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2009 Pumpkin Powdery Mildew Resistance Variety Trial

Objective: To evaluate powdery mildew resistance, yield, and fruit and stem characteristics, as well as postharvest storability of experimental and commercially available jack o' lanterns for production in Tennessee.

What did we do?

- Applied 50 lbs N, 50 lbs P₂O₅, and 150 lbs K₂O pre-plant
- Planted 22 varieties from seed June 12, 2009
- Four replications per variety
- Row spacing 9' between rows, 5' between hills, 4 hills/plot, 4 plants/hill, thinned to 2 plants/hill
- Side dressed with 30 lbs N when vines began to run
- Irrigated 3 times to supplement natural rainfall
- Pest control:
 - Weeds: Ethalfuralin preemergence
Glyphosate and paraquat used in alley ways postemergence
 - Insects: Scouted regularly
Rotated carbaryl, esfenvalerate and bifenthrin for control of cucumber beetles, squash bugs and squash vine borers
 - Diseases: Scouted regularly
Alternated chlorothalonil and myclobutinil for control of powdery and downy mildew
- Harvested September 23, 2009
- Washed pumpkins for storage in 100 ppm bleach solution
- Traits evaluated:
 - ⇒ Total yield (tons/acre)
 - ⇒ Marketable yield (tons/acre)
 - ⇒ Number of fruit per acre
 - ⇒ Average weight per pumpkin (pounds)
 - ⇒ Length (inches)
 - ⇒ Width (inches)
 - ⇒ Color (yellow to deep orange)
 - ⇒ Shape (flat to oblong)
 - ⇒ Suturing (none to deep)
 - ⇒ Stem thickness (thin to thick)
 - ⇒ Stem length (short to long)
 - ⇒ Stem attachment (poor to excellent)
 - ⇒ Storability (duration)



What did we find?

Yield

The top yielders by weight were Camaro and HSR 4721, an experimental variety from Hollar Seeds. Camaro yielded an average of 22.7 tons/acre with 75% marketable fruit and an average fruit weight of 16.7 pounds. HSR 4721 yielded 21.7 tons/acre with 76% marketable fruit and an average fruit weight of 10.2 pounds. These two varieties also showed the least powdery mildew at harvest. The top yielder by number was also HSR4721. This variety averaged over 4,417 fruit per acre. While the top yielder by number, the yield was decreased by nearly 50% compared to last year. Rounding out the top five for marketable yield were Merlin (Harris), Spartan (Seedway) and ACX 7301 (Abbott & Cobb). Superior and Howden had the highest percentage of unmarketable fruit—both at 60%. ACX 7302, Pankow's Field and Howden were the lowest yielding varieties in the trial. Both Pankow's Field and Howden are known to be susceptible to powdery mildew and were used in the trial as controls.

Pumpkin yield and powdery mildew severity at harvest for 22 varieties of jack o' lanterns.

Variety	Total wt (T/A)	Mktbl wt (T/A)	Total # (frt/A)	% Unmktbl	Avg wt/ frt (lbs)	Avg # frt/	PM Severity at Harvest (%)
Camaro	22.7	18.1	2964	25	16.7	2	30
HSR4721	21.7	17.2	4417	24	10.2	2	22.5
Magic Wand	18.8	9.7	3327	53	12.1	2	77.5
HSR4710	18.4	13.3	2360	32	16.5	1	55.3
Merlin	18.3	16.4	3085	15	12.7	2	90
Capital	16.5	11.1	3388	45	10.7	2	40
Gladiator	16.5	10.2	2420	34	14.1	1	52.5
ACX 7301	16.1	14.1	3449	14	9.5	2	86.7
Magician	15.9	12.3	3267	29	10	2	62.5
Charisma	15.5	13.9	2823	8	11.1	1	83.3
20 Karat Gold	15.4	13.2	2360	16	13.9	1	81.3
Warlock	15.3	12.9	2360	13	12.9	1	67.5
Spartan	14.9	14.8	2178	2	14	1	86.7
Superior	14.6	7.3	2480	60	13.8	1	87.5
King Midas	13.1	9.2	1815	38	17	1	63.3
Sorcerer	12.5	11.1	2178	13	11.9	1	72.5
ACX 6501	11.7	8	2117	32	11.2	1	81.3
Hannibal	11.7	8.6	2118	30	12.1	1	80
Magic Lantern	9.9	7.8	1694	19	12.6	1	86.7
ACX 7302	9.4	8.4	1815	14	11	1	97.5
Pankow's Field	9	5.1	1694	38	9.2	1	95
Howden	5.8	2.3	1149	60	11.3	1	92.5

Yields per acre were scaled up from 9' x 20' plots with 4 hills/plot and hill spacing of 5' within the row, 2 plants/hill.

Percent unmarketable was based on fruit number.

