

# EVALUATION OF ALIETTE FOR CONTROL OF *XANTHOMONAS CAMPESTRIS* PV. *PELARGONII* ON THE GREENHOUSE GROWN GERANIUM 'TANGO'

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**The objective of our study was to evaluate the effectiveness of the fungicide Aliette 80WP and Aliette 80WG as a potential compound for control of bacterial leaf and stem blight of geranium.**

Bacterial blight of geranium caused by *Xanthomonas campestris* pv. *pelargonii* can be a serious disease on this greenhouse grown crop and can result in severe losses if quick action is not taken to prevent further spread of the disease. Rapid diagnosis of this disease is the key to successful control. A review of the literature reveals that studies have been conducted relating to epidemiology and control (1), factors affecting development (3), survival of the organism in soil (2, 4, 5) and survival and development of the pathogen in nonhost plants commonly grown with geraniums in the greenhouse (2). The objective of our study was to evaluate the effectiveness of the fungicide Aliette 80WP and Aliette 80WG as a potential compound for control of bacterial leaf and stem blight of geranium.

## Methods and Materials

The geranium cultivar 'Tango' was used as the test plant in the study. Eighty-four geranium plants were planted in 4" plastic pots in a pasteurized peat and perlite (2:1) mix, amended with calcined clay (5% of total volume). Plants were maintained in a greenhouse at 80°F +/- 5°F and fertilized with 200 ppm Peter's geranium special (15-15-15) on a rotation of two weeks of continuous feed followed by one week of watering without fertilization.

All fungicide treatments were applied fifteen days after planting; 1 day prior to inoculation with the pathogen. Subsequent treatments were applied at 7, 14, or 21 day intervals according to the

predetermined schedule. Treatments included Aliette 80WP (4 lb AI/Acre) and Kocide 77WP (2 lb AI/Acre) applied at a 7 day interval for a total of 5 applications, Aliette 80WP (4 lb AI/Acre) applied at a 14 day interval for a total of 3 applications, Aliette 80WP (4 lb AI/Acre) and Aliette 80WG (4 lb AI/Acre) applied at a 21 day interval for a total of 2 applications. The spray volume was 135 gallons per acre. Twelve inoculated/untreated and twelve uninoculated/untreated plants were included as disease and healthy controls, respectively.

A total of 36 leaves per treatment (12 plants/treatment with 3 replications) were inoculated with a known culture of *Xanthomonas campestris* pv. *pelargonii* one day after the initial fungicide treatment. Plants were inoculated by forming a water-soaked area in upper leaf tissue with a bacterial suspension adjusted turbidimetrically to  $1 \times 10^8$  cfu/ml. All plants were kept in a high humidity chamber for 24 hrs. after inoculation then returned to the greenhouse for the duration of the experiment.

Plants were examined at 1, 2, 3 and 4 weeks after inoculation for disease symptoms. Disease symptoms were rated according to the following disease index scale:

- 0.5 healed inoculation site
- 1.0 local lesion without progression
- 2.0 local lesion with water soaking or chlorosis
- 3.0 expanded lesion with or without water soaking or chlorosis

**All fungicide treatments were applied fifteen days after planting; 1 day prior to inoculation with the pathogen.**

**Table 1.** Effectiveness of Aliette 80WP, Aliette 80WG and Kocide 77WP, applied as foliar sprays at 7, 14 and 21 day spray intervals, on *Xanthomonas campestris* pv. *pelargonii* on the geranium cultivar 'Tango', 1, 2, 3 and 4 weeks after inoculation.

<u>Treatment</u>	<u>Mean Disease Index<sup>a</sup></u>			
	<u>1 Week</u>	<u>2 Weeks</u>	<u>3 Weeks</u>	<u>4 Weeks</u>
1) Disease Check Untreated/Inoculated	2.58 a	2.81 a	2.99 a	3.19 a
2) Aliette 80WP 4 lb AI/Acre; 7 day spray interval*	2.78 a	3.17 a	3.22 a	3.31 a
3) Aliette 80WP 4 lb AI/Acre; 14 day spray interval+	2.72 a	2.86 a	3.11 a	3.11 a
4) Aliette 80WP 4 lb AI/Acre; 21 day spray interval	2.90 a	3.10 a	3.19 a	3.25 a
5) Aliette 80WG 4 lb AI/Acre; 21 day spray interval	2.47 a	2.81 a	3.15 a	3.10 a
6) Kocide 77WP 2 lb AI/Acre; 7 day spray interval*	2.60 a	3.22 a	3.22 a	3.21 a
7) Healthy Control Untreated/Uninoculated	0.97 b	0.50 b	0.50 b	0.85 b
HSD	0.51	0.45	0.39	0.43

<sup>a</sup>Means followed by the same letter, within columns, do not differ significantly (HSD;  $p = 0.05$ ).

\* = Total of 5 applications

+ = Total of 3 applications

· = Total of 2 applications

Plants were inoculated by forming a water-soaked area in upper leaf tissue with a bacterial suspension.

**Table 2.** The number of 'Tango' geranium leaves, inoculated with *Xanthomonas campestris* pv. *peltogonii*, which exhibited symptoms of wilting 7 weeks after inoculation.

Seven weeks after inoculation, plants were examined and the number of inoculated leaves, per treatment, which exhibited symptoms of wilting was recorded.

<u>Treatment</u>	<u>Number of inoculated leaves wilting 7 weeks after inoculation</u>
1) Disease Check Untreated/Inoculated	1
2) Aliette 80WP 4 lb AI/Acre; 7 day spray interval*	9
3) Aliette 80WP 4 lb AI/Acre; 14 day spray interval+	7
4) Aliette 80WP 4 lb AI/Acre; 21 day spray interval·	12
5) Aliette 80WG 4 lb AI/Acre; 21 day spray interval·	1
6) Kocide 77WP 2 lb AI/Acre; 7 day spray interval*	2
7) Healthy Control Untreated/Uninoculated	0

\* = Total of 5 applications  
 + = Total of 3 applications  
 · = Total of 2 applications

None of the fungicides used in this study provided significant control of bacterial leaf and stem rot of geranium.

- 4.0 wedge shaped expanded lesion with localized vein infection and chlorosis (no visual sign of wilting)
- 5.0 wilting of individual petioles or main stem

The results were statistically analyzed using the honest significant difference (HSD) method of means comparison to determine significant differences between treatments at each examination date (Table 1).

All chemical applications were stopped 43 days after planting. Plants were maintained in the greenhouse to determine when symptoms of wilting (disease index rating 5) would occur. Wilting of individual petioles was first observed 5 weeks after inoculation. Seven weeks after inoculation, plants were examined and the number of inoculated leaves, per treatment, which exhibited symptoms of wilting was recorded (Table 2).

**Results**

The untreated/uninoculated plants remained healthy for the duration of the study. Thus, any spread of the disease due to splashing water was not a factor. None of the fungicides used in this study provided significant control of bacterial leaf and stem rot of geranium. In fact, untreated/inoculated plants failed to develop extensive disease symptoms likely because of the unfavorable environmental greenhouse conditions that prevailed at the time of year the study was conducted. Our data suggests that those fungicides applied more frequently generally resulted in greater disease severity possibly due to increased leaf wetness. However, this was not true for one treatment where Aliette 80WG applied to 'Tango' geraniums at a 21 day interval (total of 2 applications) resulted in only 1 wilting leaf 7 weeks after inoculation. The most effective control of this disease continues to be strict cultural practices and growing disease free cultured index cuttings.

## Literature Cited

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