

## Effect of Fosphite Different Rates against *Phytophthora parasitica*, Root Rot Disease on Petunia

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### Abstract

Fosphite was applied as a foliar application at different rates compared to Aliette at the labeled rate, to evaluate the efficacy and to provide protection against damping-off disease *Phytophthora parasitica* on Petunia plants (*Petunia grandiflora*). Result proved that Fosphite treatments 0.25%, 0.50% and 1.0% and Aliette significantly ( $p \leq 0.05$ ) reduced root rot disease symptoms on Petunia.

### Introduction:

Crown and root rot is caused by *Phytophthora spp.*, a soil borne fungus. They are widely spread and serious plant diseases. Once these disease-causing fungi infest the soil, it is difficult to gain control. The symptoms for the disease are wilting, yellowing of leaves, dry rot, root and stem rot. This research aimed to study the effect of different Fosphite rates along with Aliette (as the standard fungicide) on root rot disease caused by *Phytophthora parasitica*.

### Materials and Methods:

Forty-eight of Petunia plants were used in this trial. Eight plants were used for each treatment as replications. Two fungicides were tested for effectiveness. Fosphite was used at a rate of 0.125 %, 0.25 %, 0.5 % and 1 % v/v, and Chipco Aliette WDG (Rhone Poulenc) was used at a rate of 4 pounds per 100 gallons of water. Both were applied as a foliar spray (spray until wet). Control plants were untreated and sprayed with water.

Petunia plants were infected with *Phytophthora parasitica*. The fungus was grown on 10% vegetable juice agar for five days at 25 °C. Culture dishes were flooded with sterile deionized water and incubated at room temperature for one hour before zoospore suspensions from several dishes were collected. The zoospore concentration was determined using a hemacytometer and the suspension was adjusted to 10,000 zoospores per milliliter.

Petunia plants were transplanted on soil that was inoculated with *Phytophthora parasitica*. Inoculation of the soil with fungus was carried out 7 days before transplanting. The fungus was allowed 7 days to grow in the soil before it was used for transplanting. The experimental design was randomized complete block with eight replications. Treatment was applied with a hand-sprayer to the plants once on the first week. Aliette was applied at the recommended rate of 4-lb./100 gallon of water also on the first week. Petunia plants were completely wet after application. They were rated prior to the initial application and also each week for the next three weeks. Ratings were based on University of California Pathogenically Rating Scale 0-5 (0 is no disease, 5 is terminally infected). The plants were visually evaluated. The following scale was used:

Pathogenically Rating Scale 0-5 (0 is no disease, 5 is terminally infected). The plants were visually evaluated. The following scale was used:

- 0 No spots
- 1 1-3 spots present on leaves but not obvious
- 2 1-3 spots obviously present on bracts
- 3 4-12 spots present on bracts and leaves
- 4 Spots present on bracts, leaves, flowers and stems
- 5 Plant totally blighted

### Results and Discussion:

The *Phytophthora parasitica* disease rating at the pre-count at week one, for all Petunia plants ranged from 1.875 to 2.50. There was no significant ( $p \leq 0.05$ ) difference on the disease ratings among all the plants.

Although at the first week post treatment, the Fosphite treatment applications 1.0% had lower disease rating than the other treatments and the control but the difference was not statistically significant ( $p \leq 0.05$ ). Smillie et al. (1989) indicated that phosphite when present in the plant might cause modification of the fungal cell surface in such a way the plant start recognizing it as foreign and respond with its normal defense mechanisms which happen very slowly. The disease rating at the second week after treatment showed that the Fosphite treatment 0.50% and 1.0% and Aliette significantly ( $p \leq 0.05$ ) reduce the disease over the control. The Fosphite treatment 0.125% and 0.25% had lower disease rating than the control but the difference was not statistically significant ( $p \leq 0.05$ ). Fenn and Coffey (1985) stated that low concentrations of phosphorus lightly reduce the disease. Also Dolan and Coffey (1988) indicated that phosphorous acid treatments had different inhibition range on mutant *Phytophthora* strains. The disease rating for the control plants increased to 4.750 at third week after treatment applications. At the third week after the treatment applications all treatments except the Fosphite at 0.125% had significant ( $p \leq 0.05$ ) differences among the disease rating than control. Fosphite treatments 0.125% had lower disease rating than control but the difference was not statically ( $p \leq 0.05$ ) significant. The results indicated that Fosphite treatments at 0.25%, 0.50% and 1.0% reduced the symptoms of the disease caused by *Phytophthora parasitica*.

Table 1. Effect of Fosphite and Aliette on disease control by *Phytophthora parasitica* on Petunia plants

	Disease Rating			
	Pre-count*	Week 1*	Week 2*	Week 3*
<b>Fosphite 0.125 %</b>	<b>2.125 a</b>	<b>2.750 a</b>	<b>3.625 ab</b>	<b>3.500 ab</b>
Fosphite 0.25 %	1.875 a	2.750 a	3.375 ab	2.375 bc
Fosphite 0.5 %	2.125 a	2.625 a	3.125 bc	2.000 c
Fosphite 1%	2.125 a	2.125 a	2.250 c	1.000 c
Control	2.125 a	3.750 a	4.375 a	4.750 a
Aliette rate 4 lb./100 gallon	2.250 a	2.750 a	3.125 bc	2.250 bc

\*Means in the same column not followed by the same letter differ significantly ( $p \leq 0.05$ ) as determined by DMRT.

**References:**

Dolan, T. and M. Coffey, 1988: Correlative in vitro and vivo behavior of mutant strains of *Phytophthora palmivora* expressing different resistance to phosphorous acid and Fosetyl-Na, 78 (7): 974-978.

Fenn, M. and M. Coffey, 1985: Further evidence for direct mode of action of Fosetyl-Al and phosphorous acid. *Phytopathology* 75 (9) 1064-1068.

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