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

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EVALUATION OF SOLARIZATION AND SORGHUM SUDAN GRASS FOR MANAGING PHYTOPHTHORA CROWN ROT AND FRUIT ROT IN PUMPKIN, 1995-1996: 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 had developed in 1992, 1993, and 1994. Three treatments were applied during the 1995 growing season. A randomized complete block design with four replications was used. Main plots were 45 ft X 62 ft. Fertilizer (1000 lb/A of 10-20-20) was broadcast over the entire field and incorporated on 4 May. For the solarization treatment, mustard variety Ochre (University of Idaho) was a) planted on 24 May by broadcasting seed with a lawn spreader at 7.5 lb/A then scratching it in with a weeder, b) flail chopped on 30 Jun when flowering, and c) incorporated on 3 Jul by disking four times. Soil was moistened by irrigating on 5 Jul (approx. 1.0 in.), then plots were covered on 6 Jul with 6-ft wide strips of 6 mil clear solarization plastic (AEP Industries Inc.) which were joined with adhesive for fumigation plastic (Reddick Fumigants). Plastic was held in place by burying the edges and placing bags of sand on the surface. Soil temperature was monitored with thermocouples placed at depths of 2 in. (1.7 - 2.2 in.) and 3.5 in. (3 - 3.9 in.). The plastic was removed after 75 days. For the sorghum sudan grass treatment, seed of the variety, Trudan 8, were planted on 11 Jul with a grain drill at 50 lb/A (the first planting on 25 May was not acceptable due to poor stand and abundant weeds). Control plots were disked on 23 Jun, then left fallow. Weeds were controlled in the sorghum and control plots by applying Atrex and Dual on 12 Jul. Average monthly high and low temperatures (F) were 80/57 in Jun, 86/65 in Jul, 86/62 in Aug, 76/56 in Sep, and 70/49 in Oct. Rainfall (in.) was 2.52, 1.52, 0.7, 4.43, and 6.35 for these months, respectively. The field was irrigated (approx. 1.0 in.) on 5 Jul, 13 Jul and 6-7 Sep. In 1996, fertilizer (1000 lb/A of 10-10-10) was broadcast and incorporated on 17 Jun. Pumpkin seed were planted on 2 Jul at 24-in. within row plant spacing and 68-in. between row spacing. Weeds were controlled by applying herbicides, mechanically cultivating and hand-weeding. Command (5 oz/A) was applied and lightly incorporated on 26 Jun before planting. Curbit EC (1 qt /treated A) was applied in a 10-inch band over the planted rows on 2 Jul. Cucumber beetles and aphids were managed by applying the following insecticides: Admire 2F (10 oz/treated A) in a 10-inch band over the row on 3 Jul, Metasystox R (1 qt/A) on 23 Aug, and Lannate LV (3 pt/A) on 1 Sep. Powdery mildew was managed by applying Bravo Ultrex (2.7 lb/A) and Benlate (8 oz/A) on 23 Aug and Reach F (4.25 pt/A) on 6 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. Main plots were 22.7 ft X 44 ft and were located in the center of the 1995 plots. Subplots were 22.7 ft X 22 ft. Composted turkey litter (1742 lb/A of 5-2-4 granulated natural base slow release nitrogen with iron; Sustaine Corp.) was applied to one subplot (half was broadcast and raked in by hand on 11 Jul; the rest was broadcast on 16 Aug). The other subplot received an equivalent amount of N (87 lb/A) as ammonium nitrate on 16 Aug. To minimize the chance of interplot interference due to movement of soil on boots while working, boots were dipped in PT2000 Green-Shield (Whitmire) between plots. Fruit were examined routinely for symptoms. Fruit were classified as being affected by Phytophthora fruit rot only when sporangia were visible. Rotting fruit includes fruit with *Phytophthora*. Data from one solarization plot was not included in the analysis because treatment was ended early after the plastic was torn by wind too severely to be repaired.

Soil temperature under plastic was usually at least 10 F higher than in fallow areas at both depths, even early in the day and in September. Temperature was 115 F, which was 20 F higher than in fallow areas, at 2 in. on 31 July at 3 pm. Symptoms were first observed on 22 Aug 1996: three fruit with *Phytophthora* were seen in a fallow plot treated with composted turkey litter. None of the treatments significantly affected the percentage of fruit with *Phytophthora*, rotting fruit, or apparently healthy fruit. However, there were more fruit with *Phytophthora* (%) in the fallow plots and in the subplots treated with composted turkey litter for each main plot treatment. Many fruit had typical symptoms of Phytophthora fruit rot without visible sporangia. Total number of fruit per subplot also was not affected (treatment averages ranged from 38 to 43).

Treatments		Fruit with Phytophthora (%)			Rotting fruit (%)		Healthy fruit (%)
Main Plot	Subplot	1 Oct	16 Oct	31 Oct	1 Oct	23 Oct	31 Oct
Control (fallow)		7.2	14.8	20.1	28.7	58.7	15.1
Solarization		4.3	11.4	14.2	29.8	55.8	16.1
Sorghum Sudan		2.1	6.9	8.7	20.2	51.9	19.1
	Ammonium nitrate	2.6	5.4	10.1	26.9	54.4	15.3
	Composted turkey litter	6.6	14.5	18.7	24.9	56.5	18.4
Control (fallow)	Ammonium nitrate	3.3	7.0	14.2	28.2	51.1	14.8
Control (fallow)	Composted turkey litter	11.2	22.6	25.9	29.2	66.2	15.5
Solarization	Ammonium nitrate	2.6	4.6	11.3	32.3	59.4	14.0
Solarization	Composted turkey litter	6.0	10.3	17.1	27.3	52.1	18.2
Sorghum Sudan	Ammonium nitrate	1.9	4.3	4.9	21.5	53.8	16.9
Sorghum Sudan	Composted turkey litter	2.4	9.5	12.5	18.9	50.0	21.4
ANOVA analyses (p-values)							
Replication		.0320	.0884	.0231	.1229	.6596	.8477
Main Plot		.5570	.6193	.4384	.4731	.8547	.9422
Rep X Main Plot		.0311	.1464	.0629	.0713	.0321	.0077
SubPlot		.0748	.0796	.0713	.5335	.7924	.4282
SubPlot X Main Plot		.3069	.5619	.8305	.7743	.1948	.8977