

### **Evaluation of pumpkin and squash varieties for resistance to powdery mildew - Hancock, 2004**

A trial was conducted at the Hancock Agricultural Research Station, in central WI, to evaluate the reaction of selected squash and pumpkin cultivars and breeding lines to powdery mildew. Seeds of 20 lines were planted in the greenhouse on 2 Jun (Jiffy-7® pellets, 4-5 seeds per pellet). Seedlings were transplanted to the field on 14 Jun and later thinned to leave the one most vigorous plant per hill. Each plot consisted of a single row containing three hills, spaced 3 ft apart in the row. Rows were 12 ft apart with alleys 24 ft wide between ends of adjacent plots. The trial was designed as a randomized complete block with four replications. The soil type was Plainfield sand with pH 6.3. Fertilizer consisted of 5-10-30, 100 lb/A, placed in the furrow when rows were marked prior to transplanting, sidedress applications of 34-0-0, 30 lb/A, 6 Jul, 20 Jul and 2 Aug and application of 28%UAN through the irrigation (50 lb N/A) 21 Jun. Ridomil Gold, 2 pt/A was applied 8 Jul to treat damping off symptoms but no other fungicide was applied to the trial. Capture 2EC, 3 fl oz, was applied 28 Jun for insect control. Plants were not inoculated; only natural inoculum of the powdery mildew fungus contributed to disease establishment. Powdery mildew severity was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (all foliage and stems dead), and ratings were converted to percentages. On 16, 23 and 31 Aug, 7, 13, 21 and 28 Sep, six older leaves, six middle-aged leaves, and six new leaves were chosen arbitrarily and rated in each plot. Individual leaves were rated only for powdery mildew severity. In addition, whole plot assessment (also using the Horsfall-Barratt scale) was done for four areas (approximately 3 ft by 3 ft) in each plot on 3, 9, 16, 23 and 31 Aug, 7, 13, 21 and 28 Sep. There appeared to be leaf death due to several causes other than powdery mildew so the whole plot rating included effects of powdery mildew as well as any other cause of defoliation. Summer squash (yellow crookneck and zucchini) were harvested every 3-5 days throughout the growing season when fruit reached 6-8 in. in length. Winter squash (acorn and butternut) and pumpkins were harvested 7 Oct. Number of fruit, weight, and whether fruit were marketable or immature were recorded. The number of rotting fruit was recorded for each squash and pumpkin line but these fruit were not weighed. Rainfall recorded during the growing season (in.) was 14-30 Jun (1.44), Jul (3.7), Aug (2.93), Sep (0.52) and 1-7 Oct (0.71). An additional 9.8 in. of water was applied as overhead sprinkler irrigation in 20 applications (21 Jun-14 Sep).

Cool nights, warm days, dry weather and nightly dews provided environmental conditions highly favorable for powdery mildew development. Among the nine pumpkin cultivars and breeding lines in the trial, three entries (Magician, Iron Man and HMX 3694) exhibited significantly less disease than the susceptible check (Howden) in whole plot ratings. Among the two acorn winter squash entries, disease developed slowest on Royal Ace and by mid September, there were significant differences in the severity of disease on the oldest and middle-aged leaves. Significant differences were not observed in susceptibility of the butternut squash lines and only small differences in susceptibility were observed in zucchini squash and yellow crookneck squash entries. Prestige and Payroll zucchini appeared to be slightly more susceptible in our trial than Elite. Yields reflected the potential of each cultivar in an unsprayed environment and did not appear to be related to the amount of foliar disease.

**Table 1A.** *Severity of powdery mildew on pumpkin lines – whole plot rating*<sup>1</sup> (footnotes for all tables are located after Table 5C).

