

2008

## Pumpkin Cultivar Observation Trial, Indiana 2007

Elizabeth T. Maynard

*Purdue University - Main Campus*, [emaynard@purdue.edu](mailto:emaynard@purdue.edu)

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Maynard, Elizabeth T., "Pumpkin Cultivar Observation Trial, Indiana 2007" (2008). *Purdue Fruit and Vegetable Research Reports*. Paper 8.  
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# Pumpkin Cultivar Observation Trial, Indiana 2007

Elizabeth T. Maynard, Purdue University, Westville, Indiana 46391

## Introduction

Pumpkins for decorative use are grown on more than 4,000 acres in Indiana. Combined acreage in Indiana, Michigan, Illinois, and Ohio represents about a quarter of pumpkins grown for decorative use in the United States. Successful pumpkin production requires the use of cultivars that yield well and produce pumpkins of the size, shape, color, and quality demanded by the market. There is keen interest in cultivars that also show resistance to powdery mildew. This trial was conducted to observe the performance of jack-o-lantern, pie, and mini-pumpkin cultivars in northern Indiana.

## Materials and Methods

The trial was conducted at the Pinney-Purdue Agricultural Center on a Tracy sandy loam with 2.4% organic matter and 57 ppm phosphorus (P), 139 ppm potassium (K), 180 ppm magnesium (Mg), 750 ppm calcium (Ca), and pH 6.7. Winter wheat planted in fall 2006 following a soybean crop was killed with glyphosate (0.75 lb. ae/A) on May 9, 2007 and incorporated on May 22. A total of 80 lbs./A N was applied; half from urea broadcast on June 7 and the remainder from urea ammonium nitrate injected in early July. Pumpkins were planted on June 8 using a modified John Deere Maximerge 7000 planter and dropping seeds by hand into the seed tube. Each pumpkin cultivar was planted in a plot 36 feet long by 27 feet wide with two rows spaced 9 feet apart. Each mini-pumpkin cultivar was planted in a single row, with two cultivars in a 36-foot by 27-foot plot. Weeds were controlled with the preemergence herbicide Strategy<sup>®</sup> (ethalfluralin+clomazone) applied at 4 oz./A on June 11, hoeing and hand weeding in mid-July, and cultivation between plots. Overhead irrigation was applied on June 11 to incorporate Strategy<sup>®</sup> and during the season as needed. Pumpkins were thinned to achieve the desired stand of 12 plants per row for jack-o-lantern pumpkins (1,075 plants per acre), and 24 plants per row for pie and mini-pumpkins (2,150 plants per acre). The insecticide Arctic<sup>®</sup> 3.2 EC (permethrin) was applied at 4 oz./A on July 3 for squash vine borer and on August 27 for squash bug. Fungicides were applied as follows to manage powdery mildew, downy mildew, plectosporium, and other diseases: July 21 Topsin M<sup>®</sup> 0.5 lb./A and Bravo Ultrex<sup>®</sup> 1.6 lbs./A.; July 27 Ranman<sup>®</sup> 2.5 oz./A and Bravo Ultrex<sup>®</sup>; August 3 Bravo Ultrex<sup>®</sup> and Tanos<sup>®</sup> 8 oz./A; August 11 Bravo Ultrex<sup>®</sup> and Previcur Flex<sup>®</sup> 1.2 pt./A; August 13 Quadris<sup>®</sup> 13 oz./A; August 16 Bravo Ultrex<sup>®</sup> and Ranman<sup>®</sup>; August 27 Bravo Ultrex<sup>®</sup>, Topsin M<sup>®</sup>, Previcur Flex<sup>®</sup>. Pumpkin plant vigor was evaluated on September 1 using a scale of 9=extremely vigorous to 1=very low vigor. Pumpkins were harvested on September 5-6, and 28. Harvested fruit were graded into marketable orange (at least one-half orange), marketable green (full size and starting to turn but less than one-half orange), and cull. Fruit that collapsed before the first harvest were not included in the cull category. The number and weight of pumpkins in each group were recorded and used to calculate average fruit size and percent of total yield in each category. On September 15, pumpkins from the first harvest were evaluated for color, shape, suture depth, peduncle length, width and health, uniformity, and overall quality, and vines were rated for powdery mildew.

## Results and Discussion

The growing season was dry at first, averaging less than a 1/2 inch of rain weekly for the latter half of June and first half of July. July was cool: temperatures averaged 2°F to 4°F below normal, and there was only one week when temperatures exceeded 90°F. August was wet and warm, with more than 9 inches of rain and high temperatures reaching 90°F every week except one. Pumpkins emerged quickly and grew well. Fruit set began in mid-July. By the first harvest in early September, pumpkin fruit were either more than one-half orange, or had not yet started to turn. Dry weather in September with high temperatures at or above 90°F every week except one provided good conditions for growth and maturation of pumpkins set later in the summer.

