

**Cooperative Research Project  
Dr. W. Douglas Gubler, U.C. Davis Dept. of Plant Pathology**

<b>Trial name .....</b>	<b>MBA Strawberry Fruit Rot Trial, 2006</b>
Location.....	Monterey Bay Academy, Watsonville, CA (La Selva Beach)
Investigators.....	Dr. W. Douglas Gubler, 530.752.0304; Dr. Hai Su, 752.4982
Cooperators.....	Maria Vidauri <a href="mailto:mvidauri@calstrawberry.org">mvidauri@calstrawberry.org</a> (831)724-1301
Crop .....	Strawberry cv 'Diamante'
Diseases	Anthracnose <i>Colletotrichum acutatum</i> ; Grey mold <i>Botrytis cinerea</i>

***Trial layout and method***

Objective.....	Efficacy of fungicides for control of Botrytis and anthracnose fruit rots		
Experimental design ....	Fungicides applied to single bed plots, randomized complete block design, 4 replications.		
Application method .....	CO <sub>2</sub> Sprayer (R&D sprayer); 60 psi; 4 nozzle arm		
Plant spacing.....	12"/2 plants; 8" between rows	Bed spacing.....	52" c-c, 40" tops
Treatment unit.....	12 plants; 84 " row	Treatment unit area.....	84" x 52"
Area/Trt, ft <sup>2</sup> .....	121.3	Area/Treatment, acre .....	0.002785
Vol. Water/acre, gal....	120	Vol. water/trt.....	0.33gal = 1.3L
Apps. Start .....	May 10	Apps. End .....	July 19
Treatment interval.....	7-10 days unless specified	Evaluation stage.....	periodic, 1x/week
Evaluation method.....	Fruit rot evaluated at weekly harvests by Coastal Berry staffs		

***Treatments protocol***

#	sponser	Treatments	FP/A		FP/Trt		Notes	Application code**
1		Untreated Control			0			
2		Elevate 50 WDG (standard)	1.5	lb	1.89	g		
3	Isagro-USA	Domark 1SL + Switch 62.5 WDG	5.70	fl oz	0.47	ml	14 day	A—H/L
4	Isagro-USA	Domark 1SL + Captan Pro 80 WDG	5.70	fl oz	0.47	ml	14 day	A—H /L
5	Valent Syngenta	Switch 62.5WG	14.0	oz	1.11	g		
6	Valent	V10135 50DF	0.5	lb	0.63	g		
7	Valent	V10135 50DF	0.75	lb	0.95	g		
8	Valent	V10135 50DF	1.0	lb	1.26	g		
9	Valent	V10135 50DF	1.25	lb	1.58	g		
10	Valent	V10135 50DF alt/wSwitch 62.5WDG	0.75	lb	0.95	g		
			0.36	lb	0.45	g		
11	Natural Industries	Micro 108 + Silwett L77	6	oz	0.47	g		
			7	fl oz	0.58	ml		
12	AgroQuest	Elevate 50WDG alt/w (Serenade ASO + Silwet L-77)	1.5	lb	1.89	g		
			4	qt	10.69	ml		
			7	fl oz	0.58	ml		
13	AgroQuest	Captan 50 WP alt/w (Serenade ASO + Silwet L-77)	6	lb	7.58	g		
			4	qt	10.69	ml		
			7	fl oz	0.58	ml		
14	Bayer	(Scala 60 SC + Captan 80 WP) alt/w	9	fl oz	0.74	ml		AB EF
			1.88	lb	2.37	g		
		Captan 80 WP	3.75	lb	4.74	g		CD

15	Syngenta	Abound	15.0	fl oz	1.24	ml		
16	BASF	Pristine 38 WG	23	oz	1.82	g		
17	BASF	Pristine 38 WG alt/w Switch 62.5 WDG	23 14	oz oz	1.82 1.11	g g		
18	Du Pont	DPX Lem 17 20SC (200G/L)	30.7	fl oz	2.53	ml	6.4 oz dry active/A	
19	Arysta Life Science	(Captan Pro80WDG + Elevate 50WG) fl by	3.75	lb	4.74	g		A
		+ Elevate 50WG) fl by	1.5	lb	1.89	g		B
		Pristine 38.5 WG fl by	23	oz	1.82	g		C
		(Captan Pro80WDG + Elevate 50WG) fl by	3.75	lb	4.74	g		D
		+ Elevate 50WG) fl by	1.5	lb	1.89	g		E
		Switch 62.5 WDG fl by	14.0	oz	1.11	g		F
		(Captan Pro80WDG + Elevate 50WG) fl by	3.75	lb	4.74	g		
		Scala 60 SC	1.5	lb	1.11	g		
			9	fl oz	0.74	ml		
20	Crompton	Procure 480SC	8	fl oz	0.66	ml	14 day	
21	Crompton	Elite 45 WP	4	oz grapes	0.32	g	14 day	
22	Morse	KeyPlex 350 DP	1	qts	2.67	ml		
23	Morse	KeyPlex 350 DP	2	qts	5.34	ml		

