Comparison of Products for Management of Powdery Mildew on Cantaloupe in 2003

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Abstract

Powdery mildew occurs annually on melons in Arizona. Podosphaera xanthii (Sphaerotheca fuliginea) is the plant pathogenic fungus that causes powdery mildew on cucurbits, such as cantaloupe, honeydew, watermelon, cucumber and squash. When environmental conditions are favorable, disease incidence and severity can reach economically significant levels. Development of powdery mildew on melons is favored by moderate temperatures and relative humidity, succulent plant growth and reduced light intensity brought about by a dense plant canopy. Existing products as well as some materials under development were evaluated and compared for efficacy in management of powdery mildew on cantaloupe in a field trial conducted during the spring of 2003 at the Yuma Agricultural Center. A moderately high level of disease had developed by crop maturity (June 17) on untreated plants. Among treatments, the degree of powdery mildew suppression ranged from modest to essentially complete control. All treatments significantly reduced the severity of powdery mildew compared to untreated plants. The best performer among all treatments in this trial was Procure at 0.25 lb a.i., which completely inhibited disease development. Several other treatments resulted in a low mean disease severity rating (1 to 5 mildew colonies per leaf), including Quinoxyfen+Actigard, Rally+Actigard, Flint alternated with Bravo, Microthiol Disperss, Bravo, Quinoxyfen, Rally, Flint alternated with Bravo, Flint+Reason+Bond, Topsin M, Quadris+Latron B-1956, Flint+Actigard, Flint, Topsin+Trilogy, Kaligreen+No Foam A, Quadris+Latron B-1956 alternated with Actigard, Quadris+Latron B-1956+Actigard, and Pristine. Multiple applications of a single compound are included in these trials to gather information on the relative efficacy of each separate chemistry over a multi-year period. Among tested products, several are registered for use in Arizona for control of powdery mildew on melons. The use of a mixture or rotation among efficacious chemistries with different modes of action will help to inhibit the development of insensitivity by the pathogen to one or more of these active ingredients.

Introduction

Powdery mildew is an annual concern to melon growers in Arizona. The disease on cantaloupes, caused by the fungus *Podosphaera xanthii* (formerly known as *Sphaerotheca fuliginea*), first appears as small, white, superficial spots on leaves and stems. These spots will enlarge, become powdery in appearance, increase in number and eventually cover stems and both surfaces of leaves. Young infected leaves may turn chlorotic and die. Severely infected leaves turn brown and dessicate. Cantaloupe fruit on severely infected plants may ripen prematurely, be of poor quality and become sunburned due to the reduced plant canopy. Development of powdery mildew is favored by moderate temperatures and relative humidity, dry soil conditions, reduced light intensity and succulent plant growth. These conditions often exist within the plant canopy of an actively growing cantaloupe planting. The same pathogen causes powdery mildew on watermelons, honeydews, squash and other cucurbits.

When available, effective control of powdery mildew can be achieved by planting cultivars that are resistant to the

pathogen. 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 pathogen, going from spore germination on the plant to subsequent release of spores from this infection site, can be as short as 4 to 5 days. By the time initial colonies are visible on plant leaves, numerous additional infection sites are already developing but not yet visible. Sulfur is an excellent powdery mildew fungicide, but can cause serious leaf burn on many melon cultivars in the high temperatures that occur in desert production areas when environmental and cultural conditions favor disease. Several other compounds, such as azoxystrobin (Quadris), chlorothalonil (Bravo), myclobutanil (Rally), neem oil (Trilogy), potassium bicarbonate (Armicarb, Kaligreen), thiophanate-methyl (Topsin M), and trifloxystrobin (Flint) are available for management of powdery mildew on melons as well. A fungicide trial was initiated in the spring of 2003 to compare the efficacy of available fungicides as well as new compounds under development for management of powdery mildew on cantaloupe.

Materials and Methods

This fungicide study was conducted at the Yuma Valley Agricultural Center. The soil was a silty clay loam (7-56-37 sand-silt-clay, pH 7.2, O.M. 0.7%). Cantaloupe 'Topmark' was seeded and watered March 4, 2003 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. Each of the five blocks of treatments was bordered by two beds planted to casaba melon 'Golden Beauty.' Fungicide treatments were applied with a tractor-mounted boom sprayer that delivered 50 gal/acre at 100 psi to nozzles spaced 12 inches apart. Foliar applications of fungicides were made May 19, May 27, June 2, June 11. Maximum and minimum ranges of air temperature (°F) were as follows: March, 64-90, 38-59; April, 70-90, 41-61; May, 75-107, 46-71; June 1 to 17, 94-109, 59-70. The only measurable rainfall during this time period occurred in March (0.10 inches). Disease severity was determined at crop maturity on June 16 and 17 by collecting 10 leaves at random from each plot and rating the severity of powdery mildew on the upper and lower leaf surfaces using the following rating system: 0=no powdery mildew present; 1 = 1 to 5 powdery mildew colonies on the leaf surface; 2 = 6 to 10 powdery mildew colonies on the leaf surface; 3 = more than 10 colonies to 25% of the leaf surface covered with powdery mildew; 4 = 26 to 50% of leaf surface covered with powdery mildew; 5 = 51 to 100% of leaf surface covered with powdery mildew.

Results and Discussion

The data in the following graph illustrates the degree of control obtained by applications of the various materials tested in this trial. Among treatments, the degree of powdery mildew control ranged from modest to essentially complete. Powdery mildew was not evident at the first application of materials. Initial signs of powdery mildew were not detected until May 27 on the casaba melon plants and 2 to 3 days later on cantaloupe plants. The Golden Beauty casaba melon is very susceptible to powdery mildew and was planted to serve as a nursery for production of powdery mildew fungal spores once these plants became infected. A moderately high level of disease developed by crop maturity on untreated cantaloupe plants. Powdery mildew in this trial was caused by *Podosphaera xanthii* (formerly known as *Sphaerotheca fuliginea*). Disease control observed on the upper leaf surface suggests that tested materials can significantly reduce powdery mildew compared to no treatment when the test compound is applied directly to the leaf surface with relatively good coverage. On the other hand, effective disease control on the underside of leaves, where coverage by the fungicide was not optimal, demonstrates the efficacy of chemistries that can move within the leaf. Due to the late onset of disease, yield differences were not detected.

2003 Cantaloupe powdery mildew trial