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

Trial name	**MBA Strawberry Powdery Mildew Trial, 2006**
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 mvidauri@calstrawberry.org
Crop	Strawberry cv 'Albion'
Disease.....	Powdery mildew (*Sphaerotheca macularis* f. sp. *fragariae)*

Method

Objective.....	Efficacy of fungicides for control of leaf powdery mildew		
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; 8" between rows	Bed spacing.....	52"c-c, 40" tops
Treatment unit.....	12 plants; 84" row	Treatment unit area	84" x 52" = 30.33 sqft
Area/Trt, plants, ft^2	121.3	Area/Treatment, acre	0.002785
Vol. Water/acre, gal....	120 gal/A	Vol. water/trt, liter	0.33gal = 1.3 L
Apps. Start	May 17	Apps. End	Aug 23
Treatment interval.....	14 days unless specified	Evaluation stage.....	Sept 6
Evaluation method.....	Incidence, severity on leaves, and horticultural symptoms on plants.		

Protocol

#	Sponsor	Treatments	FP/A		FP/Trt		Notes	Tol*	Application code**
1		Untreated Check						Y	
2		Rally 40 WP (Standard)	4	oz	0.32	g		Y	A—H/L
3	Isagro-USA	Domark 1SL	3.43	fl oz	0.28	ml	0.0268 lb ai/A	N	
4	Isagro-USA	Domark 1SL	4.57	fl oz	0.38	ml	0.0357 lb ai/A	N	
5	Isagro-USA	Domark 1SL	5.70	fl oz	0.47	ml	0.0446 lb ai/A	N	
6	Valent	V-10118 .41EC	6.2	fl oz	0.51	ml	.02 lb ai/A	N	
7	Valent	V-10118 .41EC	9.4	fl oz	0.77	ml	.03 lb ai/A	N	
8	Valent	V-10118 .41EC	12.5	fl oz	1.03	ml	.04 lb ai/A	N	
9	Natural Industries	Micro 108 (10^7 cfu/ml) + Silwet L-77	6.0 7.0	oz fl oz	0.47 0.58	g ml		N	A—H/L
10	AgroQuest	Sonata ASO alt/w (Flint 50 WDG + Silwet L-77)	3.0 3.0 7.0	qt oz fl oz	8.02 0.24 0.58	ml g ml		N	ACEGIK BDFHJL
11	Bayer	(Trifloxystrobin + Captan 65WG premix) x 2 alt/w Captan 80 WP x 2	22.0 2.0	oz lb	1.74 2.53	g g		N	AB, EF CD
12	Bayer	Flint 50 WDG alt/w Captan 80 WP	3.0 2.0	oz lb	0.24 2.53	g g		N	ACE BDF
13	BASF	Pristine 38.5 WG	23.0	oz	1.82	g		N	A—H /L
14	Crompton	Procure 480SC	8.0	fl oz	0.66	ml		N	
15	Crompton	Procure 480SC alt/w Pristine 38.5 WG	8.0 23.0	fl oz oz	0.66 2.73	ml g		N	
16	Morse	KeyPlex 350 DP	1.0	qts	2.67	ml		N	
17	Morse	KeyPlex 350 DP	2.0	qts	5.34	ml		N	

* Tol indicates if all products in treatment have EPA tolerance and product can be harvested.

** Application will be extended if disease pressure has been low.

Applications

Date..... App.# ..... Stage (days)	May 17 1 (A) 1 (4:30-6:30 pm)		June 1 2 (B) 14 (9:00-11:00am)		June 15 3 (C) 28 (5:00-7:00pm)		June 29 4 (D) 32(5:00-7:00pm)	
Trt# 1	Untreated Check		Untreated Check		Untreated Check		Untreated Check	
2	Rally 40 WP	0.32g	Rally 40 WP	0.32g	Rally 40 WP	0.32g	Rally 40 WP	0.32g
3	Domark 1SL	0.28ml	Domark 1SL	0.28ml	Domark 1SL	0.28ml	Domark 1SL	0.28ml
4	Domark 1SL	0.38ml	Domark 1SL	0.38ml	Domark 1SL	0.38ml	Domark 1SL	0.38ml
5	Domark 1SL	0.47ml	Domark 1SL	0.47ml	Domark 1SL	0.47ml	Domark 1SL	0.47ml
6	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml
7	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml
8	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml
9	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml
10	Sonata ASO + Silwet L-77	8.02ml 0.58ml	Flint 50 WDG	0.24g	Sonata ASO + Silwet L-77)	8.02ml 0.58ml	Flint 50 WDG	0.24g
11	(Trifloxystrobin + Captan 65WG premix) x 2	1.74g	(Trifloxystrobin + Captan 65WG premix) x 2	1.74g	Captan 80 WP x 2	2.53g	Captan 80 WP x 2	2.53g
12	Flint 50 WDG	0.24g	Captan 80 WP	2.53g	Flint 50 WDG	0.24g	Captan 80 WP	2.53g
13	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g
14	Procure 480SC	0.66ml	Procure 480SC	0.66ml	Procure 480SC	0.66ml	Procure 480SC	0.66ml
15	Procure 480SC	0.66ml	Pristine 38.5 WG	2.73g	Procure 480SC	0.66ml	Pristine 38.5 WG	2.73g
16	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml
17	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml

