Evaluation of fungicide programs for management of Botrytis bunch rot of grapes: 2012 field trial

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Report Summary

Bunch rot of grapes is caused by *Botrytis cinerea*, a fast-growing pathogen infecting numerous crops of commercial value. Bunch rot can potentially lead to a reduction in the yield and quality of table, raisin, and wine grapes, with high economic losses in some locations or years (Flaherty et al. 1992). Botrytis overwinters as sclerotia in mummified berries on the ground or on canes. The disease can first appear as shoot blight following frequent spring rains; flowers can become infected during bloom (Bulit and Dubos 1988). In infected fruits, disease symptoms are latent until late in the season. As sugar concentration increases in the berry, the fungus resumes growth and infects the entire fruit, often resulting in berry splitting and sporulation on the fruit surface (Flaherty et al. 1992). Free water is a requirement for the pathogen, and favorable conditions include humidities exceeding 90% and temperatures between 15-27°C (Flaherty et al. 1992, Bulit and Dubos 1988, Gubler et al. 2008). Along with leaf removal and other cultural controls, good spray coverage with a synthetic fungicide is currently the most effective form of disease management.

We examined the efficacy of 29 fungicide treatment programs for control of Botrytis bunch rot in Chardonnay grapes in Yountville, Napa County, California in 2012. Materials included synthetic, biological, and organic treatments. Three applications were made between June and September 2012. A new site was used and no botrytis disease developed (on untreated vines or others) during the trial.

Materials and Methods

The field trials were conducted using complete randomized block designs, with plots consisting of 2 adjacent vines (11 ft row spacing and 5 ft vine spacing). Each treatment consisted of 4 replicates (0.0101 acres). Fungicides were tank mixed and applied with backpack sprayers. Three applications were made during the growing season: 25 May (bloom), 25 June (pre-close) and 17 August (veraison). Each application was made in 200 gallons/acre of water (2.0 gallons/treatment). Other pesticides were applied between bloom and harvest by the commercial vineyard managers for control of powdery mildew and vine mealy bug. No botrytis developed (on untreated vines or others) during the trial.

Figure 1. Images of Botrytis Trial site in Yountville, Napa Co., CA. A) and B).

A **B**

Table 1. Trial 1 Experimental fungicide treatments. "alt" = alternated with; "FP" = formulated product