*Application schedule*

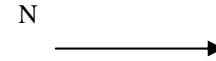
Date..... App.# ..... Stage (days) .....	May 10 1 (A) 1 (4:30-7:30pm)		May 18 2 (B) 7 (9:30-12:00am)		May 25 3 (C) 14 (5:00-7:30pm)		May 31 4 (D) 22 (5:00-7:30pm)	
Trt# 1	Untreated Control		Untreated Control		Untreated Control		Untreated Control	
2	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g
3	Domark 1SL + Switch 62.5 WDG	0.47ml 0.87g			Domark 1SL + Switch 62.5 WDG	0.47ml 0.87g		
4	Domark 1SL + Captan Pro 80 WDG	0.47ml 4.74g			Domark 1SL + Captan Pro 80 WDG	0.47ml 4.74g		
5	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g
6	V10135 50DF	0.63g	V10135 50DF	0.63g	V10135 50DF	0.63g	V10135 50DF	0.63g
7	V10135 50DF	0.95g	V10135 50DF	0.95g	V10135 50DF	0.95g	V10135 50DF	0.95g
8	V10135 50DF	1.26g	V10135 50DF	1.26g	V10135 50DF	1.26g	V10135 50DF	1.26g
9	V10135 50DF	1.58g	V10135 50DF	1.58g	V10135 50DF	1.58g	V10135 50DF	1.58g
10	V10135 50DF	0.95g	Switch 62.5WDG	0.45g	V10135 50DF	0.95g	Switch 62.5	0.45g
11	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml
12	Elevate 50WDG	1.89g	(Serenade ASO + Silwet L-77)	10.69ml 0.58ml	Elevate 50WDG	1.89g	(Serenade ASO + Silwet L-77)	10.7ml 0.58ml
13	Captan 50 WP	7.58g	(Serenade ASO + Silwet L-77)	10.69ml 0.58ml	Captan 50 WP	7.58g	(Serenade ASO + Silwet L-77)	10.7ml 0.58
14	(Scala 60 SC + Captan 80 WP)	0.74ml 2.37g	Captan 80 WP	4.74g	(Scala 60 SC + Captan 80 WP)	0.74ml 2.37g	Captan 80 WP	4.74g
15	Abound	1.24ml	Abound	1.24ml	Abound	1.24ml	Abound	1.24ml
16	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g
17	Pristine 38 WG	1.82g	Switch 62.5 WDG	1.11g	Pristine 38 WG	1.82g	Switch 62.5 WDG	1.11g
18	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml
19	Captan Pro80 + Elevate 50	4.74g 1.89g	Pristine	1.8g	Captan Pro80 + Elevate 50	4.74g 1.89g	Switch	1.11g
20	Procure 480SC	0.66ml			Procure 480SC	0.66ml		
21	Elite 45 WP	0.32g			Elite 45 WP	0.32g		
22	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml
23	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml

