Cooperative Research Project, Doug Gubler, U.C. Davis Dept. of Plant Pathology

Trial name.....	**Grape powdery mildew fungicide trial 1 2005**	Update: 31 May 05
Location.....	Courtland, Sacramento Co. (Herzog Ranch)	
Investigator.....	Doug Gubler, 530.752.0304	
Cooperators.....	John, Cathy, Randy Baranek, Tom Herzog, Herzog Ranch	
Crop	Grape 'Chardonnay'	
Disease.....	Powdery mildew, *Erysiphe necator*	

Method

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^2
Area/Treatment, sq ft...	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.

Protocol

#	colr	Sponsor	Materials	Appln	Interval	FP/A		FP/Trt		Notes	Tol	FP/tk
1	W	lab	Untreated								Y	
2	PU	lab	Pristine 38WG	B-G	21	10.5	oz	8.63			Y	13.5
3	BD	lab	Rally	C-G	14-21	4	oz	3.29		1.6oaa	Y	5.13
4	BS	Exptl	Cmpd A	B-G	14-21	14.4	floz	12.33		3oaa	N	19.26
5	RKC	Exptl	Cmpd A	B-G	14-21	20.6	floz	17.64		4.3oaa	N	27.56
6	GKC	Exptl	Cmpd A	B-G	14-21	27.3	floz	23.37		5.7oaa	N	36.52
7	B	Exptl	Cmpd B	B-G	14-21	8	oz	6.57			Y	10.3
8	KC	Chemin	Flutriafol	B-G	14	8	oz	6.57			N	10.3
9	YRD	Chemin	Flutriafol	B-G	14	5	oz	4.11			N	6.42
		Bayer	Elite	AD	14	4	oz	3.29			Y	5.13
			Flint	BE	21	2	oz	1.64				2.57
10	O		Pristine	C	21	10.5	oz	8.63				13.5
11	OC	Uniroya	Procure 480SC	B-G	14	6	floz	5.14			Y	8.03
		Uniroya	Procure480SC	B-F	14	6	fl oz	5.14			Y	8.03
12	OKD		alt/w Flint	C-G	14	2	oz	1.64				2.57
13	OKS	Uniroya	A1717	B-G	10-14	2	pt	27.4			Y	42.8
14	OS	Uniroya	A1717	B-G	10-14	4	pt	54.8			Y	85.6
		Uniroya	A1717 +	B-G	10-14	2	pt	27.4			Y	42.8
15	OYS		20-20-20 Fert.			4	lbs	52.6				82.1
16	YC	Uniroya	Kocide 4.5LF	B-G	14	2	pt	27.4			Y	42.8
		Gowan	Pristine fol/b	B	21RI	10.5	oz	8.63			Y	13.5
			Vintage+	C-F	14RI	4,5,6,6	oz	3.29				5.13
			Latron B-1956			5.3	floz	4.54		.03%		7.09
17	P		Quintec	G								
		Gowan	Pristine alt/w	BD	21RI	10.5	oz	8.63			Y	13.5
			Rubigan EC +	CE	14RI	4,6	oz	3.29				5.13
			Latron B-1956			5.3		4.54		.03%		7.09
			Quintec 250SC	F	21RI	6	floz	5.14				8.03
18	OD		Rubigan	G		6	floz					
		Gowan	Pristine alt/w	BD	21RI	10.5	oz	8.63			Y	13.5
			Vintage +	CE	14RI	5,6	oz	4.11				6.42
			Latron B-1956			5.3	floz	4.54		.03%		7.09
			Quintec 250SC	F	21RI	6	floz	5.14				8.03
19	R		Vintage	G		6	oz					
		Gowan	Pristine fol/b	B	21RI	10.5	oz	8.63			N	13.5
			GWN-4307	C-F	14RI	40,50,60,60	lb	526				821
20	RC		Quintec	G								

#	colr	Sponsor	Materials	Appln	Interval	FP/A		FP/Trt		Notes	Tol	FP/tk
		DowAgro	Rally 40W alt/w	B-G	14	4	oz	3.29			Y	5.13
21	GS		Quintec 250SC		14	4	floz	3.42				5.35
		DowAgro	Rally 40W alt/w	B-F	21	5	oz	4.11			Y	6.42
22	RKD		Quintec 250SC	C-G	21	6	floz	5.14				8.03
		DowAgro	Rally 40W alt/w	B-F	18-28RI	5	oz	4.11			Y	6.42
23	RKS		Quintec 250SC	C-G	18-28RI	6	floz	5.14				8.03
		BASF	Pristine +	B-G	21-28 RI	10.5	oz	8.63			Y	13.5
24	YKC		Latron			3	floz	2.57				4.01
25	Y	BASF	Sovran	B-G	21	4	oz	3.29			Y	5.13

Notes:

1. Tol indicates whether all products in the treatment have an EPA tolerance for grapes, and the crop can be harvested.
2. Grower applications: Sulfur dust on 12,19,26 Apr.