No.	Flag	Product(s)	FP[1]/Acre	FP/Treatment
1	W	Untreated	none	none
2	K	Inspire Super	20 fl oz	6.0 ml
3	LG	Switch	14 oz	4.0 g
4	YKS	Vangard	10 oz	2.9g
5	Y	Elevate	16 oz	4.6g
6	YKD	S-2200 50 WG + Dyneamic	0.156 lb/a + 0.125% v/v	0.7 g + 9.5 ml
7	BS	Quash 50 WG + Dyneamic	0.156 lb/a + 0.125% (v/v)	0.7 g + 9.5 ml
8	KS	Quash 50 WG + S-2200 50 WG + Dyneamic	0.156 lb/a + 0.156 lb ai/a + 0.125% (v/v)	0.7 g + 0.7 g + 9.5 ml
9	O	Rovral + Stylet oil(1) then Vangard + Stylet oil then Rovral + Sylgard 309 then Vangard + Sylgard 309	1qt + 1%(v/v) then 10 oz + 1%(v/v) then 1qt + .125%(v/v) then 10 oz + .125% (v/v)	9.6 ml + 76 ml then 2.9g + 76 ml then 9.6 ml + 9.5 ml then 2.9g + 9.5 ml
10	OS	Rovral + Stylet oil (2x) then Rovral + Sylgard 309 (2x)	1qt + 1%(v/v) then 30fl oz + 1%(v/v) then 1qt + .125 %(v/v) then 30 fl oz + .125%(v/v)	9.6 ml + 76 ml then 9 ml + 76 ml then 9.6 ml + 9.5 ml then 9 ml + 9.5 ml
11	BC	Rovral + Problad Plus + Stylet oil (2x) then Rovral + Problad Plus + Sylgard 309 (2x)	0.75qt + 20 fl oz + 1%(v/v) (2x) then 0.75qt + 20 fl oz + .125%(v/v) (2x)	7 ml + 6 ml + 76 ml then 7 ml + 6 ml + 9.5 ml
12	GD	Problad Plus + Vangard + Stylet oil (2x) then Problad Plus + Vangard + Sylgard 309 (2x)	20 fl oz + 7.5oz + 1%(v/v)(2x) then 20 fl oz + 7.5oz + .125%(v/v) (2x)	6 ml + 2.15g + 76 ml then 6 ml + 2.15g + 9.5 ml
13	B	Problad Plus + Stylet oil then Vangard + Stylet oil then Problad Plus + Sylgard 309 then Vangard + Sylgard 309	30 fl oz + 1%(v/v) then 10 oz + 1%(v/v) then 30 fl oz + .125%(v/v) then 10 oz + .125%(v/v)	9 ml + 76 ml then 2.9g + 76 ml then 9 ml + 9.5 ml then 2.9g + 9.5 ml
14	Pu	Elevate then Optiva (3x)	1lb then 16 oz	4.6g then 4.6g
15	PKD	Elevate then Optiva then Switch then Optiva	1 lb then 16 oz then 14 oz then 16oz	4.6g then 4.6g then 4g then 4.6g
16	KD	Elevate (A) then -- then Switch (C) then ---	1 lb then --- then 14oz then ---	4.6g then 4g
17	P	Luna Experience	8 floz/a	2.3 ml
18	GS	Luna Experience alt Flint	8 floz + 4 oz	2.3 ml + 1.2 ml
19	BD	Tranquility alt Flint	12 fl oz alt 3 oz	3.6 ml alt .9 g
20	KC	CX-10440 5% SC	6.5 floz/a	2 ml

21	PKS	IKF-5411	20 floz/a	6 ml
22	OKD	Pristine then Elevate then Vangard then Flint	23 oz/a then 16 oz then 10 oz then 3oz/a	6.7g then 4.6g then 2.9g then 0.9 g
23	YS	Evolva A1	0.8 ml/l	6.1 ml
24	OKS	Evolva A2	1.6 ml/l	12.2 ml
25	PKC	Evolva B1	0.8 ml/l	6.1 ml
26	BKS	Evolva B2	1.6 ml/l	12.2 ml
27	GKS	Evolva C	0.8 ml/l	6.1 ml
28	RKD	Exp B	1800g/100L	36 g
29	RKC	Exp B1	1450 g/100L	29 g

