SQUASH (*Cucurbita maxima* 'Buttercup')
Powdery mildew; *Sphaerotheca fuliginea*

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Evaluation of fungicides and a plant defense booster for the control of powdery mildew of winter squash, 2004.

The experiment was conducted at the Ohio Agricultural Research and Development Center Muck Crops Agricultural Research Station in Celeryville, OH. Fertilizer (17-17-17, 500 lb/A) was incorporated into the test field on 27 Apr. 'Buttercup' squash seeds were sown on 14 May into 76-cell plug trays containing Scott's Metro seedling mix. Seedlings were fertilized on 28 May and 8 Jun with 150 ppm and 250 ppm Peter's 20-20-20, respectively. Plots were disked, leveled and rolled on 8 Jun. Squash seedlings were transplanted on 9 Jun. Treatments were arranged in rows in a randomized complete block design with four replications. Each row consisted of 15 plants spaced 2 ft apart on 5 ft centers. Treatments were applied on 20 and 27 Jul, and 3, 11, and 18 Aug. Bravo Weather Stik, Procure 50WS, Elexa-4 (high volume), and two rates of V-10118 5EC (Valent USA Corp., Walnut Creek, CA) were applied at a rate of 35.4 gal/A (30 psi and 2 mph). A low volume Elexa-4 treatment was applied at a rate of 23.7 gal/A (30 psi and 3 mph). A 2.5% solution of Elexa-4 was used for both the high and low volume treatments. The following insecticides were applied: Sevin XLR Plus (1 qt/A) on 25 Jun, 13 Jul, and 2 and 21 Aug; Ambush 2EC (12.8 oz/A) on 30 Jun and 23 Jul; Spintor 2SC (8 oz/A) on 9 Jul; and Pounce EC (6 oz/A) on 11 Aug. Severity of powdery mildew was determined on 17 and 26 Aug using a modified Horsfall-Barratt rating scale. Disease ratings were converted to midpoints (% powdery mildew) prior to statistical analysis. Fruits were harvested from the entire row of each plot on 26 Aug and sorted into three categories: healthy, diseased culls and healthy culls. The number and weight of fruits in each category were determined. Data were analyzed by ANOVA using SAS statistical software. Means were separated using Fisher's protected least significant difference test. Average maximum temperatures for 9-30 Jun, Jul, and 1-26 Aug were 77.5, 81.1, and 76.8 ºF; minimum temperatures were 56.8, 60.5, and 55.2 ºF; and rainfall was 6.7, 3.8, and 3.0 in., respectively.

Powdery mildew pressure was moderate to high. Except for the two treatments of the plant defense booster Elexa-4, all treatments significantly reduced powdery mildew on squash compared to the untreated control. The experimental fungicide V-10118 5EC was most effective in reducing powdery mildew severity. Procure 50WS was as effective as V-10118 5EC early in the season but not later in the season. Plots treated with Procure 50WS, Bravo Weather Stik and the two rates of V-10118 5EC produced significantly higher marketable yield than untreated control plots. There were no significant differences in the proportion of marketable fruit produced among treatments. Treatment with the high rate of V-10118 5EC resulted in significantly larger fruit than in the untreated control.

Treatment and rate/A	% powdery mildew[*]		Marketable yield (ton/A)	% Marketable Fruit	Healthy weight/fruit (lb)
	17 Aug	26 Aug			
Control	50.5 ab[**]	72.3 a	1.4 c	51.4 a	2.6 cd
Elexa-4 23.7 gal........................	59.8 a	81.6 a	1.6 bc	54.2 a	2.8 bc
Elexa-4 35.4 gal........................	38.6 b	75.4 a	1.6 bc	63.8 a	2.4 d
V-10118 5EC 0.02 gal	0.5 d	0.5 c	2.1 a	62.5 a	3.1 ab
V-10118 5EC 0.05 gal	0.5 d	0.5 c	1.9 ab	63.9 a	3.2 a
Bravo Weather Stik 2.5 pt.......	6.1 c	5.0 b	2.0 ab	68.2 a	3.0 abc
Procure 50WS 6 oz	2.0 d	8.4 b	2.1 a	71.0 a	2.9 abc

[*]Disease rating based on the midpoint values of a modified Horsfall-Barratt rating scale where 1=0%, 2= 1-3%, 3= 4-6%, 4=7-12%, 5= 13-25%, 6=26-50%, 7=51-75%, 8= 76-87%, 9=88-94%, 10= 95-97%, 11=98-99% and 12= 100% powdery mildew coverage of leaves (upper surface).
[**]Values are the means of four replicate plots; means followed by the same letter within a column are not significantly different at p≤0.05.