Fungicide control of Phomopsis cane and leaf spot on grape: 2014 field trial

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Introduction

Phomopsis cane and leaf spot of grapevine is caused by the fungal pathogen, *Phomopsis viticola*. On leaves, the disease is manifest as tiny dark spots with yellow halos on the leaf blade and veins (Bettiga *et al.*, 2014). Similar spotting can occur on petioles or on the basal portion of infected shoots, and heavy infection on shoots may cause a scab-like appearance (Bettiga *et al*., 2014). Spring rains occurring after budbreak stimulate spore release, dispersal and infection (Gubler *et al*., 2008). Spores released from overwintering pycnidia on canes and spurs are spread by rain to young shoots. Infection occurs most readily when moisture remains on the green tissue for many hours (Nita *et al*., 2008).

In California, the disease can be economically important during wet years in the north coast and in the northern San Joaquin Valley. Economic loss is generally minor, except during years when damage to shoots and fruit reduces the number of fruit clusters. In the northern San Joaquin Valley, susceptible grape varieties include Cabernet Sauvignon, Pinot Noir, Chardonnay, Thompson Seedless, and Grenache (Flaherty *et al*., 1992). Fungicide applications are made during the spring months to protect shoots.

A field trial was conducted at the UC Davis Plant Pathology Farm in northeastern Solano County, CA to evaluate the efficacy of registered and experimental fungicides on control of Phomopsis cane and leaf spot. The variety Thompson Seedless was used in this study.

Materials and Methods

The trial was conducted on 3 rows of vines in a 33 year-old Thompson Seedless vineyard (8x12 ft row spacing), using a complete randomized design with 4 replicates. Plots consisted of 4 adjacent vines. Fungicides were applied with a handgun sprayer (Nifty-Fifty circulating tank) using 75 gallons/acre on 6 Mar and 150 gallons/acre on 20 Mar. At the time of the first application, shoots were roughly 20 cm in length.

Disease was assessed 22 Aug by rating disease severity on shoots on each vine by counting the number of infected shoots. Trial models were analyzed using the ANOVA Tests for data; P-values for trial was $P<0.05$. Means comparisons were made using Fisher's LSD with $\alpha=0.05$.

Table 1. Experimental Design

Experimental design	Complete randomized design with 4 replicates.		
Experimental unit	4 adjacent vines = 1 plot		
Plot area	384 ft^2 (row spacing = 12 ft, vine spacing = 8 ft)		
Area/treatment	1536 ft^2 (4 reps = 1 treatment)	Area/treatment	0.035 acre/treatment
Volume water/acre	75 gallons (3/6/2014) = 2.63 gal/4 replicates (3/6/2014) 100 gallons (3/20/2014) = 3.5 gal/4 replicates (3/20/2014)		

Table 2. Treatments examined in the trial. FP = formulated product.

Flag	Product(s)	FP/Acre	FP/4 replicate plots
W	Unsprayed control	none	none
BS	Merivon	6.5 fl oz	6.7 ml
B	Pristine	14.5 oz	14.4 g
GD	Sovran	4 oz	4.0 g

Maps

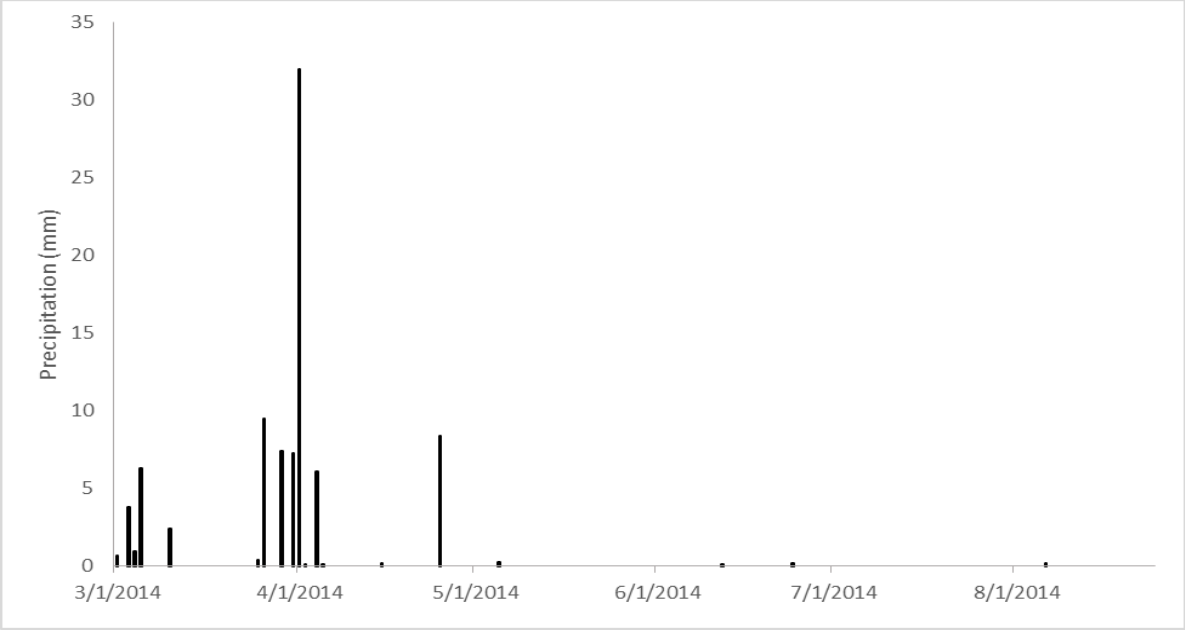
N ←

BS	GD	BS
B	B	W
GD	W	GD
BS	BS	B
B	GD	W
	W	

Results

Several rain events from the beginning of March to early April (Figure 1a) provided wetness for *Phomposis* infection on emerging green tissue. Overall disease pressure was low, however all treatments significantly decreased disease compared to untreated control.