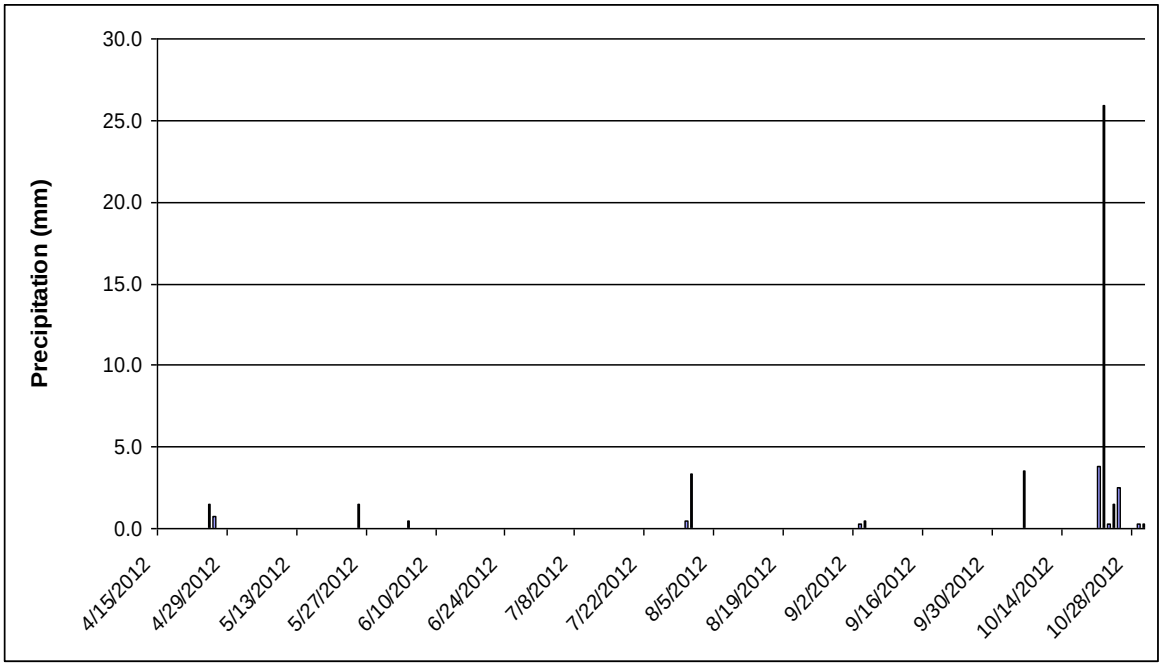
Note: The treatments described in this report were conducted for experimental purposes only and crops treated in a similar manner may not be suitable for commercial or other use.

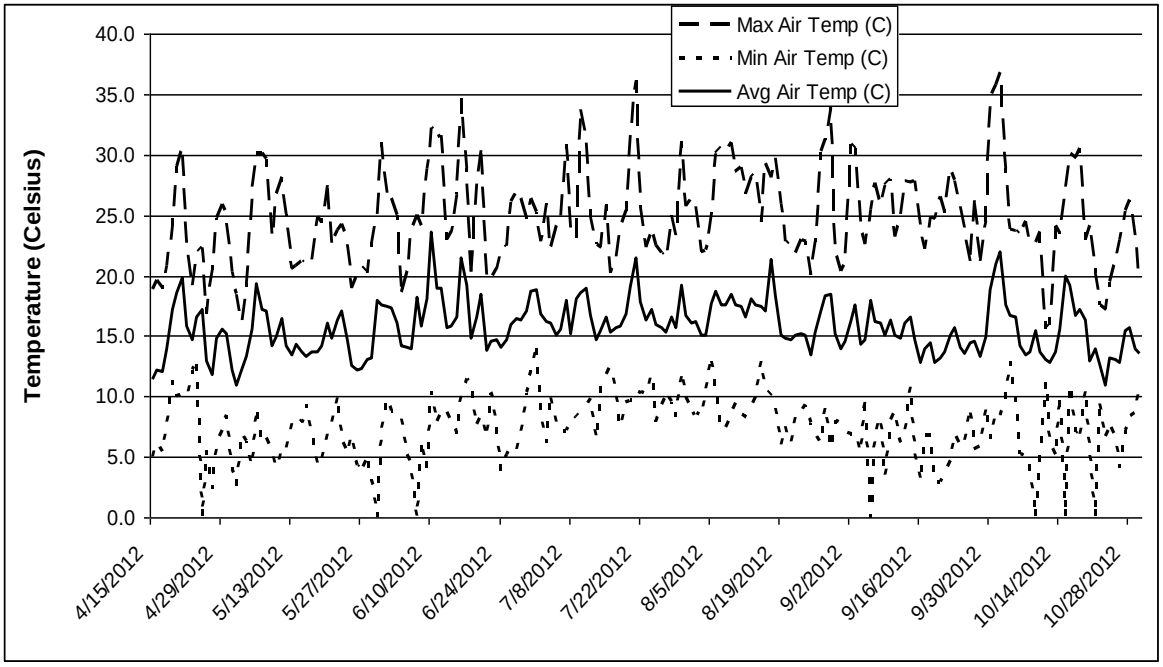
Figure 1. Layout of plots in the experimental area.

