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## Efficacy of genetic control, used alone and combined with fungicides, for managing powdery mildew in winter squash, 2001.

The objectives of this study were to compare a new powdery mildew resistant hybrid of acorn squash (PS 10705) to an older resistant hybrid (Taybelle PM) and to determine if there is a benefit to augmenting powdery mildew control by applying fungicides to these hybrids. Taybelle PM is described as having intermediate resistance. In addition to a nontreated control, each hybrid received a grower standard fungicide program (Quadris applied in alternation with Nova + Bravo on a 7-day schedule). PS 10705 also received a reduced fungicide program (standard program applied on a 14-day schedule). A field experiment was conducted at the Long Island Horticultural Research and Extension Center in Riverhead, NY, on Haven loam soil. Fertilizer (666 lb/A of 15-15-15) was broadcast and incorporated on 8 Jun. On 28 Jun, seedlings were transplanted with starter fertilizer (15 -30-15) into bare ground at 24-in. plant spacing and 68-in. row spacing. Plots contained a total of 6 plants in three rows of 2 plants each. There was 20 ft between plots. Weeds were managed by mechanical cultivation and hand weeding. Cucumber beetles were managed with a soil drench of Admire 2F (0.02 ml/plant) on 21 Jun and a foliar application of Asana XL (9.6 oz/A) on 14 Jul. To manage Phytophthora fruit and crown rot, Ridomil Gold EC (1 pt/A) was broadcast over the entire field then incorporated on 8 Jun, Acrobat (6.4 oz/A) was applied on 24 Jul, 15 Aug, 31 Aug, and 7 Sep, and Aliette 80WG (4 lb/A) was applied on 8 and 31 Aug. Additionally, soil drainage was improved by subsoiling on 25 Jul between rows before vines grew over. Average monthly high and low temperatures (F) were 80/63 in Jun, 80/63 in Jul, 84/68 in Aug, 75/59 in Sep, and 66/50 in Oct. Rainfall (in.) was 6.08, 3.43, 4.86, 2.98 and 1.97 for these months, respectively. The field was irrigated (approx. 1.0 in.) on 20 Jul, 2 and 10 Aug, and 4 and 11 Sep due to inadequate rainfall. Fungicide treatments were initiated on 30 Aug after the first sign of powdery mildew. Fungicides were applied with a tractor-mounted boom sprayer equipped with D3-45 hollow cone nozzles spaced 11 in. apart that delivered 88 gpa at 200 psi. A randomized complete block design with four replications was used. Upper and lower (under) surfaces of 5 to 50 leaves in each plot were examined weekly for powdery mildew from 6 Aug through 27 Sep. Initially, 50 older leaves were examined in each plot. As disease progressed, the number of leaves examined was adjusted based on the incidence of affected leaves in a plot. Beginning on 11 Sep, mid-aged and young leaves were also examined. Powdery mildew colonies were counted; severity was assessed when colonies could not be counted accurately because they had coalesced and/or were too numerous. Average severity for the entire canopy was calculated from the individual leaf assessments. Defoliation was assessed on 11 and 27 Sep. Fruit were harvested and weighed on 3 Oct.

Symptoms of powdery mildew were first observed on 29 Aug. Powdery mildew was significantly less severe in PS 10705 than in Taybelle PM. There was a benefit to augmenting genetic control with chemical control in terms of powdery mildew severity. This benefit was most pronounced for Taybelle PM. The AUDPC for powdery mildew on lower leaf surfaces was significantly lower in plots of PS 10705 that received either the standard or reduced fungicide programs than in plots of nontreated PS 10705. Improved disease control did not result in reduced defoliation or increased yield. Taybelle PM produced significantly more fruit than PS 10705 (6.96 and 5.83 fruit/plant, *P*-value = 0.0027). Individual fruit weight of these hybrids did not differ significantly (average of 1.9 lb/fruit).

	Powdery mildew severity (% leaf coverage) <sup>a</sup>						Defolia-		
	Upper leaf surface			Lower leaf surface			tion (%)	Mature fruit/plot	
Cultivar, Treatment <sup>b</sup>	11 Sep	27 Sep	AUDPC	11 Sep	27 Sep	AUDPC	27 Sep	Number	Weight (lb)
Taybelle PM, Nontreated	5.1 a <sup>c</sup>	24.4 a	220.2 a	5.2 a	65.5 a	373.3 a	44 a	44 a	79 a
Taybelle PM, Standard	0.2 b	0.0 b	34.7 b	0.1 b	0.2 b	9.4 bc	30 ab	40 ab	79 a
PS 10705, Nontreated	0.8 b	4.8 b	22.2 bc	0.8 b	7.8 b	29.2 b	35 ab	36 b	67 a
PS 10705, Standard	0.2 b	0.0 b	1.9 c	0.1 b	0.0 b	0.2 c	28 b	34 b	67 a
PS 10705, Reduced	0.0 b	0.0 b	1.4 c	0.1 b	0.1 b	0.7 c	28 b	35 b	66 a
<i>P</i> -value	0.0108	0.0011	0.0001	0.024	0.0001	0.0001	0.1816	0.0373	0.3291

<sup>a</sup> Exact colony counts were made when possible and severity was estimated using the conversion factor of 30 colonies/leaf = 1%. A square root transformation was used when needed to stabilize variance. The table contains de -transformed values.

<sup>b</sup> Standard program: Quadris F (15.4 oz/A)(week 1,3) and Nova 40W (5 oz/A) + Bravo Ultrex 82.5WG (2.7 lb/A) (week 2).

Reduced program: Quadris (week 1) and Nova + Bravo (week 3). Quadris was applied with NuFilm P (6 oz/A). Application times were: 1=30 Aug, 2=6 Sep, and 3=13 Sep.

<sup>c</sup> Numbers in a column with a letter in common are not significantly different according to Fisher's Protected LSD (P = 0.05).