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Title: Effect of fungicides on downy mildew and Botrytis blight on *Osteospermum*

Host: On 27 January, 2005 *Osteospermum fruticosum* 'Ostica - Purple' plugs were planted in A815 pots containing Sunshine Mix No. 1. The plants were fertilized with 1/4 tsp. Osmocote Plus 15-9-12 the same day. The test was conducted in a heated greenhouse (minimum 55) with poly and shade cloth covering the top and sides.

Inoculation: Plants were infected with *Plasmopara halstedii* by placing symptomatic plants in the same greenhouse and using fans on 31 January, 2005.

Treatments:	Rate/100 gal
A. Water control	-----
B. Phyton 27	15 oz
C. Aliette	16 oz
D. Fosphite	32 oz (2-1-05 only) then 24 oz
E. Heritage	2 oz
F. Subdue MAXX	1 oz
G. STBX 304	25 oz
H. Fosphite	48 oz

Chemical application dates: All treatments were applied as a foliar spray (to drip) as listed above on 1, 8, 15 February, 1, 11 and 21 March, 2005.

Date	Time applied	Air temperature	Water temperature	Weather
1 February	9:00 AM	15.5 C	12.0 C	clear
8 February	7:30 AM	14.4 C	12.0 C	overcast
15 February	7:30 AM	11.0 C	13.0 C	rain
1 March	7:30 AM	13.3 C	13.0 C	clear
11 March	8:00 AM	15.5 C	17.0 C	clear
21 March	7:30 AM	17.8 C	15.0 C	overcast

On 22 February, 2005 pockmarks or burns on leaves was recorded using the following scale: 1 – none, 2 – slight, 3 – moderate, 4 – severe to 5 – plant dead.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
B.	1	1	1	1	1	1	1	1	1	1	2	1	1.1 a
C.	2	1	1	2	1	2	1	1	1	1	1	2	1.3 a
D.	3	3	3	2	2	1	2	2	2	2	2	2	2.2 b
E.	2.5	2.5	2.5	1	1	1	1	2	1	1	1	1	1.4 a
F.	3	2.5	2	1	1	1	2	2	1	1	1	1	1.5 a
G.	1	1	1	3	3	3	3.5	3.5	3.5	3.5	3.5	3.5	2.7 c
H.	1	1	1	1	1	1	1	1	1	2	2	1	1.2 a

  

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	7	30.5	4.357	11.8	<0.0001
Error	88	32.6	0.371		highly significant
Total	95	63.1			

Conclusions: After three applications, slight damage was seen on plants treated with 32/24 oz of Fosphite but not 48 oz which seems odd. The most significant damage was seen with plants treated with STBX304.

On 22 February, 2005 residue severity was recorded using the following scale: 1 – none, 2 – slight, 3 – moderate, 4 – severe to 5 – extreme – plant completely covered.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
B.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
C.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
D.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
E.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
F.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
G.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
H.	2	2	2	2	2	2	2	1	2	2	1	2	1.8 b

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	7	7.29	1.0417	55.0	<0.0001
Error	88	1.67	0.0189	highly significant	
Total	95	8.96			

Conclusions: Only Fosphite at 48 oz/100 gal resulted in significant (but very slight) residue after three applications.

On 23 February, 2005 plant height (cm) was recorded.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	16	18	17	14	16	19	17	14	16	17	19	18	16.8 a
B.	21	19	19	21	21	20	16	19	19	18	18	19	19.2 a
C.	19	20	24	18	17	17	17	15	16	17	19	19	18.2 a
D.	20	22	20	17	18	13	17	21	19	17	19	18	18.4 a
E.	20	15	18	15	16	17	16	16	18	22	21	18	17.7 a
F.	19	21	18	20	19	22	18	18	19	17	18	15	18.7 a
G.	19	19	18	13	17	17	18	15	18	18	17	16	17.1 a
H.	21	24	22	19	16	15	17	18	17	18	18	17	18.5 a

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	7	57.0	8.14	1.90	0.0795
Error	88	377.8	4.29	not significant	
Total	95	434.7			

Conclusions: Plant height was not affected by treatment at this rating.

On 31 March, 2005 Botrytis severity (the number of leaves per plant with sporulation) was recorded.

Ttt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	0	0	0	0	0	0	7	6	4	2	0	3	1.8 a
B.	0	7	3	0	3	5	2	6	6	1	2	6	3.4 a
C.	0	1	0	0	0	0	2	10	15	1	8	8	3.7 a
D.	0	1	0	0	3	1	2	4	5	0	2	2	1.7 a
E.	0	0	0	0	0	0	3	4	3	0	1	0	1.0 a
F.	0	1	0	0	2	0	5	9	10	3	2	3	3.0 a
G.	4	0	0	0	0	0	9	12	5	0	6	1	3.1 a
H.	0	0	0	1	0	0	8	5	8	1	3	0	2.2 a

  

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	7	79.990	11.427	1.098	0.372
Error	88	915.917	10.408	not significant	
Total	95	995.906			

Conclusions: The level of Botrytis was extremely variable and not significantly affected by treatment. All treatments had some Botrytis development although the least was seen in plants treated with Heritage at 2 oz/100 gal, Fosphite at 24 oz/100 gal or the water sprayed controls.

On 31 March, 2005 the number of leaves per plant with downy mildew was recorded. The level of disease caused by the downy mildew was slight to say the least.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	6	4	0	5	0	1	2	1	0	2	1	0	1.8 b
B.	0	0	0	0	0	0	0	0	0	0	0	0	0.0 a
C.	0	0	0	0	0	0	0	0	0	0	0	0	0.0 a
D.	1	0	0	0	0	0	1	1	0	0	0	0	0.2 a
E.	0	0	0	0	0	0	0	0	0	0	1	0	0.1 a
F.	0	0	0	0	0	0	0	1	0	0	0	0	0.1 a
G.	0	0	0	0	0	0	0	0	0	0	0	0	0.0 a
H.	3	2	0	0	0	0	0	0	0	0	0	0	0.4 a

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	7	32.667	4.667	6.553	<0.001
Error	88	62.667	0.712	highly significant	
Total	95	95.333			

Conclusions: All fungicide treatments significantly eliminated downy mildew from these plants. The disease pressure was VERY low.

Summary for the effect of fungicides on downy mildew on *Osteospermum*

Treatment	Rate/100gal.	Phytotoxicity 22 February	Residue 22 February	Height (cm) 23 February	Botrytis 31 March	Downy mildew 31 March
Water	-----	1.0 a	1.0 a	16.8 a	1.8 a	1.8 b
Phyton 27	15 oz	1.1 a	1.0 a	19.2 a	3.4 a	0.0 a
Aliette	16 oz	1.3 a	1.0 a	18.2 a	3.7 a	0.0 a
Fosphite	32 oz then 24 oz	2.2 b	1.0 a	18.4 a	1.7 a	0.2 a
Heritage	2 oz	1.4 a	1.0 a	17.7 a	1.0 a	0.1 a
Subdue MAXX	1 oz	1.5 a	1.0 a	18.7 a	3.0 a	0.1 a
STBX 304	25 oz	2.7 c	1.0 a	17.1 a	3.1 a	0.0 a
Fosphite	48 oz	1.2 a	1.8 b	18.5 a	2.2 a	0.4 a