Subjective Ratings

Pumpkin color, shape and suturing, as well as stem length, thickness and attachment were rated subjectively at harvest on a 1-9 scale (see below for scale key). In these 22 varieties, color ranged from light to medium orange. HSR 4721 was the lightest pumpkin in the group, while Spartan was the darkest. Shape ranged from round to slightly oblong. Howden, ACX 6501 and HSR 4721 tended to be variable in shape, ranging from 5 to 8, 3 to 9 and 3 to 6, respectively. Suturing ranged from none (ACX 6501, HSR 4710 and Warlock) to medium (Magic Wand). Stem length ranged from medium to medium-long. Stem thickness ranged from medium to medium-thick. Attachment ranged from slightly below average to above average.

Subjective ratings of color, shape, suturing, and stem length, thickness and attachment for 22 varieties of jack o' lanterns.

Variety	Color	Shape	Suturing	Stem Characteristics		
				Length	Thickness	Attachment
20 Karat Gold	5.3	4.8	1.5	5.3	6	6.3
ACX 6501	3.9	6.8	1	4.5	7.1	4
ACX 7301	5	6	2.3	5	5.5	5.8
ACX 7302	5	5	1.8	5.5	5.8	6
Camaro	3.5	5.8	1.5	5.3	6.3	6.3
Capital	6.3	5.6	3.8	7.8	6	6
Charisma	5.7	5	3	6.7	5	6
Gladiator	6.5	6.3	3.8	5	6.8	7.5
Hannibal	5.9	5.1	3	5.8	6.4	6.5
Howden	4.8	5.6	2.3	5	6	7.4
HSR4710	4.5	5.5	3.5	5	5.5	5.5
HSR4721	3	5.9	1	5.8	6	5
King Midas	6.3	6.6	3.3	5.8	5.8	6.5
Magic Lantern	5.7	5.7	1.8	4.7	5.7	6.7
Magic Wand	6	5	4.3	4.8	6.8	7.3
Magician	5.5	5.8	3.3	5.5	6.5	7
Merlin	6.3	5.5	3.6	6	5.8	6.8
Pankow's Field	4.5	7.3	1.9	6.8	5.6	5
Sorcerer	6.6	4.8	2.5	6.3	5.8	7
Spartan	6.8	6	3.8	4.5	5.8	6.8
Superior	5.8	6.6	3.3	7.1	7.3	5.8
Warlock	6.6	6	1	4.5	7.3	7.3

Color Scale: 1=Yellow, 5=Orange, 9=Deep Orange

Shape Scale: 1=Flat, 5=Round, 9=Oblong

Suturing Scale: 1=None, 5=Medium, 9=Deep

Stem Length Scale: 1=Short, 5=Medium, 9=Long

Stem Thickness Scale: 1=Thin, 5=Medium, 9=Thick

Stem Attachment Scale: 1=Poor, 5=Average, 9=Excellent

Length and Width

For length and width measurements, HSR 4710 measured both the longest and widest, followed closely by Warlock, Camaro, Gladiator and Spartan. Charisma and HSR 4721 were the smallest in length, while Howden and Pankow's Field were the smallest in width.

Variety	Length (in)	Width (in)	Seed Source
Warlock	11.25	10.65	Harris Moran
Superior	10.95	9.58	Outstanding
Spartan	11.15	10.15	Seedway
Sorcerer	10.15	9.6	Siegers
Pankow's Field	10.5	8.73	Harris
Merlin	10.3	10.7	Harris
Magician	10.3	10.3	Harris Moran
Magic Wand	10.15	10.5	Harris
Magic Lantern	10.63	10.53	Harris Moran
King Midas	12.5	10.15	Siegers
HSR 4721	9.3	9.05	Hollar
HSR 4710	11.38	10.93	Hollar
Howden	9.45	8.75	Seedway
Hannibal	9.85	9.55	Siegers
Gladiator	11.3	9.85	Harris Moran
Charisma	9.07	10.2	Johnny's
Capital	9.95	9.35	Outstanding
Camaro	11.25	10.75	Hollar
ACX 7302	9.9	9.28	Abbott & Cobb
ACX 7301	10.5	9.60	Abbott & Cobb
ACX 6501	10.4	9.1	Abbott & Cobb
20 Karat Gold	9.85	9.90	Siegers
Lengths and widths are the average of 5 pumpkins/plot.			

Storage

Eight pumpkins (4 washed/4 unwashed) were placed into storage on September 23. These pumpkins will be weighed every two weeks until the end of October to document weigh loss and overall storage-life.

Conclusions

Heavy disease pressure reduced pumpkin yield and quality, Camaro was the top yielder by weight, while HSR 4721 yielded the most pumpkins per acre and came in second for yield by weight. Both of these varieties also ranked highest for powdery mildew resistance, which reinforces variety selection as the first line of defense in an integrated disease management program.

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