

2007 Powdery Mildew of Cantaloupe Fungicide Trial

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This study was conducted at The University of Arizona, Yuma Agricultural Center in a silty clay loam soil (7-56-37 sand-silt-clay, pH 7.2, O.M. 0.7%). Cantaloupe ‘Topmark’ was seeded Mar 6, 2007 on beds with 80 inches between bed centers, then sprinkler irrigated to germinate seed. Subsequent irrigations were made by furrow irrigation. Treatments were replicated five times in a randomized complete block design with each replicate plot consisting of 25 ft. of row. A single bed at the north and south boundary of the trial was planted to “Juane canary” melon. Depending on treatment, foliar application of materials was made May 17, May 24, May 31, Jun 8 and Jun 15 with a tractor-mounted boom sprayer (hollow-cone nozzles spaced 12 in. apart) that delivered 50 gal/acre at 100 psi. Growth stage for each application date is as follows: May, 17, fruit up to 3.5 inches in diameter, plants covering bed; May 24, fruit about 4 to 4.5 inches in diameter, plants covering bed and some of the furrow; May 31, fruit about 4.5 to 5 inches in diameter, initial netting developing; Jun 8, fruit 5 to 5.5 inches in diameter, netting more developed; Jun 15, melons at front end of maturity. Maximum and minimum ranges (°F) of air temperature were as follows: Mar 6 to 31, 2007, 71-100, 40-56; Apr, 68-99, 45-63; May, 83-102, 49-67; Jun 1 to 23, 87-109, 56-70. Maximum and minimum ranges of relative humidity were as follows: Mar 6 to 31, 52-87, 5-36; Apr, 48-85, 5-26; May, 43-83, 5-27; Jun 1 to 23, 41-77, 5-15. No significant rainfall (over 0.01 inch) occurred during this experiment. Disease severity was determined Jun 20 to 23 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 leaf surface; 2 = 6 to 10 powdery mildew colonies on leaf surface; 3 = more than 10 colonies to 25% of 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. Yield was determined by counting the number of cantaloupes in each plot that were marketable.

The data in the following table illustrate the degree of control obtained by applications of the various materials tested in this trial. Powdery mildew was first detected in plots on May 31, when the third application of treatments occurred. The “Juane canary” 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 on untreated cantaloupe plants by the time they reached maturity and were rated for disease severity. Among treatments, the degree of powdery mildew control ranged from essentially 0 to 100%. Materials that reduced the severity of disease on both the top and bottom of leaves by an average amount of at least 90% compared to untreated plants included Microthiol Disperss, Procure, Quintec, V-10118, Inspire Super, Endura, Cabrio, and Pristine, when applied on a 7-day spray interval. Other treatments that reduced powdery mildew by at least 80% included alternation between the conventional fungicide Procure and the biopesticides Serenade Max, Sonata, or Actinovate as well as alternation among the two biopesticides Actinovate and Kaligreen. Alternating applications of products with different modes of action is imperative to minimize the development of insensitivity in the pathogen population

to one or more of these active ingredients.

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 is far from optimal, often demonstrates the efficacy of chemistries that can move within the leaf or redistribute after application. Due to the late onset of powdery mildew, there were no significant differences in the yield of marketable melons among treatments; therefore, yield data is not presented. No evidence of phytotoxicity was observed with any of the treatments.