Materials

Sponsor	Product	Active Ingr.	Conc.	Tol.	Mfr	Contact
BASF	Pristine 38WG	Pyraclostrobin	12.8%	Y	BASF	John Helm
		+ Boscalid	25.2%			
	Sovran 50WG	Kresoxim methyl	50%	Y	BASF	
Bayer	Flint 50WG	Trifloxystrobin	50%	Y	Bayer	Matt Elhardt
	Elite 45WP	Tebuconazole	45%	Y	Bayer	
	Pristine 38WG	Pyraclostrobin	12.8%	Y	BASF	
		+ Boscalid	25.2%			
Cheminova	Flutriafol 125SC	Flutriafol	125 g/L	N	Cheminova	Terry Baker
Dow Agro	Quintec 250SC	Quinoxyfen	250 g/L	Y	Dow Agro	Jim Mueller
	Rally 40W	Myclobutanil	40%	Y	Dow Agro	
Expermtl	Cmpd A	cmpd A	200 g/L	N		
	Cmpd B	compd B	70%	Y		
Gowan	Rubigan 1EC	Fenarimol	1 lb/gal	Y	Gowan	James Brazzle
	Pristine 38WG	Pyraclostrobin	12.8%	Y	BASF	
		+ Boscalid	25.2%			
	Quintec 250SC	Quinoxyfen	250 g/L	Y	Dow Agro	
	GWNexpdust	??		N	Gowan	
	Vintage	Fenarimol	11.6%	Y	Gowan	
Lab	Sulfur 80DF	Sulfur	80%	Y	Wilbur-Ellis	
	Pristine 38WG	Pyraclostrobin	12.8%	Y	BASF	
		+ Boscalid	25.2%	Y		
	Rally 40W	Myclobutanil	40%	Y	Dow Agro	
Uniroyal	Procure 480SC	Triflumizole	480 g/L	Y	Uniroyal	Curt Sandberg
	Flint 50WDG			Y	Uniroyal	
	A1717					
	20-20-20	N-P-K	20% ea	Y		
	Kocide 4.5LF	copper hydroxide				

Applications

Date	5/11	5/27	6/9	6/15	6/30	7/11	7/14	7/21
App #	1	2	3	4	5	6	7	8
Stage	Pre-bllom	Late-bloom						
Vol	138 gal/A (1.2gal/rep)	138 gal/A (1.2gal/rep)	6 gal/treat (1.2 gal/rep)	6 gal/treat (1.2 gal/rep)	6 gal/treat (1.2 gal/rep)	6 gal/treat (1.2 gal/rep)	6 gal/treat (1.2 gal/rep)	6 gal/treat (1.2 gal/rep)
1								
2	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	
6	X	X	X		X		X	
7	X	X	X		X		X	
8	X	X	X		X		X	
9	X	X	X		X		X	
10	X	X	X		X		X	
11	X	X	X		X		X	
12	X	X	X		X		X	
13	X	X	X		X	X		X
14	X	X	X		X	X		X
15	X	X	X		X	X		X
16	X		X		X		X	
17	X		X		X		X	
18	X		X		X			X
19	X		X		X		X	
20	X		X		X		X	
21	X	X	X		X		X	
22	X		X		X			X
23	X		X		X			X
24	X		X		X			X
25	X		X		X			X