Trt No.	Cultivar/Breeding line	Source	3 Aug	9 Aug	16 Aug	23 Aug	31 Aug	7 Sep	13 Sep	21 Sep	28 Sep
1	Howden (susceptible)	Harris	0.0	1.0	1.8	4.4	11.4	40.8	56.3	66.8	75.0
6	Magician (HMX 0683) (PMRR)	Harris	0.0	0.3	1.0	2.6	12.2	21.2	36.7	44.7	58.8
7	Aladdin (PMR)	Harris	0.0	0.1	0.6	2.8	8.8	35.7	63.5	70.5	74.1
8	Iron Man (HMX 2690) (PMR)	Harris	0.0	0.3	0.6	2.3	6.1	19.0	29.0	44.0	51.8
9	HMX 2689 (PMRR)	Harris	0.0	0.1	0.0	2.0	6.3	19.5	36.9	50.0	65.4
10	HMX 3692 (PMR)	Harris	0.0	0.3	0.7	2.5	5.7	17.7	30.1	50.0	57.2
11	Magic Lantern (PMR)	Harris	0.0	0.3	0.9	3.8	12.3	26.4	56.6	54.5	66.5
12	HMX 3694 (PMR)	Harris	0.0	0.0	0.9	2.5	6.4	8.9	24.4	33.2	47.3
13	HMX 4682 (PMR)	Harris	0.3	1.6	1.6	4.7	13.0	23.5	46.1	62.5	73.5
<b>Pr &gt; F<sup>2</sup></b>			0.46	0.44	0.21	0.43	0.26	0.07	<0.01	<0.01	0.07
<b>LSD<sup>2</sup></b>			NS	NS	NS	NS	NS	NS	15.8	18.6	NS

**Table 1B.** *Severity of powdery mildew on pumpkin lines – individual leaf rating*<sup>3</sup>.

	16 Aug			23 Aug			31 Aug			7 Sep			13 Sep			21 Sep			28 Sep			
	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	
1	2.0	1.9	1.1	8.9	8.8	5.1	51.6	25.4	1.6	96.3	78.4	9.1	99.2	87.3	23.9	99.8	97.7	26.5	100.0	93.2	32.1	
6	0.9	0.7	0.3	1.5	1.3	0.8	25.2	15.2	0.7	49.9	27.1	1.5	84.2	49.2	0.2	97.1	85.1	0.5	98.6	67.0	2.0	
7	0.7	0.5	0.3	2.5	2.0	1.5	34.9	10.9	2.9	95.5	67.1	12.0	99.8	95.4	14.5	99.9	96.9	4.8	100.0	95.4	2.5	
8	0.5	0.2	0.1	2.1	1.4	0.7	38.3	17.4	1.1	74.3	32.6	2.4	95.2	69.5	13.1	98.8	86.9	5.4	99.6	91.0	25.3	
9	0.0	0.0	0.0	1.9	1.6	0.9	19.5	8.4	1.4	57.4	24.2	3.8	87.2	60.2	9.5	97.4	77.6	10.0	99.6	88.6	8.5	
10	0.7	0.4	0.5	2.1	1.7	0.9	33.5	14.4	1.3	78.5	33.1	7.5	98.0	73.8	14.8	97.5	90.2	16.9	99.4	87.8	22.6	
11	1.2	0.7	0.3	3.7	2.3	1.4	35.0	16.5	1.0	74.0	43.7	3.2	97.1	66.0	5.9	99.4	91.9	2.4	99.9	78.5	2.7	
12	0.6	0.9	0.1	1.9	1.6	1.0	39.1	14.1	2.0	74.0	37.8	1.7	96.7	70.6	2.1	97.2	81.4	2.9	99.7	90.9	4.9	
13	2.0	1.7	1.1	18.0	10.3	7.7	52.5	30.6	5.5	80.4	52.2	3.2	98.2	83.7	7.6	99.3	89.7	3.8	100.0	93.6	11.6	
<b>Pr &gt; F<sup>2</sup></b>		0.37	0.19	0.59	0.45	0.47	0.49	0.47	0.63	0.27	<0.01	<0.01	0.32	0.04	<0.01	0.51	0.48	0.04	0.12	0.62	0.15	0.09
<b>LSD<sup>2</sup></b>		NS	NS	NS	NS	NS	NS	NS	NS	NS	22.8	27.6	NS	10.1	21.1	NS	NS	12.1	NS	NS	NS	NS

