Cantaloupe: *Cucumis melo* L.

THE INTEGRATED USE OF BIOPESTICIDES WITH CONVENTIONAL FUNGICIDES TO CONTROL POWDERY MILDEW ON CANTALOUPE, SPRING 2009.

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Sphaerotheca fuliginea

On 25 Mar. 2009, plots were established at the University of Florida's Gulf Coast Research and Education Center in Balm, FL to assess the effect of several fungicides on the severity of powdery mildew on cantaloupe. Plots consisted of 8 ft bed sections along 300 ft, raised beds with 4 ft center-to-center bed spacing. Beds were covered with black virtually impermeable mulch and irrigated with a drip system. Seeds of the cantaloupe cultivar Hale's Best were planted at 30" spacing along beds skipping a 6 ft section between plots and every third bed as a buffer. Fungicide treatments were applied on 28-Apr, 5-May, 12-May, and 1-Jun with a CO_2 back pack sprayer calibrated to deliver 40 to 100 gal/A at 40 psi. A non-treated control was included to measure disease pressure. Treatments were arranged in a randomized complete block design with each treatment repeated 4 times. Plots were monitored regularly for powdery mildew, and rated 14 May and 28 May after disease reached acceptable levels across the trial. Marketable yield was assessed from a single harvest of plots on 9 June.

Environmental conditions during the beginning of the trial were unusually dry. Only 1.34 inches of rain were recorded for April, while 10.86 inches was recorded for the month of May. Symptoms of powdery mildew were first observed in control plots on 5-May. Due to the susceptible nature of the cultivar, disease developed rapidly, but a bit later than expected. Alternating applications of Previcur Flex (1.2 pt/A) and Curzate 60DF (3.2 oz/A) on 28-Apr, 5-May, 12-May, and 1-Jun were used to minimize the impact of downy mildew, which was critical when conducive conditions occurred in the latter half of May. Since conditions were so favorable for downy mildew in the latter half of May, the trial was terminated prematurely with only a single harvest of all fruit to avoid complications.

The severity of powdery mildew was rated using the Horsfall-Barratt scale on 14 May, 51 days after planting (DAP), and ranged from 0 to 4 corresponding to mid-percentage values of 0 and 18.0%, respectively. By 28 May, 65 DAP, disease severity values ranged from 3 to 10 corresponding to 9.0 and 98.5%, respectively. Significant differences were detected among treatments on both dates (Table 1). Area under disease progress curves (AUDPC) were also calculated using the trapezoidal method and also revealed significant differences among treatments (Table 1).

Based on AUDPC values, all treatments reduced disease significantly relative to the non-treated control and fell into 3 groups of effectiveness against powdery mildew (Table 1). Treatments 1, 2, 5 & 10 composed the first group with the lowest AUDPC values; treatments 3,4, & 11 with the second highest group of AUDPC values; and treatments 6, 7, 8, & 9 with the highest AUDPC values other than the untreated control. Each of the three standards fell into one of the 3 effectiveness groups. Treatments 5 and 11 consisted of alternate applications of Rally 40W and Quintec at varying rates. Treatment 6 consisted of weekly applications of Bravo Weather Stik at 3 pt/A. While all the standard treatments conferred significant protection against powdery mildew, the difference in efficacy between the two Rally-Quintec treatments is surprising, and reflects the varying levels of disease throughout the trial than a true rate effect.

Total number of marketable fruit and total weight was collected for the trial (Table 1). Significant differences were detected for both parameters. Average fruit weight was calculated from total fruit number and total weight, but differences were not significant (Table 1). All treatments, except 6 & 8, out yielded the untreated control. Treatments 3, 5 and 9 yielded the highest number and total weight of marketable fruit in the trial (Table 1). Treatments 9 and 10 did exhibit some minor phytotoxicity (a mild chlorosis) that was more prevalent at the beginning of the trial, but did not appear to impact plant production based on yields.

Table 1. Effect of fungicides and biopesticides on the LS Mean (95% confidence interval) of powdery mildew and cantaloupe yields during spring 2009 field trial at GCREC, Wimauma, FL.

