

10 September, 2004

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Title: Effect of fungicides on *Phytophthora* aerial blight on vinca

Host: On 21 July, 2004 *Catharanthus roseus* (vinca) 'Cooler Red' 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 greenhouse with poly and shade cloth covering the top and sides then moved under mist on 2 September, 2004 for the duration of the trial.

Inoculation: Plants were inoculated with a mycelial slurry of a 7-day old culture of *Phytophthora parasitica* blended at the rate of 1 plate per 100 ml of sterilized water. The slurry was drenched into the potting medium at the rate of 10 ml per pot on 4 August, 2004 and watered lightly to distribute the inoculum.

Treatments:	Rate/100 gal
A. Water - non-inoculated	-----
B. Water - inoculated	-----
C. G41 drench	8 oz
D. G41 drench	16 oz
E. PlantShield HC drench	4 oz
F. Actinovate/Capsil sprench	6/4 oz
G. Aliette 80WDG spray	32 oz
H. Fosphite spray	64 oz
I. Fenstar drench	7 oz
J. Fenstar drench	14 oz
K. Fenstar spray	7 oz
L. Fenstar spray	14 oz

Chemical application dates: All treatments were applied as a foliar spray (to drip), drench at 35 ml per 3.5 inch pot or 20 ml per pot sprench as listed above on 30 July, 13 and 30 August, 2004. Treatments C, D and E were applied once only on 30 July, 2004 and received water only for the duration of the trial.

Date	Time applied	Air temperature	Water temperature	Weather
30 July	6:45 AM	17.8 C	22.0 C	clear
13 August	8:00 AM	26.7 C	26.0 C	clear
30 August	7:15 AM	18.9 C	24.0 C	clear

On 20 August, 2004 residue severity was recorded using the following scale: 1 - no residue, 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.	2	2	2	1	2	2	1	2	2	2	2	2	1.8 ab
B.	2	2	2	2	2	2	1	1	2	1	2	1	1.7 ab
C.	2	2	2	1	1	2	2	2	2	2	2	1	1.7 ab
D.	2	2	2	2	2	2	1	2	2	2	1	2	1.8 ab
E.	2	2	2	2	2	1	1	2	2	2	1	2	1.7 ab
F.	2	2	2	2	2	2	2	1	2	2	2	2	1.9 ab
G.	2	2	2	2	2	2	2	2	2	2	1	2	1.9 ab
H.	2	2.5	2	2	2	2	2	2	2	2	2	2	2.0 ab
I.	2	1	2	2	2	2	2	2	1	1	1	1	1.6 a
J.	2	2	2	1	1	1	1	2	2	2	2	2	1.7 ab
K.	2	2	2.5	2	2	2.5	2.5	2	2	2	2.5	2	2.2 b
L.	2.5	3	2.5	2.5	2.5	3	2.5	2.5	3	3	3	3.5	2.8 c

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	13.8	1.253	8.25	<0.0001
Error	132	20.0	0.152	highly significant	
Total	143	33.8			

Conclusions: The greatest residue was found on the Fenstar spray treatments which worsened with rate increase. Even at this level residue was slight-moderate only. All remaining treatments had only very slight to slight residue.

On 23 August, 2004 top grade was recorded using the following scale: 1 – dead, unsalable, 2 – poor, unsalable, 3 – good, salable, 4 – very good, salable, and 5 – excellent, salable.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	4	4	3.5	4	3	3	4	4	4	4	3.5	4	3.8 ab
B.	4	3.5	3	3.5	4	3.5	3.5	4	4	4	3	3.5	3.6 ab
C.	3	4	3.5	4	3.5	3.5	3.5	3.5	3.5	4	4	3.5	3.6 ab
D.	4	3.5	4	3	3.5	3.5	4	3.5	3.5	4	3.5	3	3.6 ab
E.	3	3.5	3.5	3.5	3	3.5	4	4	4	3	4	3.5	3.5 ab
F.	3.5	3	3.5	3.5	3	3.5	2	3.5	3.5	3.5	4	4	3.4 ab
G.	3	3	3	4	4	4	3.5	4	3.5	3	3	4	3.5 ab
H.	4	4	3.5	4	4	4	4	4	3.5	4	3	3.5	3.8 ab
I.	3.5	3	4	4	3.5	4	4	3.5	4	3	3.5	3.5	3.6 ab
J.	3.5	3.5	2.5	3.5	3.5	4	4	3.5	3.5	2	3.5	3.5	3.4 ab
K.	3.5	2.5	3.5	3	2.5	3	3.5	4	4	3.5	3.5	3	3.3 a
L.	4	4	3.5	4	4	3.5	4	4	3.5	4	4	4	3.9 b

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	4.10	0.373	2.17	0.0199
Error	132	22.73	0.172	significant	
Total	143	26.83			

Conclusions: The lowest top grades were seen in the 7 oz Fenamidone spray treatment. The best were in the 14 oz Fenamidone spray treatment. There was no statistical difference between the remaining treatments and those above.

On 23 August, 2004 disease symptoms were rated using the following scale: 1 - no disease, 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	2	1	1	2	1	1	1	1	1	1	1.2 a
C.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
D.	1	1	2	1	1	1	1	1	1	1	1	1	1.1 a
E.	1	1	1	1	3	1	1	2.5	2.5	2	1	3	1.7 b
F.	1	1	1	1	1	1	3	3	2	2	1	2	1.6 b
G.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
H.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
I.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
J.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
K.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
L.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	7.58	0.689	5.15	<0.0001
Error	132	17.67	0.134	highly significant	
Total	143	25.25			

Conclusions: The only significant disease was found in the PlantShield HC and Actinovate/Capsil drenches. All remaining treatments showed very little to no disease at this rating date.

