MUSKMELON (*Cucumis melo* 'Superstar')
Powdery mildew; *Sphaerotheca fuliginea*

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EVALUATION OF A BIOCONTROL AGENT AND BIOCOMPATIBLE FUNGICIDES FOR MANAGING POWDERY MILDEW OF MELON, 1996: A hyperparasitic fungus, *Ampelomyces quisqualis* (AQ10), and two biocompatible fungicides, a potassium bicarbonate (Kaligreen) and a mineral oil (JMS Stylet-Oil), were compared in an experiment conducted on Haven loam soil at the Long Island Horticultural Research Laboratory in Riverhead, NY. Kaligreen was also applied with Nova to determine whether including a systemic fungicide would improve control, especially on the lower leaf surface. Nova was selected because resistance to benomyl and to triadimefon had been detected in 1991-1995. Fertilizer (1000 lb/A of 10-10-10) was broadcast and incorporated on 17 Jun. Phytophthora fruit and crown rot occurred to a limited extent in part of this field in 1994. Therefore, Ridomil 2E (2 qt/A) was broadcast over the entire field on 19 Jun then incorporated. In addition, soil drainage was improved by subsoiling between rows on 22 Jul. Three-week-old seedlings were transplanted into black plastic mulch on 24-25 Jun at 36-in plant spacing and 68-in row spacing. Plots consisted of three rows of 10 plants each. Plants were sidedressed with ammonium nitrate (34-0-0) at a rate of 30 lb N/A on 25 Jul. Weeds were controlled by applying Dual 8E at 1 pt/treated A to the bare soil between the strips of mulch on 25 Jun, mechanically cultivating and hand-weeding. Cucumber beetles and aphids were managed by applying the following insecticides: Asana (9.6 oz/A) on 8 Jul, Lannate LV (3 pt/A) on 29 Jul and 1 Sep, and Metasystox R (1 qt/A) on 23 Aug. Downy mildew was managed by applying Ridomil 2E (1 pt/A) on 3 and 26 Sep and Aliette 80WDG (3 lb/A) on 6 and 26 Sep. Average monthly high and low temperatures (F) were 80/60 in Jun, 80/63 in Jul, 82/63 in Aug, and 75/58 in Sep. Rainfall (in.) was 2.94, 4.78, 2.8, and 4.74 for these months, respectively. The field was irrigated (approx. 1.0 in.) on 25 Jun; 2 and 11 Jul; 9-10, 20, and 28-29 Aug. A randomized complete block design with four replications was used. Two treatments were started before disease detection (preventive schedule); the rest were started after symptoms were found on older leaves (IPM schedule). AQ10 was applied with 0.3% AddQ Spray Adjuvant. Kaligreen was applied with NuFilm P (6 oz/A). Spray coverage was optimized by using a tractor-mounted boom sprayer equipped with ALBUZ ATR lilac ceramic hollow cone nozzles (median droplet size of 60 microns) spaced 11 in. apart that delivered 71 gal/A at about 250 psi. Travel speed was 1.3 mph. Treatments were made on 21 and 29 Jul; 5, 12, 17, 23, and 30 Aug during late afternoon or early evening (except 17 Aug), to provide favorable conditions for the hyperparasitic fungus. Rain (1.32 in.) began within an hour of the second application, therefore the third application was made as soon as possible afterwards. Upper and lower surfaces of at least 15 leaves in each plot were examined for powdery mildew on 31 Jul; 5, 12, 19 and 26 Aug; 3 and 11 Sep. Colonies were counted or severity (percent leaf area covered by mildew) was estimated. Average severity for the entire canopy was calculated from the individual leaf assessments. Some plots could not be assessed on 11 Sep because of premature defoliation. Area under disease progress curve (AUDPC) was calculated for severity from 5 Aug through 3 Sep. Leaves with powdery mildew were collected on 21 Aug, 27 Aug and 2 Sep from control and AQ10-treated plots. They were examined with a microscope to determine if *A. quisqualis* was parasitizing powdery mildew. Number and weight of ripe fruit and number of rotten fruit were determined for the center 15 ft of each plot on 6, 9 and 13 Sep. Percentage of sucrose was determined using a hand refractometer for two fruit per plot on 9 and 13 Sep.