		Disease Severity[z]			Marketable Yield		
TRT	Treatment, rate/acre (application)[y]	14-May	28-May	AUDPC	No. Fruit	Weight (lbs)	Avg. Fruit Size (lbs)
1	Lem17 SC, 16 floz (1-4)	1.1 (0 - 3.5)	16.1 (6.8 - 25.5)	144 (51 - 237)	15 (11 - 19)	37.5 (27.7 - 47.2)	2.5 (2.2 - 2.8)
2	Lem17 SC, 16 floz (1,3); Quintec, 4 floz (2,4)	0 (0 - 2.4)	16.1 (6.8 - 25.5)	113 (20 - 206)	15 (10 - 19)	39.7 (30.0 - 49.4)	2.8 (2.5 - 3.1)
3	Rally 40W, 5 oz (1,3); Lem17 SC, 16 floz (2,4)	0 (0 - 2.4)	50.0 (40.7 - 59.3)	350 (257 - 443)	18 (14 - 22)	44.4 (34.7 - 54.2)	2.5 (2.1 - 2.8)
4	Lem17 SC, 16 floz (1-4); Bravo Weather Stik, 2 pt (1-4)	0 (0 - 2.4)	43.8 (34.4 - 53.1)	306 (213 - 399)	14 (9 - 18)	36.3 (26.6 - 46.0)	2.7 (2.4 - 3.0)
5	Rally 40W, 5 oz (1,3); Quintec, 4 floz (2,4)	0 (0 - 2.4)	28.0 (18.7 - 37.3)	196 (103 - 289)	18 (13 - 22)	44.9 (35.2 - 54.7)	2.6 (2.2 - 2.9)
6	Bravo Weather Stik, 3 pt (1-4)	1.9 (0 - 4.3)	76.8 (67.4 - 86.1)	589 (496 - 682)	8 (4 - 12)	18.2 (8.5 - 27.9)	2.3 (2.0 - 2.7)
7	Bravo Weather Stik, 1.5 pt (1,3); Lem17 SC, 16 floz (2,4); Bravo Weather Stik, 1 pt (2,4);	1.1 (0 - 3.5)	83.9 (74.5 - 93.2)	618 (525 - 711)	11 (7 - 15)	29.3 (19.6 - 39.0)	2.6 (2.3 - 2.9)
8	Bravo Weather Stik, 2 pt (1-4); Actigard 50 WG, 0.33 oz (1,2); Actigard 50 WG, 0.50 oz (3); Actigard 50 WG, 0.75 oz (4)	0.8 (0 - 3.2)	72.0 (62.7 - 81.3)	525 (432 - 618)	9 (5 - 13)	21.8 (12.1 - 31.5)	2.3 (2.0 - 2.7)
9	GWN-4617, 3.4 floz (1,3); Procure 480SC, 6 oz (2,4); Induce, 0.25% (v/v) (1,3)	0 (0 - 2.4)	62.5 (53.2 - 71.8)	438 (344 - 531)	18 (13 - 22)	44.8 (35.1 - 54.5)	2.6 (2.3 - 2.9)
10	GWN-4617, 1.7 floz (1,3); Procure 480SC, 4 oz (1,3); Quintec, 6 floz (2,4); Induce, 0.25% (v/v) (1,3)	0 (0 - 2.4)	23.3 (13.9 - 32.6)	163 (70 - 256)	16 (11 - 20)	36.6 (26.8 - 46.3)	2.4 (2.1 - 2.7)
11	Rally 40W, 4 oz (1,3); Quintec, 6 floz (2,4)	0.4 (0 - 2.8)	43.8 (34.4 - 53.1)	317 (224 - 410)	17 (13 - 21)	36.6 (26.9 - 46.4)	2.2 (1.8 - 2.5)
12	Untreated Control	9.1 (6.7 - 11.5)	96.3 (86.9 - 105.6)	925 (832 - 1018)	8 (4 - 12)	17.6 (7.9 - 27.3)	2.3 (1.9 - 2.6)
	P > F	*0.0002*	*< 0.0001*	*< 0.0001*	*0.0016*	*0.0005*	*0.3155*

[y] Treatments (TRT) were applied 28-Apr, 5-May, 12-May, and 1-Jun corresponding with applications 1 to 4, using a backpack sprayer calibrated initially for 40, 60 and then 100 gallons per acre. Listed treatment rates are on a per acre basis unless noted otherwise. Seeds were planted 25-Mar.

[z] The severity of powdery mildew was assessed as the percentage of canopy affected. The Horsfall-Barratt scale was used for all ratings, but values were converted to mid-percentages prior to statistical analyses. Area under disease progress curve (AUDPC) was calculated for each treatment using the trapezoidal method. Values in parentheses represent *t*-type confidence intervals ($\alpha = 0.95$) for each mean.