**Table 1C. AUDPC, yield and quality of pumpkin lines.**

Trt No.	AUDPC <sup>4</sup>					Total yield (t/A)	Avg. weight (lb) per marketable fruit <sup>5</sup>	Avg. total no. of fruit/plant	Fruit quality at harvest					
	Leaves				Whole plot				Marketable <sup>5</sup>		Immature <sup>6</sup>		Soft, rotting	
	Older	Middle	Young	All					Avg. no./ plant	%	Avg. no./ plant	%	Avg. no./ plant	%
1	0.670	0.568	0.138	0.458	0.279	16.4	23.7	1.5	1.2	81.3	0.2	12.5	0.1	6.3
6	0.509	0.353	0.008	0.290	0.189	11.4	14.9	1.8	1.3	75.0	0.3	12.5	0.2	12.5
7	0.628	0.526	0.060	0.405	0.278	17.0	22.9	2.0	1.3	60.7	0.5	27.1	0.3	12.1
8	0.592	0.421	0.058	0.357	0.162	7.1	4.1	3.7	2.9	78.5	0.8	21.5	0.0	0.0
9	0.517	0.360	0.049	0.309	0.188	9.3	15.6	1.7	1.0	62.0	0.3	17.5	0.4	20.5
10	0.592	0.427	0.087	0.369	0.173	7.5	19.7	2.3	0.5	26.5	0.5	22.3	1.3	51.2
11	0.593	0.431	0.025	0.350	0.239	12.7	15.4	2.2	1.4	67.0	0.4	17.6	0.4	15.5
12	0.592	0.416	0.020	0.343	0.128	7.0	4.2	3.6	2.8	76.2	0.6	17.4	0.3	6.3
13	0.661	0.520	0.057	0.413	0.242	7.8	2.3	6.3	5.6	89.5	0.5	7.1	0.3	3.3
Pr > F <sup>2</sup>	0.04	<0.01	0.06	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	0.31	0.57	0.05	<0.01
LSD <sup>2</sup>	0.102	0.119	NS	0.083	0.066	5.7	7.0	1.0	0.7	29.2	NS	NS	0.7	22.8

**Table 2A. Severity of powdery mildew on winter squash (acorn lines) – whole plot rating 1.**

Trt No.	Cultivar/Breeding line	Source	3 Aug	9 Aug	16 Aug	23 Aug	31 Aug	7 Sep	13 Sep	21 Sep	28 Sep
2	Table Ace (susceptible)	Harris	0.0	0.0	0.4	2.2	4.4	10.4	36.9	64.6	75.6
14	Royal Ace PM (PMRR)	Harris	0.0	0.0	0.0	1.6	2.3	6.3	14.6	51.4	72.5
Pr > F <sup>2</sup>			--	--	0.22	0.25	<0.01	<0.01	<0.01	0.45	0.77
LSD <sup>2</sup>			--	--	NS	NS	0.9	1.3	11.9	NS	NS

**Table 2B. Severity of powdery mildew on winter squash (acorn lines) – individual leaf rating 3.**

Trt No.	16 Aug			23 Aug			31 Aug			7 Sep			13 Sep			21 Sep			28 Sep		
	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young
2	0.6	0.2	0.1	1.9	0.9	0.7	21.2	6.3	1.6	80.1	44.4	7.3	97.5	65.0	7.8	99.7	94.3	55.3	100.0	98.1	44.5
14	0.0	0.0	0.0	1.3	0.8	0.1	5.1	1.1	0.2	46.9	17.8	5.4	64.3	33.0	10.3	93.5	81.4	42.3	100.0	94.3	75.2
Pr > F <sup>2</sup>	0.18	0.39	0.39	0.49	0.64	0.01	0.01	0.06	0.11	0.01	0.02	0.46	0.02	<0.01	0.45	0.09	0.08	0.71	--	0.11	0.17
LSD <sup>2</sup>	NS	NS	NS	NS	NS	0.4	10.0	NS	NS	18.4	18.4	NS	20.9	11.9	NS	NS	NS	NS	--	NS	NS