Date..... App.# ..... Stage (days) .....	June 8 5 4:30-7:30pm		June 15 6 5:00-7:30pm		June 22 7 5:00-7:30pm		July 5 8 5:00-7:30pm	
Trt# 1	Untreated Control		Untreated Control		Untreated Control		Untreated Control	
2	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g	Elevate 50 WDG	1.89g
3	Domark 1SL + Switch 62.5 WDG	0.47ml 0.87g			Domark 1SL + Switch 62.5 WDG	0.47ml 0.87g		
4	Domark 1SL + Captan Pro 80 WDG	0.47ml 4.74g			Domark 1SL + Captan Pro 80 WDG	0.47ml 4.74g		
5	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g	Switch 62.5WG	1.11g
6	V10135 50DF	0.63g	V10135 50DF	0.63g	V10135 50DF	0.63g	V10135 50DF	0.63g
7	V10135 50DF	0.95g	V10135 50DF	0.95g	V10135 50DF	0.95g	V10135 50DF	0.95g
8	V10135 50DF	1.26g	V10135 50DF	1.26g	V10135 50DF	1.26g	V10135 50DF	1.26g
9	V10135 50DF	1.58g	V10135 50DF	1.58g	V10135 50DF	1.58g	V10135 50DF	1.58g
10	V10135 50DF	0.95g	Switch 62.5WDG	0.45g	V10135 50DF	0.95g	Switch 62.5	0.45g
11	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml	Micro 108 + Silwett L77	0.47g 0.58ml
12	Elevate 50WDG	1.89g	(Serenade ASO + Silwet L-77)	10.69ml 0.58ml	Elevate 50WDG	1.89g	(Serenade ASO + Silwet L-77)	10.7ml 0.58ml
13	Captan 50 WP	7.58g	(Serenade ASO + Silwet L-77)	10.69ml 0.58ml	Captan 50 WP	7.58g	(Serenade ASO + Silwet L-77)	10.7ml 0.58
14	(Scala 60 SC + Captan 80 WP)	0.74ml 2.37g	Captan 80 WP	4.74g	(Scala 60 SC + Captan 80 WP)	0.74ml 2.37g	Captan 80 WP	4.74g
15	Abound	1.24ml	Abound	1.24ml	Abound	1.24ml	Abound	1.24ml
16	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g	Pristine 38 WG	1.82g
17	Pristine 38 WG	1.82g	Switch 62.5 WDG	1.11g	Pristine 38 WG	1.82g	Switch 62.5 WDG	1.11g
18	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml	DPX Lem 17 20SC (200G/L)	2.53ml
19	Captan Pro80 + Elevate 50	4.74g 1.89g	Scala	0.74ml	Captan Pro80 + Elevate 50	4.74g 1.89g	Pristine	1.8g
20	Procure 480SC	0.66ml			Procure 480SC	0.66ml		
21	Elite 45 WP	0.32g			Elite 45 WP	0.32g		
22	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml
23	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml

Date.....	July 12		July 19					
App.# .....	9		Last rating					
Stage (days) .....	8:30-10:30pm							
Trt# 1	Untreated Control							
2	Elevate 50 WDG	1.89g						
3	Domark 1SL + Switch 62.5 WDG	0.47ml 0.87g						
4	Domark 1SL + Captan Pro 80 WDG	0.47ml 4.74g						
5	Switch 62.5WG	1.11g						
6	V10135 50DF	0.63g						
7	V10135 50DF	0.95g						
8	V10135 50DF	1.26g						
9	V10135 50DF	1.58g						
10	V10135 50DF	0.95g						
11	Micro 108 + Silwett L77	0.47g 0.58ml						
12	Elevate 50WDG	1.89g						
13	Captan 50 WP	7.58g						
14	(Scala 60 SC + Captan 80 WP)	0.74ml 2.37g						
15	Abound	1.24ml						
16	Pristine 38 WG	1.82g						
17	Pristine 38 WG	1.82g						
18	DPX Lem 17 20SC (200G/L)	2.53ml						
19	Captan Pro80 + Elevate 50	4.74g 1.89g						
20	Procure 480SC	0.66ml						
21	Elite 45 WP	0.32g						
22	KeyPlex 350 DP	2.67ml						
23	KeyPlex 350 DP	5.34ml						

*Plot map*

Map MBABOT06 plots: plot #  
treatment #



**Row 13**

												85	86	87	88	89	90	91	92	93	94	95	96
												13	16	18	21	24	2	10	15	23	17	20	19

**Row 12**

												73	74	75	76	77	78	79	80	81	82	83	84
												5	3	7	14	8	22	9	6	1	11	4	12

**Row 11**

Block 4

37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
1	17	18	16	12	23	13	11	19	21	20	24	15	1	6	20	11	12	16	18	17	23	22	24	5	6	10	9	4	7	12	23	1	8	17	15

**Row 10**

01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
22	10	9	3	7	2	8	5	4	15	14	6	4	3	19	13	9	7	8	14	2	5	21	10	21	20	2	24	3	11	16	22	13	19	14	18

Block 1

Block 2

Block 3

## Results

There is a significant treatment effect for Botrytis incidence ( $P<0.0001$ ). DPX Lem17 along with Pristine, Switch, rotation of Pristine and Switch, and the multiple rotation of Captan, Elavate, Pristine, Switch, and Scala provided better control. There is also a significant treatment effect for yield ( $P=0.03$ ). However reduction in disease incidence did not correspond well with yield increase.