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Disease rating on upper leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Procure 480SC	8.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Procure 480SC + Quintec 250SC + Silwet L-77	4.0 + 4.0 + 4.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Quintec 250SC	6.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Quintec 250SC	6.0 fl oz	1,3,5						
Procure 480SC + Silwet L-77	8.0 fl oz + 4.0 fl oz	2,4	0	0	0	0	0	0
V-10118 0.41EC	12.4 fl oz	1,2,3,4,5	0	0	0	0	0	0
Microthiol Disperss 80DF	10.0 lb	1,2,3,4,5	0	0	0	0	0	0
Topsin M 4.5FL + Microthiol Disperss 80DF	10.0 fl oz + 10.0 lb	1,2,3,4,5	0	0	0	0	0	0
V-10118 0.41EC	6.2 fl oz	1,2,3,4,5	0	0	0	0	0	0
Endura 70WG + Kinetic	0.28 lb + 12.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Inspire Super	20.1 fl oz	1,2,3,4,5	0	0	0	0	0	0
Inspire	7.0 fl oz	1,2,4,5						
Bravo Weather Stik 6SC	2.0 pt	3	0	0	0	0	0	0
Cabrio 20WG + Kinetic	1.0 lb + 12.0 fl oz	1,2,3,4,5	0.2	0.2	0.1	0.1	0	0.1
Pristine 38G + Kinetic	1.16 lb + 12.0 fl oz	1,2,3,4,5	0.3	0.4	0.2	0.2	0.1	0.2
Procure 480SC	8.0 fl oz	1,3,5						
Kaligreen 82WP	5.0 lb	2,4	0.4	0.4	0.6	0.5	0.7	0.5
Procure 480SC	8.0 fl oz	1,3,5	0.5	0.5	0.3	0.6	0.5	0.5
Procure 480SC	8.0 fl oz	1,3,5						
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	2,4	0.6	1.0	0.8	0.6	0.6	0.7

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Disease rating on upper leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Continued from preceding page								
Procure 480SC	8.0 fl oz	1,3,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	0.4	0.7	0.8	0.7	0.7	0.7
Procure 480SC	8.0 fl oz	1,3,5						
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	0.4	0.8	1.0	0.6	0.6	0.7
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	1,3,5						
Kaligreen 82WP	5.0 lb	2,4	0.6	0.9	0.6	1.0	0.7	0.8
Sovran 50WG	0.3 lb	1,4						
Endura 70WG + Kinetic	0.28 lb + 12.0 fl oz	2,5						
Procure 480SC	8.0 fl oz	3	1.0	1.0	1.0	0.8	1.0	1.0
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	1,2,3,4,5	1.1	1.0	1.1	1.3	1.0	1.1
Topsin M 4.5 FL	10.0 fl oz	1,2,3,4,5	1.1	1.0	1.1	1.1	1.0	1.1
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	1,2,3,4,5	1.5	1.5	1.6	1.5	1.4	1.5
Procure 480SC	8.0 fl oz	1,5						
Cabrio 20WG + Kinetic	1.0 lb	2						
Quintec 250SC	6.0 fl oz	3						
Topsin M 4.5FL	10.0 fl oz	4	1.5	1.4	1.8	1.6	1.6	1.6
Companion	1.0 qt	1,2,3,4	1.9	1.8	1.8	1.6	1.9	1.8
Kaligreen 82WP	5.0 lb	1,2,3,4,5	1.9	2.0	2.0	2.0	2.0	2.0
Sovran 50WG	0.3 lb	1,2,3,4,5	2.4	1.9	1.9	1.8	2.0	2.0
Rally 40W	0.31 lb	1,2,3,4,5	2.1	2.0	2.0	2.0	2.0	2.0
Companion	4.0 qt	1,2,3,4,5	2.3	2.1	2.2	1.9	1.9	2.1

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Disease rating on upper leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Continued from preceding page								
Kaligreen 82WP	5.0 lb	1,3,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	2.1	2.4	2.1	2.0	1.8	2.1
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	2.2	2.0	2.2	2.1	2.2	2.1
Procure 480SC	8.0 fl oz	1,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2						
Quintec	6.0 fl oz	3						
Cabrio 20WG + Kinetic	1.0 lb + 12.0 fl oz	4	2.6	2.4	2.2	2.1	2.3	2.3
Silwet L-77	4.0 fl oz	1,2,3,4,5	2.4	2.3	2.5	2.4	2.4	2.4
Endorse (11.3%)	0.78 lb	1,2,3,4,5	2.5	2.7	2.3	2.2	2.3	2.4
Kaligreen 82WP	5.0 lb	1,3,5						
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	2.6	2.6	2.7	2.7	2.5	2.6
Flint 50WG	0.125 lb	1,2,3,4,5	2.9	2.3	2.5	2.8	2.8	2.7
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	1,2,3,4,5	2.6	2.9	2.7	2.6	2.9	2.7
Quadris 25SC + Kinetic	15.0 fl oz + 16.0 fl oz	1,2,3,4,5	2.6	2.8	2.8	2.8	2.7	2.7
Bravo Weather Stik 6.0SC	3.0 pt	1,2,3,4,5	2.9	2.7	2.7	3.0	2.7	2.8
Kinetic	12.0 fl oz	1,2,3,4,5	3.0	2.9	2.8	2.8	3.0	2.9
Kaligreen 82WP	5.0 lb	2,4	2.9	3.0	3.2	3.0	3.0	3.0
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	3.1	3.1	3.2	3.0	3.0	3.1
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	2,4	3.1	3.1	3.2	3.0	3.2	3.1
Untreated control	-----	-----	3.8	4.0	3.6	3.8	4.2	3.9
LSD (Least significant difference, P = 0.05)								0.2
Footnotes on next page								

