Evaluation of Biological and Chemical Pruning Wound Protectants Against Selected Fungi Associated with Grapevine Trunk Diseases

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Report Summary

Grapevine trunk diseases (GTDs) represent a major threat to the future economic sustainability of table grapes and wine grapes. Several taxonomically unrelated groups of Ascomycete fungi cause GTD diseases in grapevines one of which is ***Phaeoacremonium minimum.*** (1). Following precipitation events, fungal spores (sexual and asexual) become airborne and colonize exposed wood vessels caused by pruning. Total disease control is virtually unattainable because of the huge number of wounds made on an individual grapevine and extended period of wound susceptibility but one mitigation practice is to apply a protectant to exposed pruning wounds (2, 3, 4, 5).

The trial was conducted in Kern County, near Delano, CA (cv Allison, 4 years old).

Materials and Methods

A. Experimental design

In this study a total of four vines were used per treatment with 15 spurs used per vine, organized in a completely randomized block design across four rows. Grapevines were trained to quadrilateral cordons on a horizontally divided trellis with typically 5 spurs per cordon. A total of 15 spurs were used per vine with 5 spurs used for each GTD pathogen per vine. The experimental unit for this trial was 1 vine or 5 spurs. Vines were spur pruned (1 foot-long) in early March, and within 24 hours of pruning, the liquid treatments were sprayed with a 1-liter hand-held spray bottle on the pruning wound until runoff.

The following day, canes treated with non-biologically based treatments were inoculated with a 20 µl solution (~2000 spores) of either *N. parvum*, *E. lata,* and *P. minimum*. Seven days after

pruning, canes treated with biological treatments were inoculated with a 20 µl solution (~2000 spores) of either *N. parvum*, *E. lata,* and *P. minimum.*

B. Experimental treatments

The treatments described in this report were conducted for experimental purposes only and crops treated in a similar manner may not be suitable for commercial or other use.

Treatment	Active ingredient	Application Rate (100ga/Ac)	Inoculation Date
Water Control – Inoculated with *Phaeoacremonium minimum*		N/A	1 day after pruning
Topsin M + Rally	Triophanate-methyl +myclobutanil	1.25 lbs/A + 2.25 oz/A	1 day after pruning
Biotam	*Trichoderma asperellum* + *Trichoderma gamsii*	2 lbs/a	7 days after pruning
Biotam + Crab Life Powder	*Trichoderma asperellum* + *Trichoderma gamsii* + crab and lobster shell powder	2 lbs/A + 0.5 lbs/A	7 days after pruning
Vintec	*Trichoderma atroviride*	1.8 oz/A	7 days after pruning
Serenade ASO	*Bacillus subtilis* QST-713	2 qt/A and 4 qt/A	7 days after pruning
EMP	Polymer	1%	1 day after pruning
Magna-Bon CS2005	Proprietary	32 oz/A	1 day after pruning
MinerAll	Proprietary	16 lbs/A	1 day after pruning
PerCarb	sodium carbonate peroxyhydrate (85%)	4 lbs/A	1 day after pruning and after inoculation
Rhyme (sprayed at pruning wound)	flutriafol (22.7 %)	5 fl oz/A	A1 day after pruning
Katana P3	Proprietary	Proprietary	1 day after pruning
UCD 8717	Trichoderma hamatum	1x10^5 cfu/ml	7 days after pruning
UCD 8368	*Trichoderma* sp.	1x10^5 cfu/ml	7 days after pruning
UCD 8745	*Bacillus* sp.	Apply fermented product	7 days after pruning
Parade + Dyne-Amic	Pyraziflumid + Surfactant	3.1 fl oz/ga + 0.25% v/v	1 day after pruning
Parade + Dyne-Amic	Pyraziflumid + Surfactant	4.7 fl oz/ga + 0.25% v/v	1 day after pruning
OxiDate 5.0	hydrogen peroxide 27.1 + peroxyacetic acid 5%	1.28 fl oz/ga + 0.33 fl oz/ga	1 day after pruning and after inoculation
Guarda	Thyme oil	2.56 fl oz/ga	1 day after pruning and after inoculation

D. Vine Management

During the application period, vines were irrigated by drip irrigation. Sucker shoot removal and leafing were done during the duration of trial.

