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

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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 (*Botrytis cinerea*) and anthracnose (*Colletotrichum acutatum*)

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 4	Apps. End	May 26
Evaluation method	Disease incidence	Evaluation stage	Ripe fruits

2. Experimental treatments

Trt no.	Sponsor	Product	FP/Acre	FP/Treatment
1		Untreated	-	
2		Pristine 38WDG	23oz	0.90g
6	Ewing &Asso.	EA-7408	3oz	0.12g
7	Natural Industries	Actinovate + Silwet L-77 (1st appl.)	6 oz	0.24g
8	Rotem	AG3+ CuSO4 NuFilm P	1.55%+ 0.05% (w/v) 0.02%	11.3ml+ 0.37g 0.15ml
11	PurFresh	Purshade (Product B)	3%	21.9ml
12	PurFresh	Purshade	5%	36.5ml
13	PurFresh	Purshade	10%	73.0ml
14	Ewing &Asso.	EA-7408	1.5oz	0.07g

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

3. Materials

Product name	Active Ing.	Conc. AI	Mfr
Pristine 38WDG	pyraclostrobin + boscalid	12.8% 25.2%	BASF
EA-7408	Trade secret		Ewing & Associates
Actinovate	*Streptomyces lydicus* WYEC108	1x10^7 cfu/ml	Natural Industries Inc.
AG3	Mixture of salts		Rotem
Silwett L-77	Organosilicone surfactants	100%	Helena
CuSO4	CuSO4		
Purshade	Purshade	limestone	PurFresh

4. Fungicide applications

Date App.#	1 (Apr 4) (0)		2 (Apr 14) (9 days after 1st application)		3 (Apr 23) (inoc. 4/23) (18)		4 (May 5) (inoc. 5/8) (30)	
Trt# 1	Untreated		Untreated		Untreated		Untreated	
2	Pristine	0.90g	Pristine	0.90g	Pristine	0.90g	Pristine	0.90g
6	EA-7408	0.12g	EA-7408	0.12g	EA-7408	0.12g	EA-7408	0.12g
7	Actinovate + Silwett	0.24g+ 0.37ml	Actinovate	0.24g	Actinovate	0.24g	Actinovate	0.24g
8	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml
11	Product B 3%	21.9ml	Product B 3%	21.9ml	Product B 3%	21.9ml	Product B 3%	21.9ml
12	Product B 5%	36.5ml	Product B 5%	36.5ml	Product B 5%	36.5ml	Product B 5%	36.5ml
13	Product B 10%	73.0ml	Product B 10%	73.0ml	Product B 10%	73.0ml	Product B 10%	73.0ml
14	EA-7408	0.07g	EA-7408	0.07g	EA-7408	0.07g	EA-7408	0.07g

Date App.#	5 (May 15) (40)		6 (May 26) (51)	
Trt# 1	Untreated		Untreated	
2	Pristine	0.90g	Pristine	0.90g
6	EA-7408	0.12g	EA-7408	0.12g
7	Actinovate	0.24g	Actinovate	0.24g
8	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml	AG3+ CuSO4+ NuFilm P	11.3ml+ 0.37g+ 0.15ml
11	Product B 3%	21.9ml	Product B 3%	21.9ml
12	Product B 5%	36.5ml	Product B 5%	36.5ml
13	Product B 10%	73.0ml	Product B 10%	73.0ml
14	EA-7408	0.07g	EA-7408	0.07g

5. Results and discussion

There were significant differences among the treatments in disease incidence of Botrytis rot (P=0.0302) and anthracnose rot (P<0.001) (Table 1).

Purshade reduced incidence of Botrytis fruit rot by up to 56% and no significant differences were found among different rates of this treatment. Actinvate also reduced disease incidence to a similar level. Incidences with EA-7408 treatments were lower than that of the untreated control, but not significantly, due to greater variation. AG3 and Pristine were not effective in reducing Botrytis fruit rot and had similar disease incidences. Though higher incidence of Botrytis fruit rot in Pristine treated plots was also noticed in another trial, this contradicts our results of previous trials. This phenomenon needs to be investigated.

Anthracnose fruit rot incidence was the lowest in Pristine treated plots and was reduced by up to 85%, similar to the degree of control in another trial. Actinovate also significantly reduced anthracnose compared to the untreated control. EA-7408 treated plots tended to have lower incidence but not significantly different from the untreated control. Purshade and AG3 did not have effect in reducing anthracnose incidence.

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

Treatment	Botrytis incidence (%)			Anthracnose incidence (%)		
Pristine 38WDG 23 oz	16.9	±2.3	a*	5.0	±0.8	d
Untreated	16.8	±0.6	a	34.3	±1.3	ab
AG3 1.55% + CuSO4 0.05% (w/v) + NuFilm P 0.02% (v/v)	16.3	±4.0	a	33.4	±4.4	abc
EA-7408 1.5 oz	13.9	±5.0	ab	29.5	±5.1	bc
EA-7408 3 oz	11.7	±3.4	ab	30.7	±6.1	bc
Actinovate 6 oz	8.4	±2.2	b	24.6	±4.0	c
Purshade 5%	8.3	±1.2	b	35.6	±3.8	ab
Purshade 3%	7.8	±1.7	b	28.9	±2.5	bc
Purshade 10%	7.4	±1.0	b	40.3	±4.9	a
	P=0.0302			P<0.0001		

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