#	Treatments	Botrytis Incidence (%)	Anthraco-nose Incidence (%)	Yield(kg) /plan	Phyto-toxicity	Vigor
20	Procare 480SC 8 fl oz	32.9 a	0.3 a	0.215 abcde	0	3.5 a
21	Elite 45 WP 4 oz	31.7 ab	3.3 a	0.182 cdef	0	3.3 a
1	Untreated Control	30.5 ab	3.0 a	0.146 f	0	3.5 a
22	KeyPlex 350 DP 1 qt	28.9 abc	2.3 a	0.214 abcde	0	3.5 a
23	KeyPlex 350 DP 2 qts	28.0 abcd	3.0 a	0.174 def	0	3.3 a
11	Micro 108 6 oz + Silwett L77 7 fl oz	27.4 abcde	0.8 a	0.193 bcdef	0	3.8 a
15	Abound 10 fl oz	26.7 abcde	1.2 a	0.170 def	0	3.3 a
4	Domark 1SL 5.7 fl oz + Captan Pro 80 WDG 3.75 lb	25.2 bcdef	1.1 a	0.240 abc	0	3.8 a
6	V10135 50DF 0.5 lb	23.1 cdef	1.6 a	0.195 bcdef	0	3.3 a
8	V10135 50DF 1.0 lb	22.3 cdefg	0.7 a	0.249 ab	0	3.6 a
2	Elevate 50 WDG 1.5 lb	22.1 cdefg	0.8 a	0.223 abcde	0	3.5 a
13	Captan 50 WP 6 lb alt/w (Serenade ASO 4 qts + Silwet L-77 7 fl oz)	22.0 cdefg	0.9 a	0.165 ef	0	3.3 a
12	Elevate 50WDG 1.5 lb alt/w (Serenade ASO 4 qts + Silwet L-77 7 fl oz)	21.0 defgh	0.5 a	0.225 abcd	0	3.5 a
7	V10135 50DF 0.75 lb	20.7 defgh	0.6 a	0.206 abcde	0	3.3 a
14	(Scala 60 SC 9 fl oz + Captan 80 WP 1.88 lb) alt/w Captan 80 WP 3.75 lb	20.6 efgh	0.5 a	0.222 abcde	0	3.3 a
9	V10135 50DF 1.25 lb	19.0 fghi	0.8 a	0.260 a	0	3.5 a
3	Domark 1SL 5.7 fl oz + Switch 62.5 WDG 11 oz	15.1 ghij	0.4 a	0.234 abc	0	3.5 a
10	V10135 50DF 0.75 lb alt/w Switch 62.5WDG 0.36 lb	13.7 hijk	0.6 a	0.201 bcdef	0	3.5 a
19	(Captan Pro80WDG 3.75 lb + Elevate 50WG 1.5 lb) fl by Pristine 38.5 WG 23 oz fl by (Captan Pro80WDG 3.75 lb + Elevate 50WG 1.5 lb) fl by Switch 62.5 WDG 14 oz fl by (Captan Pro80WDG 3.75 lb + Elevate 50WG 1.5 lb) fl by Scala 60 SC 9 fl oz repeat	12.0 ijkl	0.4 a	0.220 abcde	0	3.0 a
16	Pristine 38 WG 23 oz	11.5 ijkl	1.7 a	0.191 bcdef	0	3.5 a
5	Switch 62.5WG 14 oz	8.2 jkl	0.1 a	0.189 cdef	0	3.0 a
17	Pristine 38 WG 23 oz alt/w Switch 62.5 WDG 14 oz	6.6 kl	0.0 a	0.196 bcdef	0	3.3 a
18	DPX Lem 17 20SC (200G/L) 30.7 fl oz	6.0 l	0.4 a	0.212 abcde	0	3.5 a

(Data with the same letter in a column are not significantly different according to Fisher's Protected LSD test at  $P=0.05$  level.

Significant level: Botrytis,  $P<0.0001$ ; Anthracnose, n.s.; Yield,  $P=0.0325$ ; Phytotoxicity, n.s.; Vigor, n.s.

Rating for leaf phytotoxicity: 0=none, 1=slight, 2=moderate, 3=heavy, 4=severe leaf discoloration or senescence.

Rating for plant vigor: 4=vigorous, 3=average, 2=poor, 1= severe stunting. )