

Fungicide control of fruit rot (*Botrytis* and anthracnose rot) in strawberry, Davis, 2008 – Trial I

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A. Introduction

Location	Armstrong Farm, Davis, California
Investigators	W. Douglas Gubler, 530.752.0304; Hai Su, 530.752.4982
Cooperators	Tom Kominek and Richard Webb
Crop	Strawberry cv. 'Albion'
Diseases	Gray mold (<i>Botrytis cinerea</i>) and anthracnose (<i>Colletotrichum acutatum</i>)

B. Material and methods

1. Trial layout

Experimental design	Treatments consist of fungicide applications to single bed plots, in a randomized complete block design, with 4 replications.		
Application method	CO ₂ Sprayer (R&D sprayer); 60 psi; 2 nozzle conejet TX6 wand		
Plant spacing	12"/2 plants		
Treatment unit	12 plants	Bed spacing	30" c-c, 24" top
Area/Trt, plants	60 ft ²	Treatment unit area	72" x 30" = 15 sqft
Vol. Water	140 G/A	Area/Treatment, acre	0.001377
Treatment interval	7 to 10 days unless specified	Vol. water/trt, liter	0.193 gal= 730 ml
Apps. Start	April 7	Apps. End	May 26
Evaluation method	Disease incidence	Evaluation stage	Red fruit.

2. Experimental treatments

Trt no.	Sponsor	Product	FP/Acre	FP/Treatment	Applications	Notes
1		Untreated	-			
2	Lab	Pristine 38WDG	23oz	0.90g		
3	Chemtura	Procure 480SC	8.0 fl oz	0.33ml	14 days	Max. 32 fl oz
4	Chemtura	Procure 480SC alt/w Switch 62.5WDG	8.0 fl oz 14 oz	0.33ml 0.55g	14days	Max. 32 fl oz of Procure
5	Chemtura	Procure 480SC alt/w Pristine 38WDG	8.0 fl oz 18.5 oz	0.33ml 0.72g	14days	Max. 32 fl oz of Procure
6	Bayer	Scala 600SC	18 floz	0.73ml		
7	Arysta	Evito 480SC+ Elevate WDG	3.0 floz 1.5lb	0.12ml 0.94g		
8	Arysta	Evito 480SC+ Elevate 50WDG	5.7floz 1.5lb	0.23ml 0.94g		
9	Arysta	Evito 480SC+ Polyoxin D 11.3% WDG	5.7floz 1.0lb	0.23ml 0.62g		
10	Arysta	Polyoxin D 11.3% WDG +Elevate 50WDG	0.5lb 1.0lb	0.31g 0.62g		
11	Arysta	Polyoxin D 11.3% WDG +Elevate 50WDG	1.0lb 1.0lb	0.62g 0.62g		
12	BASF	(Pristine 38WDG + Silwett L-77 0.05% v/v) alt/w (Scala + Silwett L-77 0.05% v/v)	23oz+ 9.0floz 18floz + 9.0floz	0.90g + 0.37ml 0.73ml+ 0.37ml		

Notes: FP=formulated product; alt/w=alternated with.

3. Materials

Product name	Active Ing.	Conc. AI	Mfr
Evito 480SC	fluoxastrobin	480g/L	Arysta
Polyoxin D 11.3% WDG	polyoxin D zinc salt	2.5%	Arysta
Elevate 50WDG	fenhexamid	50%	Arysta
Procure 480SC	triflumizole, 42.14%	480g/L	Crompton
Scala 600SC	pyrimethanil	54.6%	Bayer
Switch 62.5WDG	cyprodinil+fludioxonil	37.5%+25.0%	Syngenta
Silwett L-77	Organosilicone surfactants	100%	Helena
Pristine 38WDG	pyraclostrobin + boscalid	12.8% 25.2%	BASF

4. Fungicide applications

Date App.#	1 (Apr 7) (0)		2 (Apr 14) (6 days after 1st application)		3 (Apr 23) (inoc. 4/23) (15)		4 (May 5) (inoc. 5/8) (27)	
Trt# 1	Untreated		Untreated		Untreated		Untreated	
2	Pristine	0.90g	Pristine	0.90g	Pristine	0.90g	Pristine	0.90g
3	Procure	0.33ml			Procure	0.33ml		
4	Procure	0.33ml			Switch	0.55g		
5	Procure	0.33ml			Pristine	0.72g		
6	Scala	0.73ml	Scala	0.73ml	Scala	0.73ml	Scala	0.73ml
7	Evito + Elevate	0.12ml 0.94g	Evito + Elevate	0.12ml 0.94g	Evito + Elevate	0.12ml 0.94g	Evito + Elevate	0.12ml 0.94g
8	Evito + Elevate	0.23ml 0.94g	Evito 4+ Elevate	0.23ml 0.94g	Evito + Elevate	0.23ml 0.94g	Evito 4+ Elevate	0.23ml 0.94g
9	Evito + Polyoxin D	0.23ml 0.62g	Evito + Polyoxin	0.23ml 0.62g	Evito + Polyoxin D	0.23ml 0.62g	Evito + Polyoxin	0.23ml 0.62g
10	Polyoxin + Elevate	0.31g 0.62g	Polyoxin + Elevate	0.31g 0.62g	Polyoxin + Elevate	0.31g 0.62g	Polyoxin + Elevate	0.31g 0.62g
11	Polyoxin D + Elevate	0.62g 0.62g	Polyoxin + Elevate	0.62g 0.62g	Polyoxin D + Elevate	0.62g 0.62g	Polyoxin + Elevate	0.62g 0.62g
12	Pristine + Silwett	0.90g + 0.37ml	Scala + Silwett	0.73ml+ 0.37ml	Pristine + Silwett	0.90g + 0.37ml	Scala + Silwett	0.73ml+ 0.37ml

