	RAI

#### Spray Activity

Date	Activity
5/20	Treated all "C" treatments.
6/10	Disease pressure was high from May through this date and leaf removal had not yet been done so the decision was made to eradicate using JMS Stylet Oil.
6/10	NuFilm was replaced by latron before this date, prinstine was over dosed in trial 3.
6/16	Sprayed JMS Stylet Oil on all treatments, including guard rows and end vines of each row.
7/21	Last spray
8/8	Disease rating. Severity of 35 clusters in each plot (replication) was evaluated.

## Application

Date	5/20	5/27	6/2	6/9	6/10	6/16	6/30	7/7	7/14	7/21
App #		1	2	3	4	5	6	7	8	9
Stage										
Volu	5 gal/trt	5 gal/trt	5 gal/trt	5 gal/trt	5 gal/trt					
1										
2	X		X	X		2% Stylet oil	X			X
3	X		X		X		X		X	
4	X		X		X		X			X
5	X	X	X	X			X		X	
6	X	X	X		X		X	X	X	X
7	X	X	X	X			X	X	X	X

Detailed fungicide applications

Treatment	Product			5/20	5/27	6/2	6/9	6/10	6/16	6/30	7/7	7/14	7/21	
1. Control	-----													
2. Chemical based program <b>RDT</b>	Sulfur								2% Stylet oil				59	
	Sulfur			59		298	4.6			1.7				
3. Integrated Program <b>YWS</b>	Sulfur												59	
	Sulfur			59		298								
	Sulfur Pristine Sonata+ Nufilm Sonata+ Nufilm							98.4 Latr			98 5.6			
4. Integrated Program <b>RWS</b>	Sulfur													59
	Sulfur JMS Stylet Oil Pristine Sonata+ Nufilm Quintec			22		298		98.4 Latron			4.4			
5. Organic Program <b>GWS</b>	Sulfur													
	Sonata+Nufilm JMS Stylet Oil Sonata+ Nufilm Kaligreen JMS Stylet Oil Sonata+ Nufilm Kaligreen			22	206 Latrn	206 Latrn	0.4			89		36. 95. 6		
6. Sonata Program	Sonata+ Nufilm			98	206 Latrn	206 Latrn		98		98 5.6	98 5.6	98 5.6	98 5.6	
7. Integrated program <b>BWS</b>	Sulfur												59	
	Sulfur Quintec Sonata Pristine Sonata+ Nufilm Quintec Sonata+NF			4.4										
					206 Latrn	206 Latrn	7.7			98 5.6	4.4		98	

**Herzog Ranch Powdery Mildew Trial 3 Plot Map**  
**Rows oriented E-W**

**ROW 68**

**ROW 69**

**REP 1**

**REP 3**

YWS

GWS

W

RWS

BWS

YWS

BDT

W

GWS

BWS

RWS

RDT

RDT

BDT

**REP 2**

**REP 4**

W

BDT

RDT

GWS

GWS

W

BDT

BWS

RWS

RWS

YWS

RDT

BWS

YWS

## Result

Thirty five clusters from each plot (3 vines) were evaluated for powdery mildew on August 8, 2005. Disease severity on each cluster was rated as percentage of berries with symptoms over the total number of berries in the cluster. Incidence was calculated as percentage of number of clusters with powdery mildew over the total number of cluster in the plot (35 clusters in this observation). The data was analyzed by using SAS program. Analysis of variance was performed by GLM procedure and treatment effects were examined with multiple comparison statement by Duncan's test at P=0.05.

Disease pressure this year was the highest that I have seen in 23 years of working with this pathogen. There was a treatment effect and all treatments significantly reduced disease severity and incidence (Table 1). Disease severity is the more important of the two columns of data and the incidence data is shown for informational purpose only. Treatment 4 was one of the IPM treatment options with only one Sonata application and was not significantly different that the non-IPM treatment regime # 3. Treatment #2 was also an IPM option but with two Sonata applications and the disease severity was more severe and was not significantly different that treatment #7 with one application of Sonata. In treatment # 5, Sonata was applied 3 times with one application being made early, mid and late in the season, respectively. This was an organic treatment and disease levels were significantly higher. Sonata used by itself full season reduced disease severity by 50%, but was not economical control.

Table 1. Powdery mildew rating in trial 3

Trt#	Treatment	Severity (%)	Incidence (%)
4	A Sulfur	3.84 e	52.86 c
	B Sulfur		
	C Stylet oil		
	D Pristine		
	E Sonata+Nufilm		
	F Quintec		
3	A Sulfur	7.11 e	73.05 b
	B Sulfur		
	C Sulfur		
	D Pristine		
	E Quintec		
	F Flint		
2	A Sulfur	16.21 d	77.86 b
	B Sulfur		
	C Sulfur		
	D Pristine		
	E Sonata+Nufilm		
	F Sonata+Nufilm		
7	A Sulfur	17.58 d	73.57 b
	B Sulfur		
	C Stylet oil		
	D Pristine		
	E Sonata+Nufilm		
	F Quintec		

	A	Sulfur			
	B	Sonata+Nufilm			
	C	Stylet oil			
	D	Sonata+Nufilm			
	E	Kaligreen			
	F	Stylet oil			
	G	Sonata+Nufilm			
	H	Kaligreen			
5			26.96	c	97.86 a
6	A-H	Sonata+Nufilm	44.69	b	100.00 a
1			98.72	a	100.00 a

---

Values in a column followed by the same letter are not significantly different according to Duncan's test at P=0.05.