Detailed fungicide applications

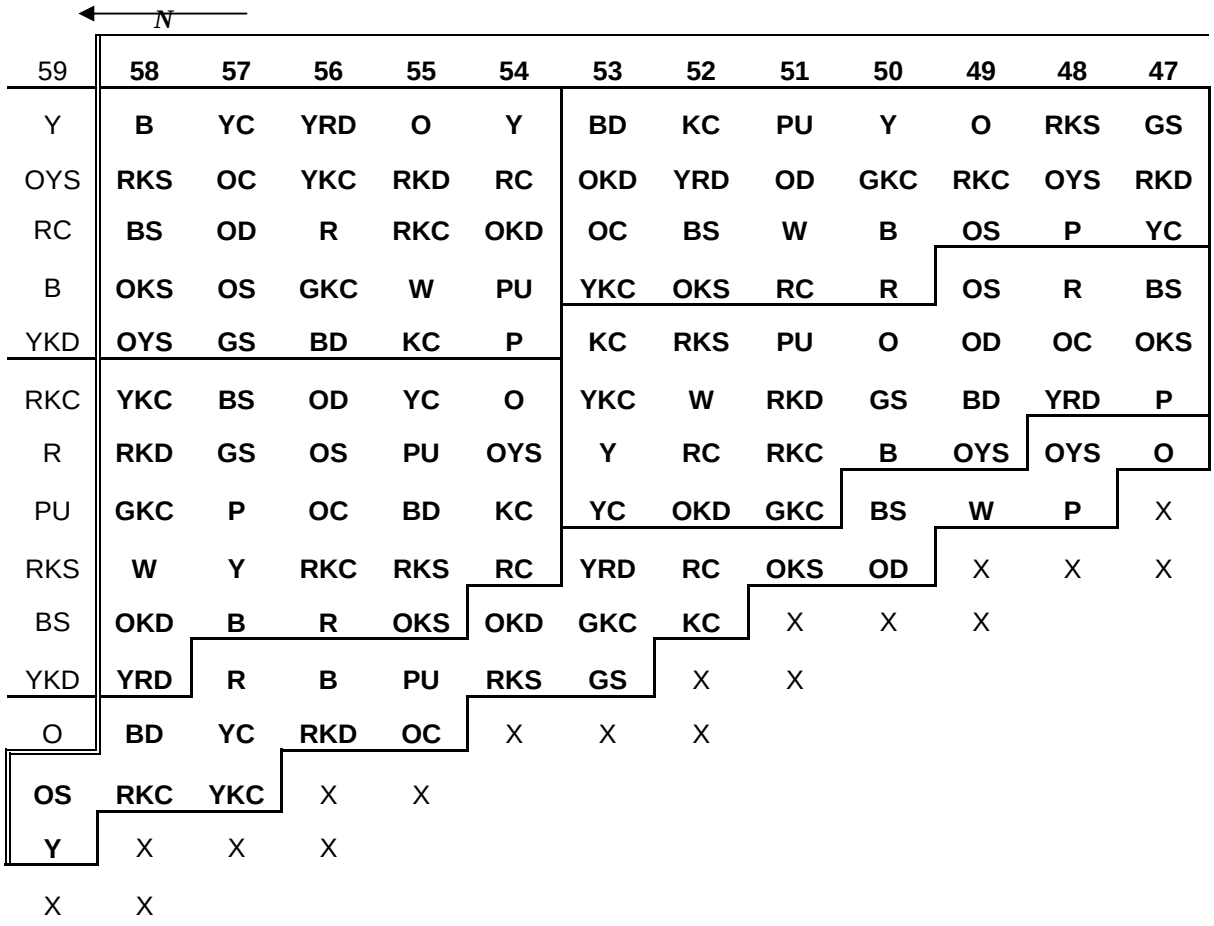
Trt #	Materials	5/11	5/27	6/9	6/15	6/30	7/11	7/14	7/21
1	Untreated								
2	Pristine 38WG	8.63		8.63		8.63			8.63
3	Rally	3.29	3.29	3.29		3.29		3.3	
4	Cmpd A	12.33	12.33	12.33		12.33		12	
5	Cmpd A	17.64	17.64	17.64		17.64		18	
6	Cmpd A	23.37	23.37	23.37		23.37		23	
7	Cmpd B	6.57	6.57	6.57		6.57		6.6	
8	Flutriafol	6.57	6.57	6.57		6.57		6.6	
9	Flutriafol	4.11	4.11	4.11		4.11		4.1	
	Elite	3.29				3.29			
	Flint		1.64					1.6	
10	Pristine			8.63					
11	Procure 480SC	5.14	5.14	5.14		5.14		5.1	
	Procure480SC alt/w	5.14	5.14			5.14			
12	Flint			1.64				1.6	
13	A1717	27.4	27.4	27.4		27.4	27.4		27.4
14	A1717	54.8	54.8	54.8		54.8	54.8		54.8
	A1717 +	27.4	27.4	27.4		27.4	27.4		27.4
15	20-20-20 Fert.	??		52.6		52.6	52.6		52.6
16	Kocide 4.5LF	27.4		27.4		27.4		27	
	Pristine fol/b	8.63							
	Vintage+			3.29		3.29			
	Latron B-1956	0.03		0.03		0.03			
17	Quintec			4.54				4.5	
	Pristine alt/w	8.63				8.6			
	Rubigan EC +								
	Latron B-1956								
	Quintec 250SC			5.14					
18	Rubigan								5.14
	Pristine alt/w	8.63							
	Vintage +					6.42			
	Latron B-1956					7.09			
	Quintec 250SC			5.14					
19	Vintage							5.1	
	Pristine fol/b	8.63							
	GWN-4307			526		526			
20	Quintec							5.1	
	Rally 40W alt/w	3.29	3.29			3.29			
21	Quintec 250SC			3.42				3.4	
	Rally 40W alt/w	4.11		4.11					4.1
22	Quintec 250SC					5.14			
	Rally 40W alt/w	4.11				4.11			
23	Quintec 250SC			5.14					5.1
	Pristine +	8.63		8.63		8.63			8.63
24	Latron	2.57		2.57		2.57			2.57
25	Sovran	3.29		3.29		3.29			3.29