Table 1 reports yield measurements, vine ratings, and fruit quality observations. Without replication it isn't possible to judge the repeatability of any differences observed in this trial, but when considered together with information from other trials the information should be useful.

Pumpkins fell into six groups based on fruit size. Six entries averaged nearly 20 pounds or more: Gold Medal, Mr. Wrinkles (SSX 5019), SSX 5121, HSR 7010, HSR 7020, and HSR 7007. All of these entries except HSR 7010 had very vigorous vines; HSR 7010 vines were dark green and tall, but not as spreading as the others. The three HSR entries had low levels of powdery mildew; SSX 5121 a little bit more, and Mr. Wrinkles and Gold Medal had higher levels of the disease. Gold Medal was the earliest of this group, with 66% of marketable yield harvested on September 5-6, and HSR 7020 and HSR 7007 the latest, both with less than 40% of marketable yield harvested on September 5-6. The HSR entries were lighter orange and HSR 7007 and HSR 7020 had shallower sutures than the others in this size group. Mr. Wrinkles and SSX 5121 had deep sutures. Gold Medal and SSX 5121 had the best peduncles of this group. SSX 5121 received the highest rating for uniformity in this group, and it and Mr. Wrinkles were the top two for overall fruit quality.

Five entries averaged 17- to 18-pound pumpkins: Gold Medallion, Spartan, RPX 1295, Appalachian and HMX 6685 (Warlock). RPX 1295 and Appalachian both had greater than 18% culls, higher than any other entries in the trial. Many of the culls were due to a hole approximately 3/8 inch in diameter that penetrated into the rind and appeared to be caused by an insect, although none were present at the time. Later in the season a similar hole was observed with squash vine borer larva. Since most of the culls were harvested on September 5-6, all the entries in this group had a similar percentage of fruit mature on the first harvest date. Gold Medallion and Appalachian had very extensive vines; the other entries had less vigorous vine growth. HMX 6685 had the lowest level of powdery mildew in this group, followed by Spartan. RPX 1295 and HMX 6685 received the best ratings for peduncle health in this group. RPX 1295 and Spartan were judged to be the most uniform in size and shape. RPX 1295 received the highest rating for overall fruit quality, followed by Spartan and HMX 6685. HMX 6685 was notable for its hard shell, which gave it a bumpy, rough surface. It did not show symptoms of bacterial fruit spot, which were common on fruit of other varieties in the first harvest.

Seven entries averaged 13- to 16-pound pumpkins: Gold Challenger, 20 Karat Gold, Gladiator, HMX 6686 (Magic Wand), Magic Lantern, RPX 1626, and HSR 7018. Gold Challenger was the earliest, with 64% of fruit marketable and orange at the first harvest. Gladiator and RPX 1626 were the latest, with under 36% of fruit marketable and orange at the first harvest. By September 28, Gladiator still had nearly 50% of fruit less than half orange. RPX 1626 and Gladiator also

had the most vigorous vines in this group; the other entries were not as extensive. Powdery mildew was lowest on HMX 6686, followed by Gladiator and HSR 7018. Gold Challenger and 20 Karat Gold received the best ratings for peduncles in this group, followed by RPX 1626 and HMX 6686. Gladiator was the most uniform in size and shape, followed by HMX 6686. Gladiator and Magic Lantern were rated the best overall fruit quality, followed by Gold Challenger and HMX 6686.

Two entries averaged 11-pound pumpkins: 325 and Charisma. Both had vigorous vines and fairly heavy powdery mildew. The peduncles of 325 were a little shorter than might be desirable, and on both cultivars peduncles tended to be shriveled or twisted. Size and shape were very uniform for both cultivars, and they received similar ratings for overall fruit quality.

Three “pie” pumpkins were included in the trial, with average weights between 3 and 4 pounds: HMX 5683 (Gargoyle), Prankster, and SSX 5078. SSX 5078 was later maturing than the other two, with nearly a third of the fruit still green on September 28. SSX 5078 had extremely vigorous vines, HMX 5683 less vigorous, and Prankster the least spreading vines. SSX 5078 had little powdery mildew, HMX 5683 had more, and Prankster had the most. The peduncles of SSX 5078 were fairly long, and tended to twist. HMX 5683 received the highest rating for uniformity and SSX 5078 received the highest rating for overall fruit quality. HMX 5683 was notable for warts on the fruit.

