

FUNGICIDES AND INTEGRATED USE OF GENETIC AND CHEMICAL CONTROL FOR MANAGING POWDERY MILDEW OF STRAIGHTNECK SUMMER SQUASH, 1993: A field experiment was conducted on Haven loam soil at the Long Island Horticultural Research Laboratory in Riverhead, NY. Fertilizer (10-10-10) was broadcast at a rate of 1000 lb/A on 24 May, then incorporated. Four-week-old seedlings were transplanted into plastic mulch on 4 Aug at 30-in plant spacing and 68-in row spacing. Plots consisted of 4 rows of 7 plants each. Weeds were controlled by applying Dual 8E (1 pt/A) on 3 Aug and by hand-weeding. The following insecticide applications were made to manage cucumber beetles, aphids, or whiteflies: Lannate L (1 qt/A) on 1 Sep, Metasystox-R 2SC (1 qt/A) on 6 Aug, Sevin 4F (1 qt/A) on 27 Aug, and Thiodan 3EC (2 pt/A) on 20 Aug. Average monthly high and low temperatures (F) and total rainfall (in.) were 80, 62, and 6.92 in Aug; and 76, 57, and 7.61 in Sep, respectively. The field was irrigated (0.5-1.0 in.) on 4, 24, 30 Aug and 4 Sep. The objectives of this experiment were: 1) to evaluate the efficacy of fungicides applied to susceptible (Goldbar) and resistant (PSX 2287) varieties, 2) to determine if powdery mildew can be controlled successfully in summer squash by initiating fungicide applications after disease detection within an IPM context, and 3) to assess the contribution of late-season fungicide applications. Bravo + Bayleton was applied in alternation with Bravo + Benlate on a 7-day schedule with a tractor-mounted boom sprayer equipped with no. 3 hollow cone nozzles that delivered 40 gal/A at 68 psi. For the preventive spray program fungicides were applied 6 times (16, 22, 28 Aug; and 2, 9, and 20 Sep). Fungicide applications were initiated on 22 Aug after disease detection for two treatment groups and terminated after 3 or 5 applications. Fruit were harvested, counted, and weighed every 3-4 days. A randomized complete block design with 4 replications was used. Ten young, mid-aged, and old leaves in each plot were examined routinely for powdery mildew. Colonies were counted or severity (percent leaf area covered by mildew) was assessed on upper and lower leaf surfaces. Severity data were transformed by natural log transformation where necessary to obtain constant variance before subjection to analysis of variance. AUDPC was calculated for severity from 23 Sep through 5 Oct. Planned comparisons were made between treatment combinations of interest.

Powdery mildew development was suppressed with fungicides applied after disease detection. Symptoms were observed earlier in plant development than in previous years, perhaps because the delay in transplanting stressed the plants. Powdery mildew was observed first on 20 Aug on most plants examined of both varieties, but Goldbar was more severely infected. Fruit was just starting to form. As compared with the non-fungicide-treated control, the preventive spray program suppressed powdery mildew development on upper leaf surfaces of both varieties and also on the lower surface of Goldbar. Late-season yield was significantly reduced for both varieties. Yield of Goldbar also was reduced by powdery mildew in mid-season. The IPM program including 3 sprays was statistically different from the preventive program (6 sprays) only in terms of disease severity for Goldbar (both leaf surfaces) and for PSX 2287 (upper leaf surfaces only). Therefore, based on the impact of powdery mildew on yield, this disease can be managed adequately with an IPM spray program consisting of 3 sprays after the start of disease development. It may be possible to achieve adequate control with fewer sprays to PSX 2287.

Variety	No. fungicide applications*	% of upper leaf surface with mildew**				% of lower leaf surface with mildew**			
		30 Sep	p-value	AUDPC	p-value	30 Sep	p-value	AUDPC	p-value
<u>Evaluation of a Preventive Spray Program</u>									
Goldbar	0.....	12.34		142.31		27.40		336.8	
Goldbar	6.....	.02	.0001	.01	.0001	14.54	.0126	159.1	.0022
PSX 2287	0.....	4.20		34.60		2.02		17.0	
PSX 2287	6.....	.00	.0001	.00	.0001	.00	.6731	.0	.7417
<u>Comparison of an IPM Spray Program with a Preventive Program</u>									
Goldbar	3.....	5.13		56.04		38.60		383.3	
Goldbar	6.....	.02	.0001	.01	.0002	14.54	.0001	159.1	.0002
PSX 2287	3.....	.49		4.32		.04		.9	
PSX 2287	6.....	.00	.0001	.00	.0001	.00	.9929	.0	.9861

* Bravo 720 3 pt/A (7-day) + Bayleton 50DF 4 oz/A (14-day) + Benlate 50DF 8 oz/A (14-day) were applied 6 times in a preventive spray program between 16 Aug and 20 Sep or 3 times in an IPM spray program between 22 Aug and 2 Sep initiated after powdery mildew was detected on at least 1 leaf in each plot for these treatment groups.

** Exact colony counts were made when possible and severity was estimated using the conversion factor of 10 colonies/leaf = 1%.

Variety	No. fungicide applications	Yield (lbs fruit/plant)*					
		Early-season (8/30-9/10)	p-value	Mid-season (9/13-9/24)	p-value	Late-season (9/27-10/8)	p-value
<u>Evaluation of a Preventive Spray Program</u>							
Goldbar	0.....	3.18		1.76		0.36	
Goldbar	6.....	3.90	.0193	3.18	.0001	1.68	.0001
PSX 2287	0.....	2.38		2.36		0.97	
PSX 2287	6.....	2.50	.6881	2.67	.2293	1.37	.0151
<u>Comparison of an IPM Spray Program with a Preventive Program</u>							
Goldbar	3.....	3.81		3.04		1.37	
Goldbar	6.....	3.90	.7454	3.18	.5763	1.68	.0514
PSX 2287	3.....	2.37		2.74		1.08	
PSX 2287	6.....	2.50	.6629	2.67	.7649	1.37	.0621