2% Stylet oil

Calendar

Date	Activity
6/10	High disease pressure due to weather and no leaf removal ie poor coverage.
6/16	Sprayed stylet oil for all treatments, including guard rows and end vines of each row.
	20-20-20 Fertilizer was replaced by 16-16-16.
7/21	Last day to spray
8/8	Disease rating. Severity of 35 clusters in each plot (replication) was evaluated.

TRIAL 1 PLOT MAP



Results

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.

High disease pressure pegged the index at nearly 100 from May through July. There was a treatment effect and all treatments significantly reduced the disease severity and incidence though many treatments did not stand up as well this year under the highest disease pressure that I have seen in 23 years. (Table 1). In this case, Procure with or without Flint, Rally by itself were the most effective fungicide regimes in reducing disease severity. Pristine alternated with Quintec and Rally alternated with Quintec, Sovran, compound b and Pristine were in the next grouping. A1717 a copper based product, Compound A, and Kocide were less effective, and reduced severity by less than 50%. Flutriafol reduced disease by about 78% as didPristine alternated with GWN-4307. Pristine was more effective when used by itself or alternated with Quintec or Vintage than with other combinations. Higher dosage of A1717, Compound A and Flutriafol reduced disease severity significantly than lower dosage of the same products.

TABLE 1. Powdery mildew rating in trial 1

Trt#	Treatment	Severity (%)	Incidence (%)
11	Procure 480SC	1.41k	21.02i
12	Procure480SC alt/w Flint	1.79k	42.94g
3	Rally	2.06k	35.80h
17	Pristine fol/by (Vintage + Latron B-1956) or Quintec	6.58jk	54.29fe
19	Pristine alt/w (Vintage + Latron), Quintec, or Vintage	6.61jk	60.80fe
23	Rally alt/w Quintec	7.27j	64.77de
25	Sovran	8.40j	66.10de
2	Pristine 38WG	9.69j	74.01c
10	Alternation of Elite, Flint, and Pristine	10.55j	85.71b
21	Rally alt/w Quintec	15.98i	71.02cd
22	Rally alt/w Quintec	16.74i	69.89cd
7	Compound B	18.87ih	74.86c
9	Flutriafol	22.73h	92.09ab
20	Pristine fol/by GWN-4307 or Quintec	22.89h	88.83b
8	Flutriafol	28.80g	99.44a
24	Pristine + Latron	32.20gf	90.40b
18	Pristine alt/w (Rubigan + Quintec) or Rubigan	35.78f	89.20b
5	Cmpd A	42.43e	92.61ab
16	Kocide 4.5LF	49.97d	100.00a
13	A1717	50.33d	98.87a
15	A1717 + 20:20:20 Fert.	52.30d	98.86a
4	Cmpd A	63.92c	99.44a
14	A1717	66.86bc	100.00a
6	Cmpd A	70.65b	100.00a
1	Untreated	97.22a	100.00a

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