

2003 Report

SECTION K: DISEASES OF FRUIT STUDY DATA BASE:

CROP: Grape, *Vitis vinifera* cv. Pinot noir

PEST: Powdery mildew, *Uncinula necator* Pers.:Fr.

TITLE: EFFICACY OF OILS AND IBR LIQUID AGAINST POWDERY MILDEW OF GRAPE, 2003

MATERIALS: AGRAL 90(Nonionic surfactant), ELEVATE 50 WDG (Fenheximide), FungiNeem, IBR liquid, NOVA 40W (Myclobutanil), ROVRAL 50 W (Iprodione), VANGARD 75 WG (Cyprodinil), Sea buckthorn juice, Sodium bicarbonate, Soybean oil, Sylgard (Nonionic surfactant), Stylet oil, Superior oil

RESULTS and DISCUSSION: Powdery mildew was first observed on grape berries on the 26 June. The only treatments that significantly reduced foliar powdery mildew early in the season were the standard grower program and the powdery mildew model program which are based on NOVA for control of powdery mildew (Table 1). The other materials all successfully reduced the severity of foliar powdery mildew and the IBR liquid and Superior oil were not significantly different than the standard grower program. None of the materials including NOVA were significantly different in controlling cluster powdery mildew on 15 July (Table 1). The materials successfully reduced the severity of cluster powdery mildew and Stylet oil + Sodium bicarbonate, Fungineem, IBR liquid and Superior oil as effectively as NOVA used in the powdery mildew program. Later in the season on 3 September only the powdery mildew model program was effective in significantly reducing foliar powdery mildew although it was not significantly different from the standard program, IBR liquid, or Superior oil (Table 2). All the materials except Soybean oil maintained their effectiveness in reducing the severity of foliar powdery mildew especially the IBR liquid, Fungineem, Stylet oil + Sodium bicarbonate, and Superior oil which did not differ significantly from the grower standard. Only the grower standard was effective in reducing the incidence of cluster powdery mildew on 3 September when compared to the control and other treatments (Table 2). All of the treatments were effective in reducing severity of cluster powdery mildew with the best treatments being the Grower standard, followed by the Powdery mildew model, IBR liquid, Stylet oil + Sodium bicarbonate, and Superior oil in order of decreasing effectiveness (Table 2). At harvest when yield weight and number of clusters were considered there was no significant difference in the number of clusters although the average cluster weight and total cluster weight were higher in the

treatments than the control (Table 3). Quality of grapes indicated by berry weight, pH, soluble solids, and titratable acidity did not differ significantly from grapes treated with the grower standard program (Table 4). The bunch rot study was inconclusive although after 8 days the lowest incidence and severity of bunch rot was in the grower standard program and after 15 days the lowest incidence and severity was in the SBT juice treatment (Table 5). Fungineem corresponded to the highest levels of bunch rot for both dates. *Penicillium* spp. grew on the bunches and probably inhibited the growth of *Botrytis* spp. making some treatments look more effective.

CONCLUSIONS: The grower standard and powdery mildew model treatments which depend on NOVA for their effectiveness against powdery mildew were generally the most effective treatments. However some of the novel treatments showed promise especially for reducing the severity of powdery mildew. The IBR liquid, Stylet oil + sodium bicarbonate, and Fungineem provided adequate control of foliar and cluster powdery mildew. None of these products appeared to compromise grape quality as indicated by pH, soluble solids, and titratable acidity. It was not clear if any of these materials were effective against bunch rot.

Table 1. Percent powdery mildew incidence and severity on Pinot Noir grapes treated with various materials and evaluated on 15 July, 2003

Treatment	Leaf Powdery Mildew		Cluster Powdery Mildew	
	Incidence	Severity	Incidence	Severity
Control	99.6 A*	51.8 A	100.0 A	46.3 A
50% SBT juice	98.8 A	24.2 BC	98.0 A	23.5 BC
1% Soybean oil + 25 mL/100L Agral 90	96.0 A	18.5 BCD	96.0 A	24.2 B
1% Stylect oil + 0.5 kg/100L Sodium Bicarbonate	95.6 A	26.5 B	92.0 A	12.9 BCD
2.5% Fungineem	92.0 A	19.1 BCD	94.0 A	12.1 BCD
2% IBR Liquid + 10 ml/100L Sylgard	84.0 AB	12.4 CDE	88.0 AB	11.2 BCD
1% Superior oil Grower (15 July)	83.2 AB 64.0 C	9.8 DE 8.0 DE	94.0 A 78.0 AB	9.4 BCD 8.4 CD
PM Model (15 July)	61.6 C	4.9 E	86.0 AB	10.8 BCD
Pr> F	<.0001	<.0001	0.198	<.0001

*Numbers followed by the same letter are not significantly different as decided by the Waller-Duncan's K-ratio t Test (K=100). Treatments were analyzed with five replications.