**Table 2C. AUDPC, yield and quality of winter squash (acorn lines).**

Trt No.	AUDPC <sup>4</sup>					Total yield (t/A)	Avg. weight (lb) per marketable fruit <sup>5</sup>	Avg. total no. of fruit/plant	Fruit quality at harvest					
	Leaves				Whole plot				Marketable <sup>5</sup>		Immature <sup>6</sup>		Soft, rotting	
	Older	Middle	Young	All					Avg. no./ plant	%	Avg. no./ plant	%	Avg. no./ plant	%
2	0.576	0.430	0.160	0.389	0.201	5.9	2.4	4.1	4.1	100.0	0.0	0.0	0.0	0.0
14	0.431	0.303	0.160	0.298	0.145	5.0	1.8	4.8	4.7	96.4	0.2	3.6	0.0	0.0
Pr > F <sup>2</sup>	<0.01	<0.01	0.99	0.03	0.16	0.08	<0.01	0.02	0.17	0.39	0.39	0.39	--	--

LSD<sup>2</sup> 0.033 0.052 NS 0.075 NS NS 0.3 0.6 NS NS NS NS -- --

**Table 3A. Severity of powdery mildew on winter squash (butternut lines) – whole plot rating<sup>1</sup>.**

Trt No.	Cultivar/Breeding line	Source	3 Aug	9 Aug	16 Aug	23 Aug	31 Aug	7 Sep	13 Sep	21 Sep	28 Sep
3	HMX 7735 (PMS)	Harris	0.0	0.1	0.6	1.2	4.1	15.4	25.2	49.0	60.2
15	WSXP1027 (PMR)	Harris	0.0	0.0	0.1	1.0	3.2	6.1	23.7	22.8	34.0
<b>Pr &gt; F<sup>2</sup></b>			--	0.39	0.06	0.87	0.71	0.48	0.88	0.11	0.08
<b>LSD<sup>2</sup></b>			--	NS	NS	NS	NS	NS	NS	NS	NS

**Table 3B. Severity of powdery mildew on winter squash (butternut lines) – individual leaf rating 3.**

Trt No.	16 Aug			23 Aug			31 Aug			7 Sep			13 Sep			21 Sep			28 Sep				
	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young		
3	0.7	0.3	0.3	1.2	0.9	0.9	14.1	5.7	0.4	38.5	22.1	1.2	73.3	42.8	5.4	96.5	61.7	0.2	100.0	41.1	0.0		
15	0.1	0.0	0.0	0.7	0.5	0.3	7.0	2.1	0.1	32.3	10.1	0.7	54.3	39.6	0.9	92.1	33.2	0.2	100.0	49.6	0.4		
<b>Pr &gt; F<sup>2</sup></b>			0.18	0.22	0.22	0.58	0.57	0.06	0.53	0.45	0.55	0.74	0.48	0.28	0.56	0.88	0.26	0.47	0.32	1.0	--	0.45	0.39
<b>LSD<sup>2</sup></b>			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	--	NS	NS

**Table 3C. AUDPC, yield and quality of winter squash (butternut lines).**

Trt No.	AUDPC <sup>4</sup>					Total yield (t/A)	Avg. weight (lb) per marketable fruit <sup>5</sup>	Avg. total no. of fruit/plant	Fruit quality at harvest							
	Leaves				Whole plot				Marketable <sup>5</sup>		Immature <sup>6</sup>		Soft, rotting			
	Older	Middle	Young	All					Avg. no./plant	%	Avg. no./plant	%	Avg. no./plant	%		
3	0.454	0.256	0.013	0.241	0.161	4.3	2.7	3.1	2.5	81.7	0.4	12.0	0.2	6.3		
15	0.393	0.183	0.004	0.193	0.094	2.7	2.0	2.6	1.6	47.5	1.0	52.5	0.0	0.0		
<b>Pr &gt; F<sup>2</sup></b>			0.50	0.47	0.27	0.46	0.21	0.34	0.46	0.55	0.31	0.13	0.09	0.14	0.19	0.19
<b>LSD<sup>2</sup></b>			NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