FOOTNOTES

1 Treatment dates: 1 = May 17; 2 = May 24; 3 = May 31; 4 = Jun 8; 5 = Jun 15. Small powdery mildew colonies (2 to 3 mm in diameter) were first observed on some plants May 31.

2 Disease ratings were performed on June 20 to 23 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 colonies present on plant.

1 = 1 to 5 powdery mildew colonies on leaf surface.

2 = 6 to 10 powdery mildew colonies on leaf surface.

3 = More than 10 colonies up to 25% of 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.

2007 Powdery Mildew of Cantaloupe Fungicide Trial

Disease rating on lower leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Procure 480SC	8.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Procure 480SC + Quintec 250SC + Silwet L-77	4.0 + 4.0 + 4.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Quintec 250SC	6.0 fl oz	1,2,3,4,5	0	0	0	0	0	0
Quintec 250SC	6.0 fl oz	1,3,5						
Procure 480SC + Silwet L-77	8.0 fl oz + 4.0 fl oz	2,4	0	0	0	0	0	0
V-10118 0.41EC	12.4 fl oz	1,2,3,4,5	0	0	0	0	0	0
Microthiol Disperss 80DF	10.0 lb	1,2,3,4,5	0.4	0.4	0.3	0.3	0.3	0.3
Topsin M 4.5FL + Microthiol Disperss 80DF	10.0 fl oz + 10.0 lb	1,2,3,4,5	0.4	0.6	0.4	0.3	0.3	0.4
V-10118 0.41EC	6.2 fl oz	1,2,3,4,5	0.5	0.6	0.7	0.3	0.9	0.6
Cabrio 20WG + Kinetic	1.0 lb + 12.0 fl oz	1,2,3,4,5	0.7	0.5	0.8	0.8	0.8	0.7
Pristine 38G + Kinetic	1.16 lb + 12.0 fl oz	1,2,3,4,5	0.5	0.7	0.8	0.8	0.7	0.7
Procure 480SC	8.0 fl oz	1,3,5						
Kaligreen 82WP	5.0 lb	2,4	0.5	0.7	0.9	0.9	0.6	0.7
Procure 480SC	8.0 fl oz	1,3,5						
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	2,4	0.5	0.7	0.7	0.8	0.6	0.7
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	1,3,5						
Kaligreen 82WP	5.0 lb	2,4	0.7	0.9	0.7	0.9	0.9	0.8
Endura 70WG + Kinetic	0.28 lb + 12.0 fl oz	1,2,3,4,5	0.7	0.9	0.7	0.9	1.0	0.8
Inspire Super	20.1 fl oz	1,2,3,4,5	0.8	0.9	1.0	0.9	0.9	0.9
Procure 480SC	8.0 fl oz	1,3,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	0.9	1.0	0.8	0.8	0.9	0.9
Procure 480SC	8.0 fl oz	1,3,5						
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	1.0	1.0	1.0	0.9	0.8	0.9