Table 2. Percent powdery mildew incidence and severity on Pinot Noir grapes treated with various materials and evaluated on 3 September, 2003

Treatment	Leaf Powdery Mildew		Cluster Powdery Mildew	
	Incidence	Severity	Incidence	Severity
Control	99.2 A*	74.7 A	100.0 A	90.8 A
50% SBT juice	100.0 A	49.8 BCD	100.0 A	41.8 BC
1% Soybean oil + 25 mL/100L Agral 90	100.0 A	59.6 ABC	100.0 A	40.0 BC
1% Stylect oil + 0.5 kg/100L Sodium Bicarbonate	99.3 A	34.6 DEF	98.0 A	31.8 BCD
2.5% Fungineem	99.6 A	34.5 DEF	100.0 A	38.0 BC
2% IBR Liquid + 10 ml/100L Sylgard	98.8 AB	31.9 DEF	82.0 AB	25.6 CDE
1% Superior oil	86.8 AB	42.9 CDE	94.0 AB	33.4 BCD
Grower (15 July)	87.2 AB	20.3 EFG	68.0 BC	13.4 DE
PM Model (15 July)	81.1 B	18.4 GF	78.0 AB	20.6 CDE
Pr> F	<.0001	<.0001	0.0006	<.0001

*Numbers followed by the same letter are not significantly different as decided by the Waller-Duncan's K-ratio t Test (K=100). Treatments were analyzed with five replications.

Table 3. Effect of various materials on number of clusters and weight (kg) of ‘Pinot noir’ grapes at harvest

Treatment	No. Of Clusters	Avg. Cluster wt.	Total Cluster wt.
Control	157.6 B*	0.052 D	8.1 C
50% SBT juice	198.2 AB	0.067 BCD	13.2 BC
1% Soybean oil + 25 mL/100L	211.0 AB	0.065 BCD	13.6 ABC
Agral 90			
1% Stylect oil + 0.5 kg/100L	187.4 AB	0.086 B	16.5 AB
Sodium Bicarbonate			
2.5% Fungineem	193.4 AB	0.080 BC	15.5 AB
2% IBR Liquid + 10 ml/100L	193.8 AB	0.063 BCD	12.3 BC
Sylgard			
1% Superior oil	187.6 AB	0.066 BCD	12.2 BC
Grower (15 July)	217.8 AB	0.074 BCD	16.4 AB
PM Model (15 July)	199.0 AB	0.086 B	16.6 AB
Pr> F	0.4044	<.0001	0.0225

*Numbers followed by the same letter are not significantly different as decided by the Waller-Duncan K-ratio t Test (K=100). Treatments were analyzed with four replications.

Table 4. Effect of various treatments on quality of pinot noir grapes at harvest on 23 September

Treatment	Berry weight	pH	Soluble solids	Titrateable acidity
Soybean oil	84.9 A*	3.5 B	19.1 A	15.5 A
1% Stylet oil + 0.5 kg/100L Sodium Bicarbonate	84.2 A	3.6 AB	17.7 A	15.7 A
2.5% Fungineem	85.9 A	3.8 A	18.6 A	16.1 A
2% IBR Liquid + 10 ml/100L Sylgard	75.2 A	3.6 AB	17.5 A	15.2 A
1% Superior oil	87.4 A	3.6 AB	16.5 A	14.5 A
Grower (15 July)	90.1 A	3.6 AB	18.5 A	14.2 A
Pr> F	0.6381	0.273	0.9582	0.6921

*Numbers followed by the same letter are not significantly different as decided by the Waller- Duncan K-ratio t Test (K=100).

Table 5. Effect of various treatments on percent bunch rot of Pinot noir grapes incubated at 10 °C for 8 and 15 days

Treatment	After 8 days		After 15 days	
	Incidence	Severity	Incidence	Severity
Control	32.0 ABC*	1.6 B	32.0 BC	2.4 BC
50% SBT juice	44.0 ABC	2.4 B	4.0 CD	0.2 C
1% Stylect oil + 0.5 kg/100L Sodium Bicarbonate	56.0 AB	3.2 AB	60.0 AB	3.8 B
2.5% Fungineem	64.0 A	5.6 A	72.0 A	8.8 A
2% IBR Liquid + 10 ml/100L Sylgard	40.0 ABC	2.2 B	44.0 AB	3.2 BC
1% Superior oil	40.0 ABC	2.6 B	52.0 AB	3.4 BC
Grower (15 July)	16.0 C	0.8 B	32.0 BC	1.8 BC
Pr> F	0.0385	0.0057	<.0001	<.0001

*Numbers followed by the same letter are not significantly different as decided by the Waller- Duncan K-ratio t Test (K=100).