

# Evaluation of Powdery Mildew Tolerant Pumpkin Cultivars in Missouri

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## **Introduction:**

Powdery mildew (*Podosphaera xanthii*) is one of the most serious diseases infecting pumpkins in Missouri. Infection begins on the crown leaves of the pumpkin and eventually progresses to other leaves. Powdery mildew gradually weakens the plant and results in leaf loss. Damage to the fruit is often secondary from lower yield and sun scalding. However, powdery mildew can colonize the stem reducing the aesthetic appearance of the pumpkin. Two effective strategies for controlling powdery mildew are cultivar resistance /tolerance coupled with an effective spray program. The objective of this research was to evaluate the majority of powdery mildew tolerant pumpkin cultivars.

## **Methods:**

Eleven powdery mildew tolerant (PMT) pumpkin cultivars were evaluated (Table 1).

‘Howden’, a standard, non-tolerant cultivar was evaluated as the control.

**Table 1.** Powdery mildew tolerant pumpkin cultivars evaluated-Columbia, MO 2005.

<b>Cultivar</b>	<b>Days to maturity<sup>z</sup></b>	<b>Fruit characteristics</b>	<b>Seed vendor</b>
Aladdin	115	Large fruit (25-35 lb)	Harris Seeds
Charisma	105	Blocky fruit (14-18 lb)	Johnny’s Seeds
Hobbit	100	Small (12 lb) fruit	Holmes Seeds
Iron Man	110	Small (3-4 lb) fruit	Harris Seeds; Chesmore Seeds
Magic Lantern	115	Medium (16-25 lb) fruit	Chesmore Seeds; Harris Seeds
Magician	110	Small (10-16 lb) fruit	Chesmore Seeds; Harris Seeds;
Merlin	115	Medium (15-25 lb) fruit	Harris Seeds
Mystic Plus	105	Small (7-8 lb) (pie pumpkin)	Harris Seeds
Neon	70	Precocious orange (7-10 lb) fruit. Very early maturing.	Holmes Seeds
Reliable	91	Medium fruit (18-22 lbs.)	Holmes Seeds
Touch of Autumn	95	Small (2-4 lb) fruit	Holmes Seeds; Seigers Seed
Howden	105	Medium (15-20 lb) <b>No powdery mildew tolerance</b>	Johnny’s Seeds; Chesmore Seeds

<sup>z</sup>Days from seeding.

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Pumpkins were planted as 2 week-old transplants on July 3, 2005 at the University of Missouri Bradford Research and Extension Center near Columbia, MO. Prior to transplanting, the soil was tilled and pressed into a raised bed which was covered with white plastic mulch and drip irrigation. Fifty percent of the total seasonal nitrogen (50 lb/acre) was applied and all the phosphorus and potassium as a directed top dress to each bed. A starter solution of 20-20-20 was applied to each transplant. The remaining nitrogen (40 lbs/acre) was applied through the drip irrigation system over the course of the growing season. Admire insecticide was applied as a transplant drench to control cucumber beetles (24 fl oz/acre).

Later in the season, Capture and Asana were used for cucumber beetle and squash bug control. Transplants were spaced 36 inches apart with rows 96 inches (8 ft) on center. This spacing resulted in a plant population of 1815 plants/acre. Individual plots consisted of one row with 10 plants. Each cultivar was replicated three times in a randomized complete block experimental design.

The cultivar 'Howden' was either routinely sprayed with fungicides labeled for powdery mildew control every 14 days (3 spray applications) or not sprayed. All powdery mildew tolerant cultivars were sprayed every 14 days with the penetrating fungicides Quadris (15 oz/acre) and Flint (2 oz/acre).

Pumpkins were harvested on October 5 and October 12. Each pumpkin was weighed and evaluated for quality.

### **Results and Discussion:**

#### **Top Performance based on weight class:**

20 lbs. and greater (Extra Large): *Aladdin*

12-20 lbs. (Large): 1. *Magic Lantern*. 2. *Reliable*. 3. *Merlin*.

6-12 lbs. (Medium): 1. *Magician*. 2. *Charisma*. 3. *Neon*

2-6 lbs. (Small): 1. *Mystic Plus*. 2. *Iron Man*. 3. *Hobbit*

< 2 lbs. (Miniature): *Touch of Autumn*

Powdery mildew tolerant pumpkin cultivars are available within each size class. 'Magic Lantern' produced the highest yield of all pumpkin cultivars evaluated (Table 2). 'Magic Lantern' consistently produced uniform quality pumpkins with no development of

powdery mildew on the handles (fruit stems). ‘Aladdin’ is a high-yielding, large pumpkin with very good quality. ‘Reliable’ has an elongated fruit with good yields.