On 31 August, 2004 disease symptoms were rated using the following scale: 1 - no disease, 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	2	1	1	2	1	1	1	1	1	1	1.2 a
C.	1	1	1	1	1	1	2	1	1	1	1	1	1.1 a
D.	1	1	2	1	1	1	1	1	1	1	1	1	1.1 a
E.	1	1	1	2	3	1	1	3	3	2.5	1	2.5	1.8 b
F.	1	1	1	1	1	1	2	3	2	2	1	3	1.6 b
G.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
H.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
I.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
J.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
K.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
L.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	9.85	0.896	6.04	<0.0001
Error	132	19.58	0.148	highly significant	
Total	143	29.44			

Conclusions: The greatest disease was found again in the PlantShield HC and Actinovate/Capsil drenches. All remaining treatments showed very little to no disease.

On 7 September, 2004 disease symptoms were rated using the following scale: 1 - no disease, 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	2	1	1	1	1	2	2	1	1	1	1.2 a
C.	1	1	1	1	1	1	2.5	1	1	1	1	1	1.1 a
D.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
E.	1	1	1	2	3	1	2.5	3	4	2.5	1	3.5	2.1 b
F.	1	1	2	1	1	2	2	3	2	1	3.5	2	1.8 b
G.	1	1	1	1	1	1	1	1	1	1	1	1	1.0 a
H.	1	1	1	1	2	2	1	1	1	1	1	1	1.2 a
I.	1	1	1	1	1	1	2	1	1	1	1	1	1.1 a
J.	1	1	1	1	1	1	1	2	1	1	1	1	1.1 a
K.	1	1	1	2	1	1	1	1	1	1	1	1	1.1 a
L.	1	1	1	1	1	1	1	2	1	1	1	1	1.1 a

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	16.5	1.502	6.41	<0.0001
Error	132	30.9	0.234	highly significant	
Total	143	47.5			

Conclusions: At this final rating the greatest disease was still found in the PlantShield HC and Actinovate/Capsil drenches. All remaining treatments except the noninoculated, 16 oz G41 and Aliette had slight disease levels. Those three were disease free at test end.

On 8 September, 2004 plant height (cm) was recorded.

Trt	1	2	3	4	5	6	7	8	9	10	11	12	Mean
A.	19	18	19	20	16	17	20	20	21	18	15	18	18.4 b
B.	19	19	17	15	19	15	16	16	19	17	15	19	17.2 ab
C.	19	21	21	20	18	17	19	21	19	15	18	18	18.8 b
D.	19	18	21	18	16	18	20	21	19	17	13	15	17.9 ab
E.	17	20	19	19	18	16	21	20	20	16	21	17	18.7 b
F.	20	17	21	17	13	19	16	19	19	21	19	18	18.3 ab
G.	17	17	17	19	19	20	17	18	18	17	18	18	17.9 ab
H.	18	19	19	18	16	19	21	19	20	19	18	19	18.8 b
I.	18	20	19	20	19	21	21	21	20	17	17	17	19.2 b
J.	23	20	17	16	19	18	16	18	18	14	19	16	17.8 ab
K.	17	13	16	19	16	14	16	19	20	17	13	12	16.0 a
L.	18	18	21	19	16	16	19	22	20	20	20	18	18.9 b

Source	DF	Sum of squares	Mean square	F value	P value
Treatment	11	103.1	9.38	2.55	0.0059
Error	132	485.5	3.68	significant	
Total	143	588.6			

Conclusions: The tallest plants were in the noninoculated, 8 oz G41, 4 oz PlantShield HC, Fosphite, Fenstar 7 oz drench and Fenstar 14 oz spray treatments. The shortest plants were in the Fenstar 7 oz spray.

Summary of growth effects and disease control on Phytophthora aerial blight on vinca

Treatment	Application method	Rate/ 100 gal	Residue 8-20	Top grade 8-23	Disease 8-23	Disease 8-31	Disease 9-7
Water-noninoculated	Drench	-----	1.8 ab	3.8 ab	1.0 a	1.0 a	1.0 a
Water-inoculated	Drench	-----	1.7 ab	3.6 ab	1.2 a	1.2 a	1.2 a
G41	Drench	8 oz	1.8 ab	3.6 ab	1.0 a	1.1 a	1.1 a
G41	Drench	16 oz	1.8 ab	3.6 ab	1.1 a	1.1 a	1.0 a
Plantshield HC	Drench	4 oz	1.8 ab	3.5 ab	1.7 b	1.8 b	2.1 b
Actinovate/ Capsil	Sprenc	6 oz/ 4 oz	1.9 ab	3.4 ab	1.6 b	1.6 b	1.8 b
Aliette 80WDG	Spray	32 oz	1.9 ab	3.5 ab	1.0 a	1.0 a	1.0 a
Fosphite	Spray	64 oz	2.0 ab	3.8 ab	1.0 a	1.0 a	1.2 a
Fenstar	Drench	7 oz	1.6 a	3.6 ab	1.0 a	1.0 a	1.1 a
Fenstar	Drench	14 oz	1.7 ab	3.4 a	1.0 a	1.0 a	1.1 a
Fenstar	Spray	7 oz	2.2 b	3.3 a	1.0 a	1.0 a	1.1 a
Fenstar	Spray	14 oz	2.8 c	3.9 b	1.0 a	1.0 a	1.1 a