Figure 1. (a)Daily precipitation and (b) temperature data for Davis, California from March to August 2013. Data are from CIMIS station 6 (http://wwwcimis.water.ca.gov/).



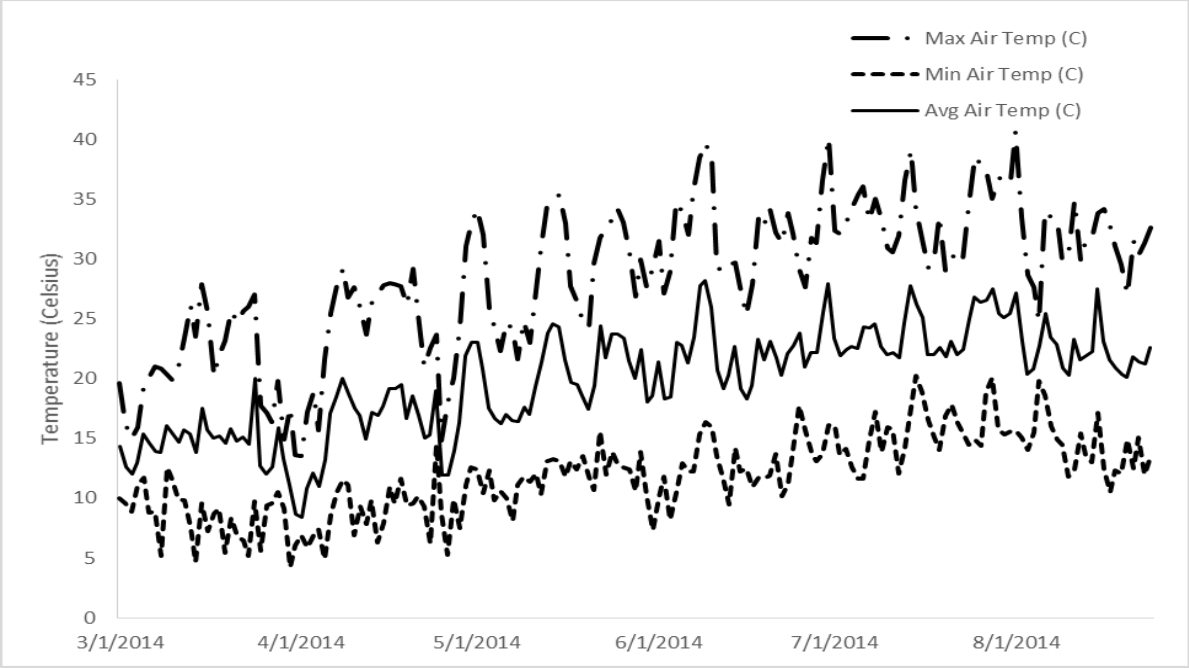


Table 3. Treatment effects on shoot disease symptoms. Treatment means with different letters are significantly different according to the Fisher's LSD test (α = 0.05). '*' Treatment followed by rate per acre.

Treatment	Mean # of infected shoots
Unsprayed control	5.06 a
Pristine 14.5 oz	3.33 b
Sovran 4 oz	3.13 b
Merivon 6.5 fl oz	2.88 b

References

Grape Pest Management. UC DANR Publication 3343, 3nd edition. Regents of the University of California. Bettiga *et al*., 2014

Gubler WD, Smith RJ, Varela LJ, Vasquez S, Stapleton JJ, and Purcell AH. (2008) UC IPM Management Guidelines: Grape, UCANR Publication 3448, Diseases.

Nita M, Ellis MA, and Madden LV (2008) Variations in disease incidence of Phomopsis cane and leaf spot of grape in commercial vineyards in Ohio. Plant Disease 92:1053-1061.

Appendix: Materials

Product	Active ingredient(s) and concentration	Class	Manufacturer
Merivon	fluxopyroxad (21%), pyraclostrobin (21%)	SDHI (7)/QoI (11)	BASF
Pristine	pyraclostrobin (12.8%) boscalid (25.2%)	SDHI (7)/QoI(11)	BASF
Sovran	kresoxim-methyl (50%)	QoI (11)	Cheminova

Appendix references: (1) Adaskaveg, et al. 2012. Efficacy and timing of fungicides, bactericides and biologicals for deciduous tree fruit, nut, strawberry, and vine crops 2012, available at http://www.ipm.ucdavis.edu/PDF/PMG/fungicideefficacytiming.pdf , (2) 2013 Fungicide trials, available at http://plantpathology.ucdavis.edu/Cooperative_Extension/Gubler/2013_Fruit_Crop_Fungicide_Trials/, (3) various sources including product labels and/or MSDS.