Field Evaluation of Potential New Fungicides for Control of Powdery Mildew of Cantaloupe in 1994

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Abstract

Powdery mildew of cantaloupe in Arizona is caused by the plant pathogenic fungus Sphaerotheca fuliginea. The disease is found in melon fields each year; however, the incidence and severity of the disease is quite variable. Disease development is favored by low relative humidity, moderate temperatures, and succulent plant growth. Potential new fungicides were evaluated for disease control in a field trial conducted in the spring of 1994. In this study, Rally and Reach provided the highest level of disease control and highest percentages of marketable fruit when compared to untreated cantaloupe plants.

Introduction

Powdery mildew, a disease caused by the plant pathogenic fungus *Sphaerotheca fuliginea*, is usually not difficult to find in cantaloupe plantings in Arizona. Disease symptoms first appear as small, white, superficial spots on stems and leaves. When these lesions enlarge, they become powdery in appearance, increase in number and eventually cover stems and both surfaces of leaves. Infection on young leaves can lead to general chlorosis and eventual death of infected leaves. Severely infected leaves become brown and desiccated with resultant premature defoliation. Cantaloupe fruit are free of visible infection; however, severely infected plants produce prematurely ripened fruit of poor quality that are at greater risk to sunburn damage because of the reduced plant canopy. The degree of yield reduction depends upon the duration and severity of disease development.

Disease development is favored by low relative humidity, dry soil conditions, moderate temperatures, reduced light intensity, and succulent plant growth. These conditions often exist within the plant canopy of actively growing cantaloupe plantings.

Disease control can be achieved by planting cultivars that demonstrate tolerance or resistance to the disease. If susceptible cultivars are grown, it is extremely important to have fungicidal protection in place when environmental conditions become favorable for disease development. The life cycle of the fungal pathogen, going from spore germination on the leaf to lesion formation and subsequent release of masses of new spores, can be as short as 4-5 days. By the time the first lesions are visible on plant leaves, numerous additional lesions are already developing but not yet visible. Sulfur, applied in a timely manner, can inhibit disease development, but serious leaf burn can result in the high temperatures that often occur when environmental and cultural conditions are favorable for development of powdery mildew. Triadimefon (Bayleton) can also help control powdery mildew, but some growers in Arizona have not achieved the level of disease control that they would like to see with this material.

In an attempt to increase the number of chemical disease control options available to growers for control of powdery mildew of cantaloupe, a field trial was initiated in the spring of 1994 to test the efficacy of potential new fungicides for disease control.

Materials and Methods

This study was conducted at the Yuma Valley Agricultural Center. Cantaloupe (Topmark) was seeded March 2 on beds with 80 inches between row centers. Treatments were replicated five times in a randomized complete block design. Each replicate consisted of 25 feet of row with a plant spacing of 12 inches. Treatment beds were separated by single nontreated beds. Fungicide treatments were applied with a tractor-mounted boom sprayer that delivered 100 gallons/acre at 100 psi to nozzles spaced 12 inches apart. Fungicides were applied May 27. Maximum and minimum ranges of air temperature (F) were as follows: May, 78-105, 51-65; June 1-14, 98-109, 59-69. Furrow irrigation was used for the duration of the study. Disease severity was determined June 7 by collecting 25 leaves at random from each replicate of each treatment and counting the number of powdery mildew lesions present. Yield was determined June 14 by counting the percentage of fruit in each plot that were marketable.

Results and Discussion

Results of this study are summarized in Table 1. Disease severity was high within the test plots at the end of the trial. At an appropriate rate, all tested compounds reduced the level of powdery mildew. Treatments that significantly increased marketable yield as well as reduced the level of disease included Rally, Reach (at the high rate), Bravo 720, and Bayleton. No symptoms of phytotoxicity were observed on treated plots.

This study has identified some new materials that might increase the chemical disease control options for powdery mildew of cantaloupe in the future. Further evaluation of potential new fungicides for disease control is planned for next year. Of the new materials tested in this study, Reach has now been registered for use on cantaloupes. Consult the label for application rate and other appropriate information.

Table 1. Effect of fungicide treatments on development of powdery mildew and yield of cantaloupe in 1994 field trial. Michael Matheron and Martin Porchas, Yuma Agricultural Center, University of Arizona.

Treatment	Rate of product/A	Number of lesions *	Percentage marketable fruit
Rally 40W	2.5 oz.	16 a **	72 e **
Reach	4.5 pt.	42 a	57 de
Benlate 50WP	8.0 oz.	104 b	42 abcd
Fluazinam 500 g/l	1.6 pt.	113 b	39 abc
SM-9	0.75 pt.	151 c	29 a
Reach	3.0 pt.	162 c	41 abcd
Sunspray oil + sodium bicarbonate	1.0% solution + 0.063M	173 c	28 a
Bravo 720	3.0 pt.	210 d	52 cd
Bayleton 50DF	6.0 oz.	211 d	48 bcd
Bravo 825 (82.5 DG)	1.8 lb.	242 e	33 ab
Control	----	250 e	35 ab

* Each value is the average number of lesions recorded from 25 leaves collected at random from each replicate plot in a treatment.

** Values followed by the same letter are not significantly different (P = 0.05) according to the Duncan-Waller K-Ratio (LSD) Test.