E. Data Collection and Statistics

The efficacy of the treatments controlling the GTDs were recorded as the Mean Percentage of Infection (MPI). This was calculated by: (Number of GTD infected samples/Number of total samples) x 100. There was total of 4 repetitions (4 vines) with 5 spurs per GTD per treatment. Treatments were compared against the untreated control and a standard control. Means comparisons were made using Fisher's least significant difference test ($p<0.05$).

Results

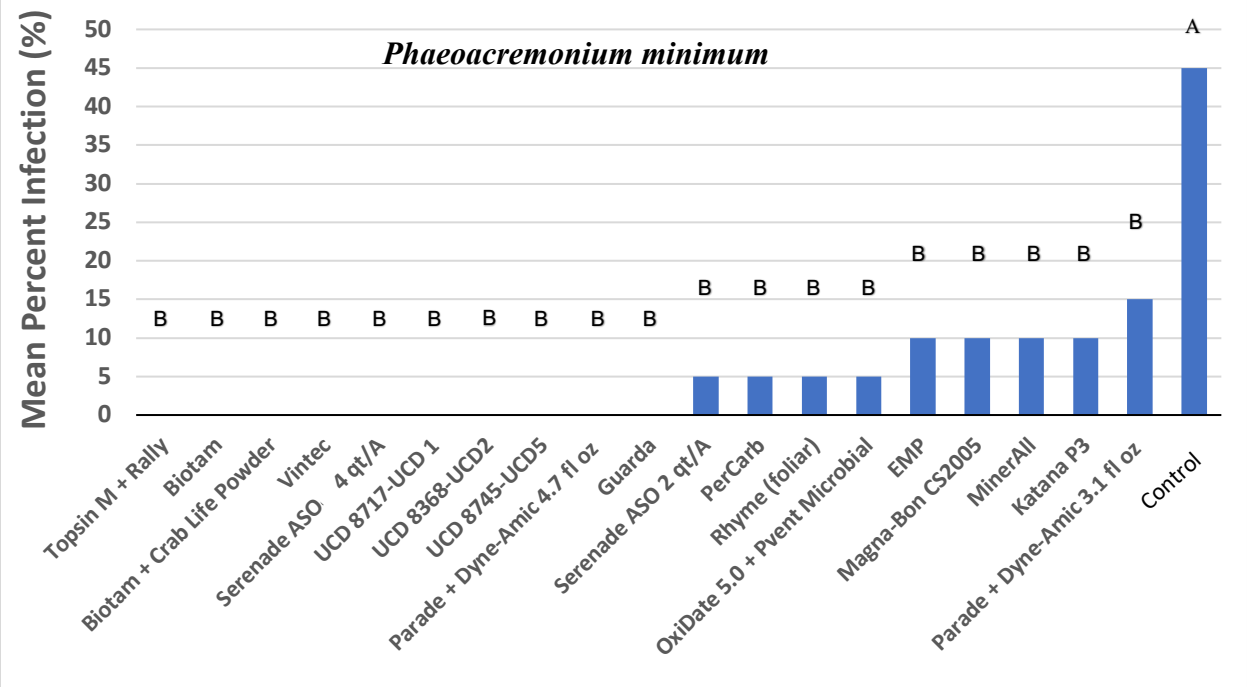

Figure 1. *Phaeoacremonium minimum* inoculated vines (Allison 4) in Kern county, 2021. Values represent the average of twenty replicates. Treatments with a different letter are significantly different according to Fisher's LSD test, P≤ < 0.05).

Acknowledgements

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Literature Cited

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