Date..... App.# ..... Stage (days)	July 12 5 (E) 5:00-7:30pm		July 26 6 (F) 5:00-7:30pm		Aug 9 7(G) 3:00-5:00pm		Aug 23 8(H) 5:00-7:00pm	
Trt# 1	Untreated Check		Untreated Check		Untreated Check		Untreated Check	
2	Rally 40 WP	0.32g	Rally 40 WP	0.32g	Rally 40 WP	0.32g	Rally 40 WP	0.32g
3	Domark 1SL	0.28ml	Domark 1SL	0.28ml	Domark 1SL	0.28ml	Domark 1SL	0.28ml
4	Domark 1SL	0.38ml	Domark 1SL	0.38ml	Domark 1SL	0.38ml	Domark 1SL	0.38ml
5	Domark 1SL	0.47ml	Domark 1SL	0.47ml	Domark 1SL	0.47ml	Domark 1SL	0.47ml
6	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml	V-10118 .41EC	0.51ml
7	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml	V-10118 .41EC	0.77ml
8	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml	V-10118 .41EC	1.03ml
9	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml	Micro 108 (10^7 cfu/ml) + Silwet L-77	0.47g 0.58ml
10	Sonata ASO + Silwet L-77	8.02ml 0.58ml	Flint 50 WDG	0.24g	Sonata ASO + Silwet L-77)	8.02ml 0.58ml	Flint 50 WDG	0.24g
11	(Trifloxystrobin + Captan 65WG premix) x 2	1.74g	(Trifloxystrobin + Captan 65WG premix) x 2	1.74g	Captan 80 WP x 2	2.53g	Captan 80 WP x 2	2.53g
12	Flint 50 WDG	0.24g	Captan 80 WP	2.53g	Flint 50 WDG	0.24g	Captan 80 WP	2.53g
13	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g	Pristine 38.5 WG	1.82g
14	Procure 480SC	0.66ml	Procure 480SC	0.66ml	Procure 480SC	0.66ml	Procure 480SC	0.66ml
15	Procure 480SC	0.66ml	Pristine 38.5 WG	2.73g	Procure 480SC	0.66ml	Pristine 38.5 WG	2.73g
16	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml	KeyPlex 350 DP	2.67ml
17	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml	KeyPlex 350 DP	5.34ml

Plot map

MBABOT06 plots: plot #
treatment #

N

Row 9

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
2	**3**	**6**	**7**	**1**	**8**	**14**	**13**	**10**	**12**	**9**	**4**	**16**	**15**	**11**	**17**	**5**			**2**	**10**	**9**	**4**	**7**	**8**	**15**	**3**	**6**	**5**	**1**	**14**	**17**	**12**	**11**	**16**	**13**

Block 3 Block 4

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
2	**4**	**8**	**10**	**3**	**9**	**7**	**5**	**6**	**15**	**14**	**13**	**1**	**11**	**17**	**12**	**16**			**7**	**5**	**4**	**8**	**3**	**15**	**13**	**2**	**9**	**6**	**12**	**11**	**1**	**16**	**14**	**10**	**17**

Row 8

Block 1 Block 2

Results

Treatments were sampled on September 6, 2006, two weeks after the last spray. Powdery mildew developed late this season and the disease pressure was low. Fifty leaflets were randomly taken from each plot and disease incidence and severity were assessed. There was a significant treatment effect for disease incidence (P<0.0001) and severity (P<0.0001). There is no significant treatment effect for yield.

V-10118 and Domark had similar effective control as Rally. Higher rates for V-10118 reduced disease incidence and severity but not significantly. Biocontrol agent Micro 108 significantly reduce disease incidence and severity than the untreated check. Sonata rotated with Flint also showed significantly lower disease incidence and severity than the untreated check.

#	Treatments	Incidence (%)		Severity (%)		Yield (kg) /plant		Phyto-toxocity	Vigor	
16	KeyPlex 350 DP	65.4	a	9.3	a	0.554	a	0	3.3	a
17	KeyPlex 350 DP	65.0	a	9.5	a	0.494	a	0	3.3	a
1	Untreated Check	61.0	a	8.5	a	0.547	a	0	3.2	a
11	(Trifloxystrobin + Captan 65WG premix) x 2 alt/w Captan 80 WP x 2	34.5	b	3.0	b	0.590	a	0	3.5	a
12	Flint 50 WDG alt/w Captan 80 WP	32.3	bc	2.8	b	0.544	a	0	3.3	a
13	Pristine 38.5 WG	32.0	bcd	3.4	b	0.555	a	0	3.1	a
14	Procure 480SC	30.5	bcde	2.6	b	0.495	a	0	3.3	a
10	Sonata ASO alt/w (Flint 50 WDG + Silwet L-77)	28.5	bcdef	2.0	b	0.519	a	0	3.3	a
9	Micro 108 (10^7 cfu/ml) + Silwet L-77	20.5	bcdefg	1.7	b	0.565	a	0	3.3	a
6	V-10118 .41EC 6.2 fl oz	19.0	bcdefg	1.5	b	0.583	a	0	3.1	a
7	V-10118 .41EC 9.4 fl oz	17.5	cdefg	1.5	b	0.584	a	0	3.3	a
15	Procure 480SC alt/w Pristine 38.5 WG	16.0	defg	1.2	b	0.592	a	0	3.1	a
5	Domark 1SL	14.5	efg	0.9	b	0.566	a	0	3.4	a
2	Rally 40 WP (Standard)	13.2	fg	1.0	b	0.553	a	0	3.1	a
3	Domark 1SL	12.5	fg	0.9	b	0.593	a	0	3.1	a
4	Domark 1SL	12.0	g	0.7	b	0.574	a	0	3.1	a
8	V-10118 .41EC 12.5 fl oz	11.0	g	0.8	b	0.534	a	0	3.0	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: Incidence, P < 0.0001; Severity, P < 0.0001; Yield, n.s.; 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.)