	YKD	RKD		KD	P		KC	KD		GD	OS
LG	OKS	PKC	BKS	Y	B	B	GS	GD	RKC	KS	BD
BC	Y	KD	GKS	GD	OKS	YKD	OKD	KS	LG	PKD	RKD
PKS	OKD	GS	RKD	GS	O	GKS	BC	Y	YKD	BS	BKS
BD	YKS	BS	PKC	BS	OS	YKS	OS	W	KD	OKS	BC
W	PKD	Pu	KS	YS	PKS	BS	RKC	YS	B	OKD	K
K	GD	P	Pu	K	YKS	OKS	P	PKD	O	YS	Pu
O	B	YS	W	BD	YKD	K	PKC	O	W	PKC	P
OS	KS	GKS	BC	KC	LG	PKS	LG	Pu	PKS	GKS	YKS
BKS	KC	RKC	PKD	OKD	RKC	BD	BKS	RKD	KC	Y	GS
Row	12	11	10	9	8	7	6	5	4	3	2	1

Results and discussion

Figure 2. Precipitation history from 15 April to 30 October 2011 near the trial location. Data are from CIMIS station 109 in Carneros (http://www.cimis.water.ca.gov).





Acknowledgements

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Appendix: Materials

Product	Active ingredient(s) and concentration	Class	Manufacturer or Distributor
CX-10440 5%SC	**proprietary**	**N/A**	**Certis**
Dyneamic	**polyalkyleneoxide modified polydimethylsiloxane, nonionic emulsifiers, methyl ester of C16-C-18 fatty acids (99%)**	**adjuvant**	**Helena Chemical Co.**
Elevate	**fenhexamid (50%)**	**hydroxyanilide**	**Arysta Life Science**
Evolva 1	**proprietary**	**N/A**	**Evolva, Inc**
Evolva 2	**proprietary**	**N/A**	**Evolva, Inc.**
Evolva 3	**proprietary**	**N/A**	**Evolva, Inc.**
Exp B	**proprietary**	**N/A**	**proprietary**
Exp B1	**proprietary**	**N/A**	**proprietary**
Flint 50 WG	**trifloxystrobin (50%)**	**QoI**	**Bayer**
IKF - 5411	**proprietary**	**N/A**	**N/A**
Inspire Super	**difenoconazole (8.4%), cyprodinil (24%)**	**DMI, aniline-primidine**	**Syngenta Crop Protection, Inc.**
Luna Experience	**fluopyram (17.54%) tebuconazole (17.54%)**	**SDHI/ DMI-triazole**	**Bayer**
Luna Tranquility	**fluopyram (11.3%) pyrimethanil (33.8%)**	**SDHI/AP**	**Bayer**
Oxidate 2.0%	**hydrogen dioxide (27%)**	**N/A**	**BioSafe Systems LLC**
Pristine	**pyraclostrobin (12.8%)/boscalid (25.2%)**	**QoI-strobilurin + carboximide**	**BASF**
Problad Plus	**protein extracted from the plant of the genus Lupinus (20%)**	**plant extract**	**FMC**
Optiva	**proprietary**	**N/A**	**AgraQuest Inc.**
Rovral 4F	**iprodione (41.6%)**	**dicarboximide**	**FMC**
Quash	**metconazole (50%)**	**triazole**	**Valent**
S-2200	**N/A**	**N/A**	**Valent**

Switch	**cyprodinil (37.5%), fludioxonil (25.0%)**	**anilino-pyrimidine**	**Syngenta Crop Protection, Inc.**
Stylet oil	**paraffinic oil (97.1%)**	**oil**	**JMS Flower Farms**
Sylgard 309	**polysiloxane (80%)**	**adjuvant**	**Dow Corning Corp**
Vangard	**cyprodinil (75%)**	**anilino-pyrimidine**	**Syngenta Crop Protection, Inc.**
Vivando	**metrafenone (300g/L)**	**N/A**	**BASF**
V-10135	**N/A**	**N/A**	**Valent**