Conditions were cooler and wetter than in 1995, which most likely accounts for plants developing more slowly and powdery mildew developing later and becoming less severe in 1996 (B&C Tests 11:106). All treatments controlled powdery mildew and produced fruit with higher sugar content than the control. Bravo + Nova and Nova applied weekly were the most effective treatments, based on the AUDPC values. JMS Stylet-Oil and Kaligreen were more effective than AQ10. Applying AQ10 on a preventive schedule was not significantly more effective than using an IPM schedule. *Ampelomyces quisqualis* was observed parasitizing powdery mildew on leaves from AQ10-treated plots on 21 and 27 Aug and 2 Sep and also from control plots on 27 Aug and 2 Sep. The oil-based spray adjuvant used with AQ10, AddQ, was as effective as JMS Stylet-Oil and it was as effective as AQ10 + AddQ. Kaligreen + Nova was not more effective than either fungicide applied alone; this combination was not as effective as Bravo + Nova.

	Powdery mildew severity (% leaf coverage)							
	upper leaf surface [1]			lower leaf surface [1]			Sucrose	Yield
Treatment and rate/A (application dates) [2]	19 Aug	3 Sep	AUDPC	19 Aug	3 Sep	AUDPC	(%)	(lb/fruit)
Control (No Fungicide)	12.68 a [3]	1.99 a	241 a	3.48 a	12.2 a	169 a	4.4 c	5.62 c
Bravo Ultrex 2.7 lb (3-7) + Nova (3,5,7) [4]...	0.03 e	0.09 c	1 d	0.02 d	0.2 d	1 e	6.9 a	6.96 a
Nova 40WP (3,5,7)	1.00 de	0.25 bc	8 c	0.29 cd	0.7 cd	5 d	5.4 b	6.59 a
Nova 40WP 3 oz (3-7)	0.04 de	0.06 c	1 d	0.03 d	0.1 d	1 e	5.5 b	6.56 ab
AQ10 WDG 2 oz + AddQ 0.3% (1-7)	3.42 bc	1.25 ab	63 b	1.05 bc	3.8 b	54 b	5.6 b	6.34 abc
AddQ 0.3% (1-7)	0.58 de	0.36 bc	12 c	0.17 cd	0.8 cd	14 c	5.9 b	6.63 a
AQ10 WDG 2 oz + AddQ 0.3% (3-7)	4.85 b	0.81 abc	92 b	1.94 ab	3.6 b	73 ab	5.5 b	5.81 bc
JMS Stylet-Oil 1.5% (3-7)	0.94 de	0.42 bc	14 c	0.66 bcd	0.9 cd	12 cd	6.0 b	6.55 ab
Kaligreen 2.2 lb (3-7)	1.16 cd	0.31 bc	13 c	0.59 cd	2.0 bc	15 c	5.4 b	6.20 abc
Kaligreen 2.2 lb (3-7) + Nova (3,5,7)	0.52 de	0.27 bc	5 c	0.36 cd	0.3 d	7 cd	5.9 b	6.46 ab
P-value	0.0001	0.0358	0.0001	0.0004	0.0001	0.0001	0.0008	0.0468

[1] Exact colony counts were made when possible and severity was estimated using the conversion factor of 10 colonics/leaf = 1%. A logarithmic transformation was used to stabilize variance.
[2] Application dates: 1=21 Jul, 2=29 Jul, 3=5 Aug, 4=12 Aug, 5=17 Aug, 6=23 Aug, and 7=30 Aug.
[3] Means in a column with a letter in common are not significantly different according to Fisher's Protected LSD (P=0.05).
[4] Nova 40WP was applied at 4 oz/A for all Nova applications, except where noted otherwise.