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Disease rating on lower leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Continued from preceding page								
Inspire	7.0 fl oz	1,2,4,5						
Bravo Weather Stik 6SC	2.0 pt	3	1.0	1.0	1.1	1.0	1.0	1.0
Procure 480SC	8.0 fl oz	1,3,5	1.0	0.9	1.0	1.0	1.0	1.0
Sovran 50WG	0.3 lb	1,4						
Endura 70WG + Kinetic	0.28 lb + 12.0 fl oz	2,5						
Procure 480SC	8.0 fl oz	3	1.0	1.0	1.0	1.0	1.0	1.0
Silwet L-77	4.0 fl oz	1,2,3,4,5	1.0	1.0	1.0	1.0	1.0	1.0
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	1,2,3,4,5	1.2	1.1	1.0	1.1	1.1	1.1
Topsin M 4.5 FL	10.0 fl oz	1,2,3,4,5	1.1	1.2	1.2	1.2	1.3	1.2
Procure 480SC	8.0 fl oz	1,5						
Cabrio 20WG + Kinetic	1.0 lb	2						
Quintec 250SC	6.0 fl oz	3						
Topsin M 4.5FL	10.0 fl oz	4	1.5	1.3	1.4	1.2	1.2	1.3
Kaligreen 82WP	5.0 lb	1,3,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	1.5	1.3	1.3	1.2	1.3	1.3
Kaligreen 82WP	5.0 lb	1,2,3,4,5	1.4	1.3	1.2	1.4	1.4	1.3
Kinetic	12.0 fl oz	1,2,3,4,5	1.4	1.4	1.5	1.6	1.5	1.5
Quadris 25SC + Kinetic	15.0 fl oz + 16.0 fl oz	1,2,3,4,5	1.6	1.8	1.5	1.5	1.6	1.6
Rally 40W	0.31 lb	1,2,3,4,5	1.7	1.7	1.3	1.6	1.6	1.6
Companion	1.0 qt	1,2,3,4	1.7	1.7	1.8	1.8	1.7	1.7
Companion	4.0 qt	1,2,3,4,5	2.0	2.0	2.0	2.1	2.0	2.0
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	1,2,3,4,5	2.2	2.3	1.9	2.2	2.1	2.1
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2007 Powdery Mildew of Cantaloupe Fungicide Trial

Disease rating on lower leaf surface

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Treatment	Rate (lb a.i./A, unless noted as product)	Treatment dates ¹	Disease rating (upper leaf surface) ² for plot #					Mean value
			1	2	3	4	5	
Continued from preceding page								
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2,4	2.1	2.0	2.0	2.3	2.1	2.1
Endorse (11.3%)	0.78 lb	1,2,3,4,5	2.3	2.0	2.0	2.1	2.1	2.1
Sovran 50WG	0.3 lb	1,2,3,4,5	2.2	2.2	2.3	2.2	2.3	2.2
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	1,2,3,4,5	2.4	2.4	2.5	2.3	2.4	2.4
Flint 50WG	0.125 lb	1,2,3,4,5	2.5	2.5	2.6	3.0	2.5	2.6
Kaligreen 82WP	5.0 lb	1,3,5						
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	2.6	2.8	2.7	2.6	2.7	2.7
Procure 480SC	8.0 fl oz	1,5						
Serenade Max + Silwet L-77	2.0 lb + 4.0 fl oz	2						
Quintec	6.0 fl oz	3						
Cabrio 20WG + Kinetic	1.0 lb + 12.0 fl oz	4	3.0	2.9	2.9	3.0	2.8	2.9
Bravo Weather Stik 6.0SC	3.0 pt	1,2,3,4,5	2.8	3.0	3.0	2.9	2.7	2.9
Kaligreen 82WP	5.0 lb	2,4	3.0	2.9	3.1	2.7	2.7	2.9
Sonata AS + Silwet L-77	4.0 qt + 4.0 fl oz	2,4	3.1	2.7	2.8	3.1	2.8	2.9
Actinovate SP + Silwet L-77	0.38 lb + 2.0 fl oz	2,4	3.9	4.0	3.9	3.8	3.8	3.9
Untreated control	-----	-----	4.0	3.3	3.9	4.3	3.9	3.9
LSD (Least significant difference, P = 0.05)								0.2

Footnotes on next page

FOOTNOTES

1 Treatment dates: 1 = May 17; 2 = May 24; 3 = May 31; 4 = Jun 8; 5 = Jun 15. Small powdery mildew colonies (2 to 3 mm in diameter) were first observed on some plants May 31.

2 Disease ratings were performed on June 20 to 23 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:

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