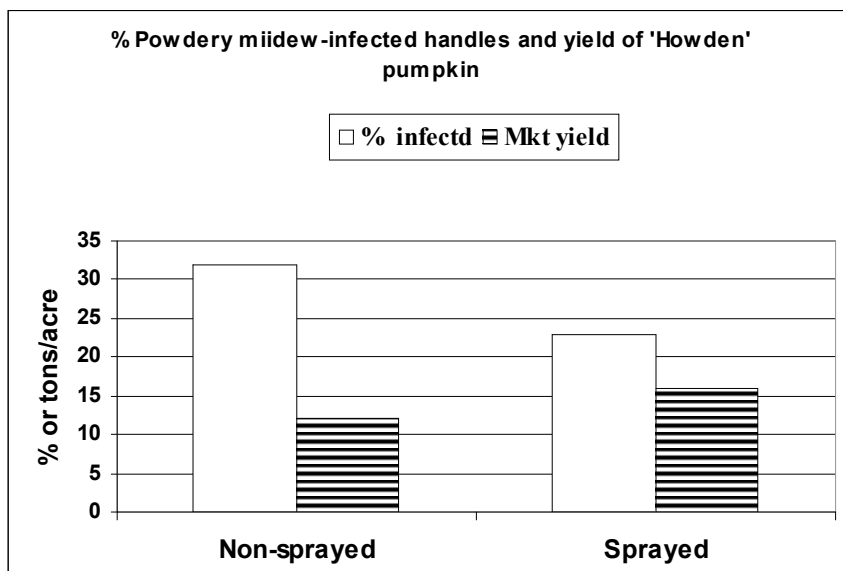
**Table 2.** Marketable yield and fruit numbers of PMT pumpkin cultivars.

<b>Cultivar</b>	<b>Yield (tons/acre)</b>	<b>Fruit no./acre</b>	<b>Avg. fruit wt. (lb.)</b>
Magic Lantern	43	5566	15
Aladdin	34	3388	20
Reliable	29	3207	18
Charisma	24	4053	12
Magician	23	4175	11
Merlin	21	2844	15
Neon	19	4417	9
Howden (sprayed)	16	1997	16
Touch of Autumn	15	13794	2
Mystic Plus	13	6353	4
Howden (non-sprayed)	12	1694	15
Hobbit	12	3751	6
Iron Man	10	6232	3
<i>LSD (0.05)</i>	<i>6</i>	<i>1953</i>	<i>-</i>

‘Charisma’ is a medium size pumpkin with a blocky round shape, and the color is light orange. Some ‘Charisma’ pumpkins had slight green flecking on the rind. ‘Hobbit’ had variable size and a light orange color. ‘Neon’ is a very early pumpkin that turns orange immediately after fruit set and has a dark green/blackish handle. ‘Neon’ could be planted much later than the majority of pumpkin cultivars. ‘Touch of Autumn’ is an excellent miniature pumpkin with uniform size and quality. ‘Touch of Autumn’ averaged 2.5 pumpkins/linear foot of row. ‘Mystic Plus’ has a dark orange color with thick handles. ‘Iron Man’ is a hard shell, small pumpkin with a large, thick handle.

In addition to using tolerant cultivars, another strategy for controlling powdery mildew is an effective spray program. For powdery mildew control, it is important to cover both upper and lower surfaces of the leaf. Mist sprayers using high pressure to penetrate the crop canopy are very effective. Also, rotate a protectant fungicide (e.g., Bravo, Kocide etc.) with penetrating types (e.g., Quadris, Flint, Cabrio). Most protectants can be sprayed on a 10-day schedule while penetrating fungicides can be sprayed on a 14-day schedule. Growers are advised to consult the *2006 Midwest Vegetable Production Guide* for specific spray recommendations.

Spraying 'Howden' with penetrating fungicides on a 14-day schedule significantly increased both marketable yield and lowered the number of pumpkin fruit with infected stems (Figure 1) By mid-September, all cultivars had some level of powdery mildew infection on the leaves. However, the powdery mildew tolerant cultivars did not exhibit any infection of pumpkin stems.



**Figure 1.** Effect of spraying 'Howden' pumpkin with penetrating fungicides for powdery mildew control. Columbia, MO 2005