**Table 4A. Severity of powdery mildew on summer squash (zucchini lines) – whole plot rating 1.**

Trt No.	Cultivar/Breeding line	Source	3 Aug	9 Aug	16 Aug	23 Aug	31 Aug	7 Sep	13 Sep	21 Sep	28 Sep
4	Elite (susceptible)	Harris	0.0	0.0	0.1	1.3	1.8	5.6	27.5	29.7	37.5
16	Wildcat (PMR)	Harris	0.0	0.0	0.0	0.3	2.5	5.9	15.8	27.5	19.9
17	Prestige (PMR)	Harris	0.0	0.1	0.3	0.9	3.1	11.7	32.9	30.3	40.2
18	Payroll – MGZ - ZYMV, WMV, PM tol	Syngenta	0.0	0.4	0.4	3.4	6.4	10.2	22.9	24.6	29.9
19	RSQ2396 - DGZ- ZYMV, WMV, PM tol	Syngenta	0.0	0.3	0.3	0.9	3.9	7.8	27.9	28.5	36.7
<b>Pr &gt; F<sup>2</sup></b>			--	0.28	0.57	0.16	0.41	0.41	0.27	0.77	0.01
<b>LSD<sup>2</sup></b>			--	NS	NS	NS	NS	NS	NS	NS	11.2

**Table 4B. Severity of powdery mildew on summer squash (zucchini lines) – individual leaf rating <sup>3</sup>.**

Trt No.	16 Aug			23 Aug			31 Aug			7 Sep			13 Sep			21 Sep			28 Sep		
	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young
4	0.2	0.1	0.1	1.0	0.1	0.1	9.8	0.9	0.1	39.7	12.5	0.7	90.4	56.5	3.2	96.7	57.5	3.5	97.5	75.0	8.4
16	0.0	0.0	0.0	0.1	0.1	0.1	3.8	0.2	0.0	46.4	9.4	2.2	90.8	39.6	3.6	95.7	61.5	1.9	96.9	71.0	2.0
17	0.1	0.3	0.0	1.0	0.5	0.4	11.3	1.2	0.6	61.2	30.0	5.1	87.3	68.7	16.3	97.1	83.5	13.2	97.8	89.8	11.5
18	0.5	0.4	0.4	9.7	2.1	1.2	23.4	13.0	7.2	58.1	33.0	7.3	87.5	66.2	6.5	95.1	73.2	1.8	97.0	69.8	9.4
19	0.3	0.2	0.0	0.6	0.2	0.1	20.6	2.1	0.4	40.6	14.3	2.5	93.3	56.1	5.0	95.2	72.3	12.7	97.0	74.7	5.0
Pr > F <sup>2</sup>	0.6	0.56	0.52	0.39	0.26	0.32	0.34	0.41	0.46	0.26	0.02	0.03	0.93	0.28	0.01	0.26	0.06	<0.01	0.84	0.36	0.68
LSD <sup>2</sup>	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	15.3	4.1	NS	NS	7.4	NS	NS	7.3	NS	NS	NS

**Table 4C. AUDPC, yield and quality of summer squash (zucchini lines).**

Trt No.	AUDPC <sup>4</sup>					Total yield (t/A)	Avg. weight (lb) per marketable fruit <sup>5</sup>	Avg. total no. of fruit/ plant	Fruit quality at harvest			
	Leaves				Whole plot				Marketable <sup>5</sup>		Soft, rotting	
	Older	Middle	Young	All					Avg. no./ plant	%	Avg. no./ plant	%
4	0.474	0.274	0.020	0.256	0.108	15.1	1.1	24.8	22.6	91.5	2.2	8.5
16	0.471	0.244	0.014	0.243	0.080	19.1	1.2	29.5	26.6	90.3	2.9	9.7
17	0.505	0.379	0.068	0.318	0.126	17.9	1.2	28.5	25.7	90.0	2.8	10.0
18	0.533	0.369	0.047	0.316	0.106	16.2	1.0	29.7	26.6	90.2	3.1	9.8
19	0.495	0.304	0.039	0.280	0.112	16.6	1.2	23.2	22.2	96.0	1.0	4.0
Pr > F <sup>2</sup>	0.64	0.05	<0.01	0.14	0.31	0.09	0.02	0.09	0.10	0.31	0.28	0.31
LSD <sup>2</sup>	NS	0.100	0.029	NS	NS	NS	0.1	NS	NS	NS	NS	NS

