

EVALUATION OF FUNGICIDES FOR MANAGING PHYTOPHTHORA FRUIT ROT IN PUMPKIN BASED ON RESULTS FROM CHALLENGE INOCULATION, 1994: Pumpkins were grown in a field (Haven loam soil) at the Long Island Horticultural Research Laboratory in Riverhead, NY, where diseases caused by *Phytophthora capsici* had not been detected previously. HMX 2692 was selected for this experiment because each semi-bush plant produces several small (13-in. diameter) fruit that were found in 1993 to be susceptible to *Phytophthora* fruit rot. On 1 Jun 94, 1000 lb/A of 10-10-10 fertilizer was broadcast and incorporated. On 18 Jul, 25-day-old seedlings were transplanted at 36-in. within row plant spacing and 68-in. between row spacing. There were 31-32 plants per treatment. Weeds were controlled by hand-weeding. Cucumber beetles and aphids were managed by applying the following insecticides: Sevin 80S (1.5 lb/A) on 22 Jul, and Lannate (1 lb/A) on 29 Jul and 12 Aug. The following fungicides were applied to suppress powdery mildew: Bravo 720 (3 pt/A) on 5, 12, 24, 30 Aug; and 7, 13 Sep; Bayleton 50DF (4 oz/A) on 5 and 24 Aug; and Tilt 41.8 GL (4 oz/A) on 30 Aug and 13 Sep. 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.) 5 times on 18, 25 Jul; 1, 10 Aug; and 8 Sep. Fungicides were applied on 30 Jul, 12 and 26 Aug. Aliette 80WG + Maneb 75DF was applied with a tractor-mounted boom sprayer equipped with no. 3 hollow cone nozzles that delivered 40 gal/A at 68 psi. Ridomil 5G was mixed with sand (1 part Ridomil:12 part sand), then distributed in a 2-ft wide band around plants. Water is needed to move Ridomil 5G into the root zone. Rain fell or the field was irrigated 2, 2, and 3 days after the three applications, respectively. Plants were just starting to produce fruit when the first treatment was made: only 19 of 95 plants had fruit on 4 Aug and the largest fruit was 1.7 in. Fungicide effectiveness was determined using fruit collected on 26 Aug before the third fungicide treatment, 30 Aug, 15 Sep, and 22 Sep. These fruit were inoculated the day of collection using the following procedures. Soil was collected from a field believed to be free of *Phytophthora capsici*, placed in aluminum trays, and allowed to dry in a hot greenhouse for several days in advance of inoculation for the first and second tests. Trays were moved outside. Soil was saturated with water. Then one fruit from each treatment was placed in each tray. There were 8, 10, and 8 trays (replications) for the 3 tests, respectively. For the first test, a piece (1-in. diam.) of pumpkin fruit with sporangia was placed in the center of each tray. For the second test, two infested hemp seed were placed under each fruit; when no symptoms developed after 7 days, a piece of summer squash fruit with sporangia was added to the center of each tray. For the third test, fruit were placed in trays from the second test along with one of the infected fruit from that test. After adding inoculum in each test, additional water was added until there was about 0.25 in. of water above the soil to provide conditions for zoospore release. This water was removed after 1 day. Water was added as needed to keep the soil moist. Fruit were inspected routinely for symptoms. For the fourth test, 25 fruit of each treatment were placed in a field where there were fruit with *Phytophthora* fruit rot just before 1.76 in. of rain on 22 Sep.

Symptoms were observed on most fruit 6-7 days after inoculation. All fruit placed in the field on 22 Sep were symptomatic 6 days later. Neither of the fungicide programs resulted in sufficient accumulation of fungicide in the fruit to reduce incidence of *Phytophthora* fruit rot adequately based on results from challenge inoculation. However, the inoculation procedures used did subject the fruit to high disease pressure. Challenge inoculation was used because field variation (in quantity of inoculum or favorability of conditions for disease development) can interfere with fungicide evaluations in infested fields.

Treatment	Fruit with symptoms of <i>Phytophthora</i> fruit rot (%) *								
	Test 1 (setup on 26 Aug)			Test 2 (setup on 30 Aug)			Test 3 (setup on 15 Sep)		
	2 Sep	6 Sep	8 Sep	13 Sep	14 Sep	15 Sep	22 Sep	27 Sep	28 Sep
Control (No Fungicide)	75	88	88	90	90	90	75	100	100
Ridomil 5G 20 lb/treated A	50	62	62	30	80	80	75	88	100
Aliette 80WG 3 lb/A + Pot. carb. 100WG 1.8 lb/A + Maneb 75DF 2 lb/A	75	75	75	50	90	100	38	100	100
Chisquare	1.50	1.33	1.33	5.83	0.01	1.14 **	3.20	2.09 **	
p-value (2 df)	.4723	.5143	.5143	.0542	.9950	.5655	.2019	.3517	

* Proportion of affected fruit out of a total of 8, 10, and 8 fruit per treatment in tests 1, 2, and 3, respectively.

** These Chisquare approximations may be invalid because there were cells with low expected counts; however, this is not a problem in this case because the data clearly demonstrate that the treatments were not effective.