MUSKMELON (*Cucumis melo* 'Superstar')
PUMPKIN (*Cucurbita pepo* 'Appalachian')
Powdery mildew; *Podosphaera xanthii* (formerly *Sphaerotheca fuliginea*)

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Efficacy of Bravo for powdery mildew control in muskmelon and pumpkin as affected by nozzle type and sprayer, 2003.

This experiment was conducted at the Long Island Horticultural Research and Extension Center in a field with Haven loam soil. Fertilizer (666 lb/A of 15-15-15) was broadcast and incorporated on 7 Jun. Transplants were set with starter fertilizer (15-30-15) into black plastic mulch with drip irrigation 21 days after seeding, which was 12 Jun for pumpkin and 17 Jun for muskmelon. Plant spacing was 24-in. within row and 68-in. between rows. Plants were watered using drip irrigation as needed based on irrometer readings. Weeds between rows were controlled by applying Gramoxone Extra EC (2 pt/treated A) on 3 Jul and hand-weeding. Cucumber beetles were managed with a foliar application of Asana XL (9.6 fl oz/A) on 14 Jul. To manage Phytophthora fruit and crown rot (*Phytophthora capsici*), Phostrol (2.5-5 pt/A) was applied on 26 Jul; and 6, 13, and 20 Aug, and soil drainage was improved by subsoiling on 25 Jul between rows before vines grew over. Average monthly high and low temperatures (F) were 80/63 in Jun, 80/63 in Jul, and 84/68 in Aug. Rainfall (in.) was 6.08, 3.43, and 4.86 for these months, respectively. A randomized complete block design with four replications was used. Plots contained 12 plants in three 4-plant rows. The contact fungicide Bravo Ultrex 82.5WG (2.7 lb/A) was applied with each nozzle on 29 Jul, 5 Aug, and 14 Aug. An additional treatment was a fungicide program that is currently recommended for cucurbit powdery mildew, Quadris + Bravo applied in alternation with Nova + JMS Stylet oil using the flat fan nozzles. This treatment was included to determine if a sufficient amount of Bravo could be deposited on lower leaf surfaces with any of the nozzles tested to achieve a similar level of control as that obtained with the systemic fungicides Quadris and Nova. Upper and lower (under) surfaces of 15 to 50 leaves in each plot, depending on incidence of affected leaves, were examined for powdery mildew on 28 or 31 Jul; 4 and 11 or 12 Aug. Spray coverage was assessed on 28 Aug by attaching water sensitive paper cards in pairs to both leaf surfaces of 11 leaves for each nozzle type, then applying a fungicide with good worker safety (potassium bicarbonate formulated as Armicarb, 5 lb/A). Proportion of each card that changed color due to spray deposit was assessed visually.

Unfortunately powdery mildew started to develop before the sprayer could be prepared for seasonal use, and thus powdery mildew was more severe than desired at the time of the first application, especially in pumpkin. Consequently none of the treatments were able to control powdery mildew on the lower surface of pumpkin leaves. On lower surfaces the standard fungicide program (Quadris + Bravo alternated with Nova + JMS Stylet oil) was numerically lowest and appeared to perform better (P = 0.076) than most treatments. This standard program also performed well on upper leaf surfaces, although statistically it only performed better than Bravo applied with conejet nozzles in pumpkin. Spray deposition on water sensitive cards located on the upper surface of leaves differed significantly among nozzle types for both cucurbits. Twin-jet flat fan provided the numerically best spray coverage in both crops. There was very little deposition on cards located on the lower surface of leaves. The air assist sprayer provided significantly better coverage than the others, but the coverage was not adequate. These results cannot be considered conclusive because powdery mildew was very severe at the start of treatments, but they are consistent with results in 2001 (F&N Tests 57:V49 and V85) in which neither an air assist boom nor novel nozzles improved control achieved with Bravo applied with conventional nozzles. Control was improved on the lower leaf surface only when systemic fungicides were also used. No phytotoxicity was observed.

Fungicide and rate/A [z]	Powdery mildew severity (%)[y]				Spray deposit on cards (%)			
Sprayer type	Muskmelon		Pumpkin		Muskmelon		Pumpkin	
Nozzle (pressure, gallonage)	upper	lower	upper	lower	upper	lower	upper	lower
Nontreated control	35.0 a [x]	33.9	32.6 a	43.5	----	----	----	----
Bravo Ultrex 82.5WG 2.7 lb								
Hydraulic boom								
Flat fan (65 psi, 53 gal/A)	4.6 b	41.9	5.0 c	36.1	69.5 cd	0.1	83.4 ab	0.5 b
D3-45 hollow cone (65 psi, 76 gal/A)	3.1 b	38.2	14.0 bc	38.0	88.0 ab	0.3	73.3 abc	0.0 b
Conejet (80 psi, 42 gal/A)	1.4 b	36.3	25.5 ab	58.0	78.9 bc	0.0	59.2 c	0.0 b
Twin-jet flat fan (65 psi, 68 gal/A)	0.1 b	21.0	21.3 abc	49.3	93.6 a	0.1	84.7 a	0.5 b
Air inclusion (72 psi, 74 gal/A)	5.1 b	44.9	11.3 bc	43.8	82.7 b	0.4	75.9 ab	0.0 b
Air assist boom								
Yellow albuz (50 psi, 26 gal/A)	1.5 b	25.8	13.8 bc	66.3	64.1 d	4.4	68.2 bc	3.0 a
Quadris F 15.4 oz + Bravo Ultrex 82.5WG alt. Nova 40W 5 oz + JMS Stylet oil 1.5%								
Hydraulic boom								
Flat fan (65 psi, 53 gal/A)	1.2 b	4.4	4.7 c	31.0	----	----	----	----
P value	0.0001	0.0758	0.028	0.308	0.0001	0.1086	0.0128	0.0143

[z] Applications were made on 29 Jul and 5 Aug.

[y] Powdery mildew colonies were counted and converted to severity using the conversion factor of 10 colonies/leaf = 1% for muskmelon and 30 colonies/leaf = 1% for pumpkin. When colonies could not be counted accurately because they had coalesced and/or were too numerous, severity was estimated. Average severity for the entire canopy was calculated from the individual leaf assessments for muskmelon. Severity values in table are for muskmelon leaves assessed on 12 Aug and for young pumpkin leaves assessed on 11 Aug.

[x] Numbers in a column with a letter in common are not significantly different according to Fisher's Protected LSD (P = 0.05).