PUMPKIN (*Cucurbita pepo* 'Wizard')
Phytophthora crown rot and fruit rot; *Phytophthora capsici*

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EVALUATION OF YARD-WASTE COMPOST USED ALONE OR IN COMBINATION WITH FUNGICIDES FOR MANAGING PHYTOPHTHORA CROWN ROT AND FRUIT ROT IN PUMPKIN, 1994: The experiment was conducted at the Long Island Horticultural Research Laboratory in Riverhead, NY, in a field (Riverhead sandy loam soil) where Phytophthora fruit rot of pumpkin developed in 1992 and 1993. On 23 May 94, 1000 lb/A of 10-10-10 fertilizer was broadcast and incorporated. Composted yard waste was obtained from Earthgro in East Moriches, NY. It was spread on 7-8 Jun at a rate of approximately 60 tons/A with a Millcreek compost spreader. The compost was incorporated to a maximum of 6 in. deep on 8 Jun. Pumpkin seed were planted on 21 Jun at 24-in. within row plant spacing and 68-in. between row spacing. Plots were thinned manually to obtain 40 plants in four 22-ft rows. There were 4 replications in a randomized block design. Weeds were controlled by applying Command 4EC at 8 oz/treated A in a 12-in. band over the row on 21 Jun before planting, mechanically cultivating and hand-weeding. Cucumber beetles and aphids were managed by applying the following insecticides: Thiodan 3EC (2 pt/A) on 6 Jul and Metasystox-R 2SC (1.5 pt/A) on 29 Jul. The fungicides Bravo 720 (2 pt/A) and Bayleton 50DF (4 oz/A) were applied on 29 Jul and 12 Aug to suppress powdery mildew. Average monthly high and low temperatures (F) and total rainfall (in.) were 84, 60, and 0.19 in Jun; 88, 67, and 0.7 in Jul; 81.5, 60.5, and 7.26 in Aug; and 75.5, 55.5, and 3.76 in Sep, respectively. The field was irrigated (1.0 in.) 8 times on 21-22 Jun; 29 Jun - 1 Jul; 7-8 Jul, 13-14 Jul; 19-20 Jul; 25-27 Jul; 1-2 Aug; and 9-10 Aug (more than one day was required to cover the field). Treatments were applied with a tractor-mounted boom sprayer equipped with no. 3 hollow cone nozzles that delivered 40 gal/A at 68 psi. The first treatment was made at the start of fruit formation: most of the largest fruit were about 0.75 in. long and these flowers had not opened. The canopy had closed within rows but not between rows. Kocide applications were initiated on 2 Sep when fruit were turning orange and leaves were starting to senesce. Soil samples were collected several times during the experiment from plots with and without compost. Microbial activity was measured using FDA hydrolysis. Apparently healthy (symptomless) and rotting fruit were counted in each plot on 31 Aug - 2 Sep; 7 - 8, 12, 16, 19, 26, and 30 Sep; and 4 Oct. Fruit were classified as having Phytophthora fruit rot if sporangia were visible. Data on orange fruit only are presented in the table for 16 Sep and 4 Oct. Most fruit rot was probably due to Phytophthora. Defoliation was assessed as the proportion of the canopy of a plot lost to crown rot such that soil was visible.

After 4 days of rain (total of 3.48 in. fell on 14, 15, 20, and 22 Aug), disease development was extremely rapid most likely because inoculum was abundant due to high incidence of Phytophthora fruit rot in this field in both 1992 and 1993. Symptoms of fruit rot and crown rot were first observed at the edge of two plots on 23 Aug. Extensive canopy collapse was observed in a few plots on 26 Aug. By 31 Aug, the proportion of a plot canopy that had died was as high as 80% for one control plot. Fungicide applications were not continued beyond 2 Sep because within plant movement of systemic fungicides was expected to be negligible due to the amount of vine decline and because Phytophthora fruit rot was not starting on the upper surface of fruit where Kocide would be deposited but rather symptoms started either on the under surface in contact with the soil or around the stem after it had rotted. Plots treated with compost (used alone or combined with a fungicide program) almost always had less defoliation and fewer rotten fruit than control plots; however, none of these treatments provided sufficient suppression of Phytophthora fruit rot under high disease pressure. There were no significant differences amongst treatments. If the primary affect of Ridomil 2E is on the soil population of *Phytophthora*, then it may not have been effective because it was applied to only one-tenth of the planted area (7-in. band over a 68-in. row). The number of symptomless orange pumpkins per plot on 19 Sep ranged from 0 to 17 for compost-amended plots (avg=8.8) and from 0 to 10 for control plots (avg=4). Microbial activity was similar in compost-amended and non-amended soil.

	Defoliation (%)			Fruit with Phytophthora (%)			Rotting fruit (%) [1]		
Treatment and rate/A (application time [2])	31 Aug	8 Sep	15 Sep	1 Sep	16 Sep	4 Oct	1 Sep	16 Sep	4 Oct
Control (No Compost + No Fungicide)	54 b [5]	74 a	87 a	14 a	16 a	22 a	67 a	87 a	97 a
Compost (60 t)	8 a	59 a	84 a	13 a	16 a	37 a	53 a	72 a	96 a
Compost (60 t) + Ridomil 2E 2 qt [3] + Ridomil/Bravo 81WP 2.5 lb (1,2) + Ridomil/Copper 70WP 2.5 lb (3) + Kocide 50DF 2 lb (4) [4]	6 a	32 a	60 a	11 a	14 a	33 a	45 a	68 a	96 a
Compost (60 t) + Aliette 80WG 3 lb + Pot. carb. 100WG 1.8 lb + Maneb 75DF 2 lb (1-3)	26 ab	56 a	71 a	8 a	11 a	26 a	51 a	73 a	92 a
P-value	.0249	.3839	.1951	.5005	.7377	.2967	.3439	.4065	.4263

[1] Most fruit rot was probably due to Phytophthora. Fruit were classified as having Phytophthora fruit rot when sporangia were visible.
[2] Application times were: 1=30 Jul, 2=12 Aug, 3=26 Aug, and 4=2 Sep.
[3] Ridomil 2E was applied on 24 Jun after planting at 2 qt/treated A in a 7-in. band over the rows.
[4] Applications of Kocide alone included the spreader/sticker Stik at 10 oz/A.
[5] Numbers in a column with a letter in common are not significantly different according to Fisher's Protected LSD (P=0.05).