Four entries were in the mini-pumpkin category, with average fruit size less than 1 pound: Kandy Korn, Sweet Lightning, Gold Dust and Gold Speck. Kandy Korn had the smallest vines and the most powdery mildew. The fruit were slightly squat with shallow sutures, and a peduncle of suitable length and width that tended to be in fair condition. The fruit were very uniform. Sweet Lightning is a winter squash that doubles as an ornamental because of its color: white with orange stripes. Vine vigor and powdery mildew were average. The fruit is squat with deep sutures, and a healthy peduncle. Gold Dust vines were similar to Sweet Lightning. The fruit is medium orange, squat with deep sutures and a long peduncle. Gold Speck has smaller vines than Gold Dust, fruit of similar shape and size, but slightly smaller. Sweet Lightning and Gold Dust received the highest overall quality ratings among these four entries.

The fruit sizes in Table 1 used to group the entries for the above discussion were calculated using orange fruit from both harvest dates. This masks some variation in fruit size between the two dates. For the following entries, average fruit size decreased 17% to 29% from September 5-6 to September 28 (values in parenthesis are the average weights of orange fruit on first and second harvests, respectively): Gladiator (16, 11), RPX 1295 (19, 14), Appalachian (18, 14), SSX 5121 (24, 18), 325 (12, 9), RPX 1626 (15, 12). Three entries showed an increase in average fruit size between 16% and 49%: Gold Medallion (17, 20), HSR 7020 (19, 25), and Magic Lantern (12, 17). In cases where a small range in fruit size is desirable, it may be worth selecting varieties that tend to produce fruit of a similar size throughout the growing season.

## **Acknowledgments**

J. Leuck and the Pinney-Purdue Agricultural Center staff, managed field operations; N. DeFrank, B. Rhoda, R. Shay, J. Sheets, J. Smiddy, and Master Gardeners from Porter and LaPorte counties assisted with field work; the seed companies listed in Table 1 provided financial support and/or seed.

**Table 1.** Yield, number of fruit, average fruit weight, and fruit quality of pumpkin cultivars in Wanatah, Indiana 2007<sup>z</sup>.