**Table 5A. Severity of powdery mildew on summer squash (yellow crookneck lines) – whole plot rating 1.**

Trt No.	Cultivar/Breeding line	Source	3 Aug	9 Aug	16 Aug	23 Aug	31 Aug	7 Sep	13 Sep	21 Sep	28 Sep
5	Gentry	Syngenta	0.0	0.0	0.3	2.2	3.8	9.4	25.7	35.2	38.3
20	RSQ2193 - CN - ZYMV, CWM, PM tol	Syngenta	0.0	0.1	0.4	2.3	4.1	11.9	16.7	32.1	27.1
Pr > F <sup>2</sup>			--	0.39	0.39	0.86	0.39	0.39	0.01	0.67	0.02
LSD <sup>2</sup>			--	NS	NS	NS	NS	NS	5.0	20.8	7.2

**Table 5B. Severity of powdery mildew on summer squash (yellow crookneck lines) – individual leaf rating 3.**

Trt No.	16 Aug			23 Aug			31 Aug			7 Sep			13 Sep			21 Sep			28 Sep		
	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young	Older	Middle	Young
5	0.3	0.2	0.1	1.3	1.2	0.5	15.6	6.9	3.1	64.5	26.6	2.9	87.6	63.8	6.1	97.3	85.5	2.5	98.8	92.6	0.0
20	0.1	0.3	0.2	1.3	0.9	0.6	15.9	7.4	1.1	64.1	27.4	0.4	85.9	40.3	1.9	96.5	65.6	0.7	98.0	55.3	0.0
Pr > F <sup>2</sup>	0.39	0.39	0.39	0.99	0.06	0.64	0.82	0.43	0.34	0.97	0.93	0.06	0.78	0.04	0.3	0.53	0.04	0.28	0.32	0.04	--
LSD <sup>2</sup>	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	20.9	NS	NS	18.2	NS	NS	34	--

**Table 5C. AUDPC, yield and quality of summer squash (yellow crookneck lines).**

Trt No.	AUDPC <sup>4</sup>					Total yield (t/A)	Avg. weight (lb) per marketable fruit <sup>5</sup>	Avg. total no. of fruit/ plant	Fruit quality at harvest			
	Leaves				Whole plot				Marketable <sup>5</sup>		Soft, rotting	
	Older	Middle	Young	All					Avg. no./ plant	%	Avg. no./ plant	%
5	0.520	0.383	0.025	0.309	0.122	10.9	0.9	22.5	20.5	91.4	2.0	8.6
20	0.515	0.281	0.008	0.268	0.104	8.0	0.8	18.8	16.5	85.8	2.3	14.2
<b>Pr &gt; F</b> <sup>2</sup>	0.85	0.03	0.17	0.04	0.23	0.08	0.03	0.3	0.3	0.45	0.74	0.45
<b>LSD</b> <sup>2</sup>	NS	0.082	NS	0.036	NS	NS	0.1	NS	NS	NS	NS	NS

**Footnotes for ALL tables**

- 1 On each rating date, four areas per plot were observed (approximately 3 ft x 3 ft). Severity was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (all foliage and stems dead). Death of foliage due to any reason was included in whole plot ratings. Ratings were converted to %.
- 2 Analysis of variance was performed on data, and Fisher's protected least significant difference (LSD) was calculated (alpha=0.05). NS = not significant at  $P = 0.05$ .
- 3 Severity was rated on a Horsfall-Barratt scale of 0 (no infection) to 11 (all foliage and stems dead). Ratings were converted to percentages. On each rating date, six older leaves, six middle aged leaves, and six young leaves were rated in each plot. Only severity of powdery mildew was considered in individual leaf ratings.
- 4 Relative area under the disease progress curve. Data for each observation date were plotted on a graph and the area under the line was calculated for each treatment providing a measure of the relative severity of disease throughout the season. A disease rating of 100% for the entire season would produce a value of 1.0. All relative AUDPC values are expressed as the proportion of this value. Either decreased disease severity or later disease development will contribute to lower relative AUDPC.
- 5 Marketable yield excludes immature and rotted fruit.
- 6 More than 50% green at harvest (pumpkins), undersize and lacking mature color (winter squash).

# Yield



