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# Effect of an Experimental Fungicide on Botrytis Gray Mold of Greenhouse Tomatoes.

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## ABSTRACT

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The experimental fungicide V-10135 was evaluated for management of Botrytis gray mold of tomatoes grown under greenhouse conditions. Two rates of fungicide were compared with an untreated control and Botran. The low rate of Elevate significantly increased the proportion of healthy plants compared to the untreated control and the Benlate treatment. Both Benlate and Elevate reduced disease severity by decreasing the number of multiple lesions on seedlings.

Botrytis gray mold, caused by *Botrytis cinerea*, is a widespread problem of greenhouse grown vegetables including tomatoes, lettuce, and cucumbers. On greenhouse tomatoes, the pathogen can become established on dying tissue at leaf scars, fruit stems and wounds causing stem cankers. It also can infect the petioles, flowers and green or ripening fruit of the plants.

To control Botrytis gray mold an integrated approach should be taken. Effective control can be achieved by maintaining low relative humidity and warm temperatures, by promoting ventilation with adequate plant spacing and pruning and by plant sanitation. Biopesticides such as Rootshield, Prestop and *Rhodosporidium diobovatum* strain S33 may prevent the formation of stem cankers when applied preventatively. However, if an outbreak of Botrytis gray mold occurs in the greenhouse a fungicide program may be needed. Currently there are very few fungicides registered for use on greenhouse tomatoes grown in Ohio. Three that are labeled for greenhouse use are Exotherm Termil, a volatized form of chlorothalonil, Manex and 2,6-dichloro-4-nitroaniline (Botran). Other fungicides including pyrimethanil (Scala) and fenhexamid (Decree) are labeled for greenhouse use against Botrytis gray mold on tomatoes but are not registered for use in Ohio.

The objective of this study was to evaluate the effect of V-10135 (Valent Inc.), an experimental fungicide, for the control of Botrytis gray mold on greenhouse tomatoes.

## MATERIALS AND METHODS

*Botrytis cinerea* L. was isolated from naturally infected begonia flowers and maintained at 20 °C on potato-dextrose agar (PDA). Inoculation was carried out with conidia from 8 day-old PDA cultures. Conidia were collected from PDA plates by flooding the plates with sterile water and dislodging the conidia with a sterile glass hockey stick. The conidial suspension was filtered through two layers of sterile

cheesecloth and the spore concentration was adjusted to 3 X $10^4$ conidia/ml. Tomato seeds (cv. Big Beef) were hot water-treated prior to seeding. Three week-old tomato seedlings were transplanted into 6 inch pots containing Wooster silt loam and arranged in a randomized complete block design with four replications and ten plants per treatment. Seven week-old tomato plants were spray inoculated (25 ml/plant) 7 days after the first fungicide application. Prior to inoculation the plants were artificially wounded by pruning the bottom two leaves and suckering the plants. High humidity was maintained by pre-misting the seedlings for 24 hr prior to inoculation and misting four times per day following inoculation. Greenhouse temperatures were maintained between 65 and 75 °F. V-10135 (0.25 and 0.50 lb ai/200 gal), Botran 75W (1 lb/A) and water were sprayed onto the tomato plants on a 7-day schedule for a total of four applications. Percent foliar disease was recorded 7 days after the second application and 4 days after the fourth application using the modified Horsfall-Barrett rating scale. The number of petioles and fruit infected and the weight of infected and healthy fruit were determined 4 days after the last fungicide application was applied. Data were analyzed by ANOVA using SAS software and means were separated using Fisher's protected least significant difference test. The experiment was not repeated.

## RESULTS

Disease pressure was low and no stem cankers were observed. Foliar symptoms included chlorosis and water-soaking at the tips of leaflets and on the petioles (Figure 1a). Ghost spots were observed on green fruit (Figure 1b). Late stage symptoms included dead leaves and sporulation on senesced petioles.

Both the low (0.25 lb ai/200 gal) and high (0.50 lb ai/200 gal) rate of V-10135 reduced foliar symptoms compared to the untreated control and Botran, however; the reduction was only significant when compared to Botran (Table 1). Both rates of V-10135 reduced the number of petioles infected compared to the untreated control, however; only the high rate was significant (Table 1). Compared to the untreated control, Botran significantly reduce the number of petioles infected but did not reduce percent foliar disease. Botran produced significantly more fruit compared to the V-10135 treatments and the untreated control, however a larger proportion of this fruit was infected with Botrytis gray mold (Table 2). There was no significant difference in percent healthy fruit among treatments (data not shown). Both rates of V-10135 significantly reduced the proportion of fruit with ghost spots compared to Botran but not compared to the untreated control (Table 2).

## DISCUSSION

V-10135 is an experimental fungicide that is being evaluated for its ability to control Botrytis gray mold on greenhouse grown tomatoes. In this study, both rates of V-10135 reduced the percent foliar disease, the number of petioles infected and the percent diseased fruit. However, the reduction was not always significant. Plants treated with V-10135 produced a higher yield of green fruit compared to the untreated control but the increase was not significant. Although Botran significantly reduced the number of infected petioles the treatment had the highest percent foliar disease suggesting that the petioles had died and fallen off the plant before being counted. Initial results suggest that

V-10135 (both rates) can reduce the number of petioles and fruit infected with Botrytis gray mold, however more trials are needed to demonstrate its efficacy.

A B

Figure 1. Symptoms of *Botrytis cinerea* on 'Big Beef' greenhouse tomatoes. (A) water-soaking and sporulation on petioles, (B) ghost spots on green fruit.

Table 1. Effect of various treatments on percent foliar disease and the number of petioles infected when challenged with *Botrytis cinerea.*

| Treatment | Percent (%) Foliar (4 Aug) | Percent (%) Foliar (15 Aug) | Number of Petioles Infected |
|---|---|---|---|
| Botran 75W 1 Lb/A | 7.7 a | 30.9 a | 1.8 b |
| V-10135 0.25 Lb/200 gal | 1.9 b | 20.3 a | 2.6 ab |
| V-10135 0.50 Lb/200 gal | 1.8 b | 18.8 a | 2.4 b |
| Untreated | 3.1 b | 25.8 a | 3.7 a |

[1]Values in a column followed by the same letter are not significantly different at P≤0.05. Means were separated using Fisher's protected least significant difference test.

Table 2. Total fruit yield and percent diseased fruit of cv. "Big Beef" tomato treated with V-10135 and Botran.

| Treatment | Total Yield (g) | Percent (%) Diseased Fruit |
|---|---|---|
| Botran 75W 1 Lb/A | 169.6 a | 37.2 a |
| V-10135 0.25 Lb/200 gal | 40.4 b | 9.9 b |
| V-10135 0.50 Lb/200 gal | 50.1 b | 4.2 b |
| Untreated | 38.9 b | 18.6 ab |

[1]Values in a column followed by the same letter are not significantly different at P≤0.05. Means were separated using Fisher's protected least significant difference test.