| Cultivar        | Seed Source <sup>y</sup> | Plants | Marketable Orange Fruit <sup>x</sup> |         |          | Total Marketable Fruit <sup>x</sup> |         | Mkt. Orange 9/5 | Mkt. Orange 9/28 | Mkt. Green 9/28 | Cull | Vine Vigor <sup>w</sup> | Vine PMR <sup>w</sup> | Color <sup>w</sup> | Shape <sup>w</sup> | Sutures <sup>w</sup> | Peduncle Length <sup>w</sup> | Peduncle Width <sup>w</sup> | Peduncle Health <sup>w</sup> | Uniform <sup>w</sup> | Overall <sup>w</sup> |
|-----------------|--------------------------|--------|--------------------------------------|---------|----------|-------------------------------------|---------|-----------------|------------------|-----------------|------|-------------------------|-----------------------|--------------------|--------------------|----------------------|------------------------------|-----------------------------|------------------------------|----------------------|----------------------|
|                 |                          |        | lbs./plot                            | no/plot | lbs./fir | lbs./plot                           | no/plot |                 |                  |                 |      |                         |                       |                    |                    |                      |                              |                             |                              |                      |                      |
|                 |                          |        | percent of total no.                 |         |          |                                     |         |                 |                  |                 |      |                         |                       |                    |                    |                      |                              |                             |                              |                      |                      |
| Gold Medal      | RU                       | 24     | 744                                  | 32      | 23.3     | 858                                 | 41      | 66              | 12               | 22              | 0    | 9                       | 3                     | M                  | S-O                | M                    | 6                            | 7                           | 7                            | 4                    | 5                    |
| Mr. Wrinkles    | SK                       | 24     | 530                                  | 23      | 23.0     | 800                                 | 41      | 55              | 0                | 43              | 2    | 9                       | 4                     | M                  | R-O                | D                    | 4                            | 4                           | 4                            | 7                    | 7                    |
| SSX 5121        | SK                       | 24     | 526                                  | 23      | 22.9     | 669                                 | 33      | 51              | 11               | 27              | 11   | 9                       | 6                     | M                  | O                  | D                    | 5                            | 7                           | 7                            | 8                    | 6                    |
| HSR 7010        | HO                       | 24     | 864                                  | 39      | 22.2     | 1072                                | 53      | 51              | 20               | 25              | 4    | 6                       | 7                     | L                  | R-O                | M                    | 5                            | 4                           | 3                            | 7                    | 4                    |
| HSR 7020        | HO                       | 24     | 604                                  | 28      | 21.6     | 972                                 | 47      | 31              | 20               | 35              | 13   | 9                       | 8                     | L                  | S-R                | S                    | 5                            | 4                           | 3                            | 6                    | 4                    |
| HSR 7007        | HO                       | 24     | 558                                  | 28      | 19.9     | 828                                 | 48      | 37              | 20               | 41              | 2    | 8                       | 7                     | L                  | R-O                | S                    | 5                            | 6                           | 5                            | 7                    | 5                    |
| Gold Medallion  | RU                       | 24     | 408                                  | 23      | 17.7     | 520                                 | 32      | 58              | 12               | 27              | 3    | 9                       | 3                     | M                  | R-O                | M                    | 5                            | 6                           | 4                            | 3                    | 3                    |
| Spartan         | SW                       | 24     | 638                                  | 36      | 17.7     | 774                                 | 46      | 47              | 27               | 20              | 6    | 6                       | 6                     | D                  | R                  | M                    | 4                            | 5                           | 4                            | 7                    | 6                    |
| RPX 1295        | RU                       | 24     | 381                                  | 22      | 17.3     | 463                                 | 29      | 36              | 25               | 19              | 19   | 6                       | 4                     | M                  | R                  | S                    | 7                            | 6                           | 7                            | 8                    | 7                    |
| Appalachian     | RU                       | 24     | 360                                  | 21      | 17.1     | 514                                 | 36      | 39              | 9                | 34              | 18   | 9                       | 3                     | M                  | R-O                | S                    | 5                            | 4                           | 4                            | 6                    | 5                    |
| HMX 6685        | HM/ST                    | 24     | 582                                  | 34      | 17.1     | 777                                 | 47      | 55              | 17               | 28              | 0    | 4                       | 8                     | M                  | R-O                | S                    | 4                            | 7                           | 7                            | 5                    | 6                    |
| Gold Challenger | RU                       | 24     | 414                                  | 26      | 15.9     | 446                                 | 30      | 64              | 15               | 12              | 9    | 5                       | 4                     | M                  | R-O                | M                    | 6                            | 6                           | 7                            | 6                    | 6                    |
| 20 Karat Gold   | RU                       | 24     | 509                                  | 33      | 15.4     | 647                                 | 46      | 42              | 21               | 25              | 12   | 5                       | 4                     | M                  | R-O                | S                    | 6                            | 6                           | 7                            | 4                    | 5                    |
| Gladiator       | HM/ST                    | 24     | 292                                  | 20      | 14.6     | 560                                 | 43      | 33              | 8                | 47              | 12   | 8                       | 7                     | D                  | S-R                | M                    | 4                            | 5                           | 4                            | 8                    | 7                    |
| HMX 6686        | HM/ST                    | 24     | 532                                  | 37      | 14.4     | 718                                 | 55      | 40              | 22               | 30              | 8    | 5                       | 8                     | D                  | S                  | D                    | 4                            | 6                           | 6                            | 7                    | 6                    |

<sup>z</sup>Plot size: 36 feet X 27 feet with 44.8 plots and 1,075 plants/A for pumpkins > 1.5 lbs. average weight; otherwise 36 feet X 13.5 feet and 89.6 plots and 2,150 plants/A.

<sup>y</sup>HM=Harris Moran, HO=Hollar, JS=Johnny's selected seeds, RU=Rupp, SK=Sakata, ST=Stokes, SW=Seedway.

<sup>x</sup>Marketable orange fruit includes all firm fruit at least one-half orange; total marketable includes all firm fruit of mature size and starting to turn orange.

<sup>w</sup>Vine vigor on September 1, vine resistance to powdery mildew, peduncle and overall fruit quality on September 15. Rated on a 1 to 9 scale: 2=low vigor, heavy powdery mildew, short/thin/shriveled peduncle, non-uniform, poor quality; 5=average; 8=good vigor, little powdery mildew, extra long/extra thick/dark green solid peduncle, very uniform, high quality. Fruit color: D=dark, M=medium, L=light orange, MT=multi-colored. Shape: S=squat, R=round, O=oblong. Sutures: S=shallow, M=medium, D=deep.

