Powdery Mildew of Cantaloupe: Comparison of Chemical Management Tools in 1996

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Abstract

Powdery mildew of cantaloupe and other melons occurs every year in Arizona; however, the incidence and severity of the disease is quite variable. This disease, caused by the plant pathogenic fungus Sphaerotheca fuliginea, is favored by moderate temperature and relative humidity, succulent plant growth and reduced light intensity. Potential new fungicides were evaluated for disease management in a field trial conducted in the spring of 1996. All tested products significantly reduced the level of disease compared to nontreated melon plants. In addition to compounds already registered for use on cantaloupe, such as Microthiol Special, Reach, Benlate, Bayleton and Bravo, the list of efficacious nonregistered agrochemicals included Quadris, Procure, BAS-490, and Rally. The possible availability of new disease management tools in the future for powdery mildew of cantaloupe and other melons could enhance our efforts to reduce the development of resistance to these fungicides by the pathogen .

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 moderate temperature and relative humidity, dry soil conditions, reduced light intensity, and succulent plant growth. These conditions often exist within the plant canopy of actively growing cantaloupe plantings.

Effective disease management 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. Other agrochemical products, such as Benlate, Bravo and Reach, also are available for management of powdery mildew of cantaloupe.

In an attempt to increase the number of chemical disease management tools available to growers for powdery mildew of cantaloupe, a field trial was initiated in the spring of 1996 to test the efficacy of potential new fungicides.

Materials and Methods

This study was conducted at the Yuma Valley Agricultural Center. Cantaloupe (Topmark) was seeded March 13 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 15, May 29 and June 12. Maximum and minimum ranges of air temperature (F) were as follows: May, 81-108, 55-69; June 1-18, 101-110, 58-68. Furrow irrigation was used for the duration of the study. Disease severity was determined June 18 by collecting 25 leaves at random from each replicate of each treatment and counting the number of powdery mildew lesions present. A heavy infestation of whiteflies during the last three weeks of this trial led to rapid leaf destruction and plant decline before any melons were mature; therefore, yield from plots could not be determined.

Results and Discussion

Results of this study are summarized in Table 1. Some powdery mildew was observed in test plots prior to the first application of fungicide treatments. Disease severity was high within the test plots at the end of the trial. All tested materials significantly reduced the level of powdery mildew in this trial. No symptoms of phytotoxicity were observed on treated plots.

This study has identified some fungicides not registered for use on melons that might increase the chemical disease management options for powdery mildew of cantaloupe in the future. Further evaluation of these potential new fungicides in 1997 is in progress.

Table 1. Effect of fungicides on development of powdery mildew of cantaloupe in 1996 field trial. Michael Matheron and Martin Porchas, Yuma Agricultural Center, University of Arizona.

Treatment	Rate of product/A	Number of mildew lesions*
Reach	4.3 pt.	21 a**
Quadris 80WG + Latron B-1956 0.06% v/v	0.125 lb. + 236 ml	21 a
Procure (UCC-A815) 50WP + Latron B-1956 0.06% v/v	0.25 lb. + 236 ml	33 abc
BAS-490 50W + Latron B-1956 0.06% v/v	0.15 lb. + 236 ml	34 abc
Quadris 80WG + Latron B-1956 0.06% v/v (Alternate with) Bravo Weather Stik	0.125 lb. + 236 ml 2.0 pt.	35 abc
Reach	3.0 pt.	41 abc
Benlate 50WP + Latron B-1956 0.06% v/v	0.5 lb. + 236 ml	42 abc
Bravo Weather Stik	3.0 pt.	49 abc
Quadris 80WG + Latron B-1956 0.06% v/v	0.25 lb. + 236 ml	51 abc
Procure (UCC-A815) 50WP + Latron B-1956 0.06% v/v	0.5 lb. + 236 ml	53 abc
Bayleton 50WG	0.25 lb.	58 abc
Microthiol Special 80WDG	5.0 lb.	59 abc
Rally 40WP	0.156 lb.	60 abc
Topsin M 70W + Latron B-1956 0.06% v/v	0.5 lb. + 236 ml	66 bc
Nontreated control	-------	123 d

* 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 a different letter are significantly different ($P = 0.05$).