Date	5 (May 15) (37)		6 (May 26) (48)	
Trt# 1	Untreated		Untreated	
2	Pristine	0.90g	Pristine	0.90g
3	Procure	0.33ml		
4	Procure	0.33ml		
5	Procure	0.33ml		
6	Scala	0.73ml	Scala	0.73ml
7	Evito + Elevate	0.12ml 0.94g	Evito + Elevate	0.12ml 0.94g
8	Evito + Elevate	0.23ml 0.94g	Evito 4+ Elevate	0.23ml 0.94g
9	Evito + Polyoxin D	0.23ml 0.62g	Evito + Polyoxin	0.23ml 0.62g
10	Polyoxin + Elevate	0.31g 0.62g	Polyoxin + Elevate	0.31g 0.62g
11	Polyoxin D + Elevate	0.62g 0.62g	Polyoxin + Elevate	0.62g 0.62g
12	Pristine + Silwett	0.73ml+ 0.37ml	Scala + Silwett	0.73ml+ 0.37ml

5. Results and Discussion

There was a significant difference among the treatments for control of Botrytis fruit rot ($P=0.0021$) and anthracnose fruit rot ($P<0.0001$). For Botrytis rot, Elevate 50 WDG tank-mixed with Polyoxin D or Evito provided better control than other treatments. Treatment with higher rate of Polyoxin D further reduced incidence of Botrytis rot than lower rate. Polyoxin D tank-mixed with Elevate reduced Botrytis rot incidence by 54% compared to the untreated control. There were no differences in Botrytis fruit rot incidence between the higher and lower rate treatments of Evito tank-mixed with Elevate. Plots treated with Pristine had higher incidence of Botrytis fruit rot and this is consistent with the results from another trial run in an adjacent field. Procure rotated with Switch or Pristine reduced Botrytis incidence compared to when it was applied alone, but not significantly.

All the fungicide treatments significantly reduced incidence of anthracnose fruit rot over the untreated control. Pristine was the most effective in controlling anthracnose fruit rot and reduced disease incidence by 82%, similar to that in another trial. Plots treated with Pristine rotated with Scala had the second lowest incidence of anthracnose fruit rot.

Table 1. Disease incidence of Botrytis and anthracnose fruit rot in Davis, California in 2008.

Treatment	Botrytis incidence (%)	Anthracnose incidence (%)
Pristine 38WDG 23 oz	29.8 ±3.7 a*	5.4 ±1.8 f
Untreated control	19.9 ±3.0 b	29.5 ±1.8 a
Procure 480SC 8.0 fl oz	18.3 ±1.5 bc	16.0 ±2.3 bcd
(Pristine 38WDG 23 oz + Silwett L-77 0.05% v/v) alt/w (Scala 600SC 18 fl oz + Silwett L-77 0.05% v/v)	18.1 ±3.7 bc	8.4 ±1.6 ef
Procure 480SC 8.0 fl oz alt/w Switch 62.5WDG 14 oz	17.7 ±2.1 bc	15.5 ±1.2 bcd
Procure 480SC 8.0 fl oz alt/w Pristine 38WDG 18.5 oz	17.6 ±2.2 bc	13.3 ±3.3 cde
Scala 600 SC 18 fl oz	17.2 ±0.3 bc	18.8 ±1.9 bc
Evito 480SC 5.7 fl oz + Elevate 50WDG 1.5 lb	15.6 ±3.7 bcd	16.3 ±2.6 bcd
Evito 480SC 3.0 fl oz + Elevate 50WDG 1.5 lb	14.8 ±3.7 bcd	15.1 ±1.4 bcd
Evito 480SC 5.7 fl oz+ Polyoxin D 11.3% WDG 1.0 lb	13.2 ±3.0 bcd	11.6 ±1.7 def
Polyoxin D 11.3% WDG 0.5 lb + Elevate 50WDG 1.0 lb	11.5 ±0.6 cd	16.4 ±1.4 bcd
Polyoxin D 11.3% WDG 1.0 lb + Elevate 50WDG 1.0 lb	9.1 ±1.1 d	20.2 ±4.4 b
	$P=0.0021$	$P<0.0001$

*Data with the same letter in a column are not significantly different according to Fisher's Protected LSD test at $\alpha=0.05$ level. Data is the mean of four replicates and standard error.