*Continued on next page*

**Table 1 (continued)<sup>z</sup>**

| Cultivar        | Seed Source <sup>y</sup> | Plants | Marketable Orange Fruit <sup>x</sup> |          |           | Total Marketable Fruit <sup>x</sup> |          | Mkt. Orange 9/5 | Mkt. Orange 9/28 | Mkt. Green 9/28 | Cull | Vine Vigor <sup>w</sup> | Vine PMR <sup>w</sup> | Color <sup>w</sup> | Shape <sup>w</sup> | Sutures <sup>w</sup> | Peduncle Length <sup>w</sup> | Peduncle Width <sup>w</sup> | Peduncle Health <sup>w</sup> | Uniform <sup>w</sup> | Overall <sup>w</sup> |   |
|-----------------|--------------------------|--------|--------------------------------------|----------|-----------|-------------------------------------|----------|-----------------|------------------|-----------------|------|-------------------------|-----------------------|--------------------|--------------------|----------------------|------------------------------|-----------------------------|------------------------------|----------------------|----------------------|---|
|                 |                          |        | lbs./plot                            | no./plot | lbs./frit | lbs./plot                           | no./plot |                 |                  |                 |      |                         |                       |                    |                    |                      |                              |                             |                              |                      |                      |   |
|                 |                          |        | percent of total no.                 |          |           |                                     |          |                 |                  |                 |      |                         |                       |                    |                    |                      |                              |                             |                              |                      |                      |   |
| Magic Lantern   | HM/ST                    | 24     | 560                                  | 41       | 13.7      | 696                                 | 52       | 46              | 24               | 19              | 12   | 4                       | 5                     | M                  | R-O                | M                    | 4                            | 5                           | 5                            | 6                    | 7                    |   |
| RPX 1626        | RU                       | 24     | 532                                  | 39       | 13.6      | 654                                 | 51       | 35              | 37               | 22              | 6    | 9                       | 5                     | M                  | R-O                | M                    | 6                            | 5                           | 6                            | 6                    | 5                    |   |
| HSR 7018        | HO                       | 24     | 672                                  | 50       | 13.4      | 798                                 | 62       | 45              | 33               | 19              | 3    | 4                       | 7                     | L                  | R                  | S                    | 4                            | 4                           | 4                            | 4                    | 6                    | 4 |
| 325             | SW                       | 24     | 566                                  | 51       | 11.1      | 636                                 | 62       | 58              | 20               | 17              | 6    | 7                       | 4                     | M                  | S-R                | D                    | 3                            | 4                           | 3                            | 8                    | 5                    |   |
| Charisma        | JS                       | 24     | 341                                  | 31       | 11.0      | 457                                 | 44       | 42              | 23               | 27              | 8    | 8                       | 3                     | M                  | S                  | D                    | 5                            | 4                           | 3                            | 8                    | 5                    |   |
| HMX 5683        | HM/ST                    | 43     | 408                                  | 113      | 3.6       | 456                                 | 125      | 67              | 22               | 10              | 1    | 7                       | 6                     | L                  | R                  | S                    | 6                            | 6                           | 5                            | 8                    | 6                    |   |
| SSX 5078        | SK                       | 48     | 408                                  | 132      | 3.1       | 608                                 | 196      | 54              | 13               | 32              | 1    | 9                       | 8                     | M                  | S-R                | M                    | 7                            | 4                           | 4                            | 7                    | 7                    |   |
| Kandy Korn      | SW                       | 20     | 72                                   | 79       | 0.9       | 72                                  | 79       | 90              | 1                | 0               | 9    | 2                       | 3                     | M                  | S-R                | S                    | 5                            | 5                           | 3                            | 7                    | 5                    |   |
| Sweet Lightning | RU                       | 21     | 82                                   | 103      | 0.8       | 82                                  | 103      | 83              | 17               | 0               | 0    | 6                       | 5                     | MT                 | S                  | D                    | 6                            | 4                           | 7                            | 5                    | 7                    |   |
| Gold Dust       | RU                       | 22     | 98                                   | 217      | 0.5       | 98                                  | 217      | 76              | 24               | 0               | 0    | 6                       | 6                     | M                  | S                  | D                    | 7                            | 4                           | 5                            | 5                    | 7                    |   |
| Gold Speck      | RU                       | 23     | 72                                   | 198      | 0.4       | 72                                  | 198      | 79              | 21               | 0               | 0    | 4                       | 5                     | M                  | S                  | D                    | 8                            | 4                           | 5                            | 5                    | 6                    |   |

<sup>z</sup>Plot size: 36 feet X 27 feet with 44.8 plots and 1,075 plants/A for pumpkins > 1.5 lbs. average weight; otherwise 36 feet X 13.5 feet and 89.6 plots and 2,150 plants/A.

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