

Evaluation of Ten Heirloom Tomato Varieties at Nine Sites Throughout the Great Lakes Region

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The Great Lakes Vegetable Working Group (WG) conducted a regional observation and evaluation trial of 10 heirloom tomato varieties. Summary results from nine of the 16 sites (Figure 1) are reported here. Individual site data are published in additional reports in the *Midwest Vegetable Trial Report*. WG members designed a protocol to observe the inherent pest resilience and horticultural qualities of 10 heirloom tomato varieties at each location. The varieties were chosen based on input from the WG members and from a member of the Solanaceae Coordinated Agricultural Project. Insect damage, disease pressure, percent germination, yield, etc., were measured weekly for each variety at each site. One of the overall goals of this project was to look for regional trends among the varieties and to make this information available to growers for use in variety selection and market planning. Given the multiple site locations, it should be helpful to growers to see the performance of each variety over a wide geographic and meteorological range. While many references exist that describe the physical characteristics of heirloom tomatoes, our intent was to augment those resources with field evaluation data on pest tolerance and yield characteristics.



Figure 1. Locations of the nine heirloom tomato variety evaluation sites in 2009: Barker, NY; Rock Springs, PA; Piketon, OH; Columbus, OH; South Charleston, OH; Macomb County, MI; West Lafayette, IN; Dixon Springs, IL; and Waseca, MN.

In addition to the pest management and horticultural information collected, some sites hosted consumer acceptance (taste) surveys using the heirloom tomato fruit produced at that site using a standard evaluation protocol. The results offer growers an insight into both the physical attributes of the fruit as well as taste preferences from the consumer perspective.

Materials and Methods

At each of the nine locations, the same 10 heirloom tomato varieties — Amish Paste, Brandywine (Sudduth/Quisenberry), Burbank, Cherokee Purple, Jaune Flamme, Opalka, Oxheart (Livingston's), Peron, Rutgers, and Tainan — were evaluated. All sites were to follow the same general protocol outlined here, but there was some variation, which is noted in each individual site report. Seeds were sown in greenhouses near each field site in April, and then transplanted into black plastic mulch in May. Percent germination of each variety was calculated for most locations. Each plot consisted of eight to 10 transplants per variety in a single row with a plant spacing of 3 to 4 feet. Fertilization at each site usually included a preplant application followed by at least one post transplant feeding. Plants were typically suckered and staked, using various support media, with string to support the growing plants. The sites with trickle irrigation applied 1 inch of water per week. Insects such as aphids, hornworms, stink bugs, and tomato fruitworms, including their associated damage, were scouted for weekly. Diseases such as early blight, *Septoria* leaf spot, and bacterial infections were also scouted for on a weekly basis at all locations. Fruit were harvested between the breaker stage and mature red. The number of marketable, culls, and green fruit were recorded, along with the weight of marketable fruit. One or two representative plants per variety were harvested once or twice per week through first frost, then harvests were halted. In addition to the yield data, sensory evaluation of the fruit was performed at a few locations with growers and consumers to gauge overall taste appeal.

Results and Discussion

All heirloom varieties used in the evaluation trial were indeterminate types except for Rutgers and Burbank, which are determinate. The growth characteristics of all varieties were medium to very large plants, with Tainan being the only exception, which is described as short and low-growing (Table 1). Although germination varied widely among the varieties, clearly Amish Paste had extremely poor germination across all sites. Tainan produced the most marketable fruits per plant, but the grape tomatoes were also the smallest fruit produced in the trial. Jaune Flamme produced the second most fruit which were also the second smallest by weight in the trial. In terms of total marketable fruit, Peron, Jaune Flamme, and Oxheart all produced more than 16 lbs per plant. Tainan, Rutgers, and Brandywine produced the fewest pounds of marketable fruit per plant. Green fruit were not recorded at many sites, but Jaune Flamme and Tainan appear to have the most per plant. Although Tainan has the most number of culled fruit per plant, if average fruit weight is taken into account, then Cherokee Purple and Oxheart have the most unsellable fruit per plant. Disease pressure overall was rated as light to moderate at most sites for early blight and *Septoria* leaf spot, with some sites reporting similar levels of bacterial infections. Insect pressure was likewise light at most sites, with hornworms and aphids being reported most often. Five sites (Macomb County, MI; Waseca, MN; Barker, NY; Dixon Springs, IL; and South Charleston, OH, collected some data on taste evaluation. In terms of overall taste satisfaction, Tainan, Peron, and Brandywine had the highest ratings, though none of them was rated above a six on the nine-point taste scale.

Additional reports on this project will be published at the Great Lakes Vegetable Working Group Web site <http://glvwg.ag.ohio-state.edu>.

Table 1. The heirloom tomato variety evaluation study conducted at nine sites within the North Central region by the Great Lakes Vegetable Working Group in 2009.

	Amish Paste	Brandywine	Burbank	Cherokee Purple	Jaune Flamme	Opalka	Oxheart	Peron	Rutgers	Tainan
Plant habit	Medium height, upright	Vigorous, bushy potato foliage	Medium height, upright	Very tall, bushy	Medium height; semi-bush type	Tall, upright	Medium height, dense foliage	Medium height	Medium height, sparse foliage	Short, with sparse foliage
% Germination (n=6 sites)	21.0	79.0	86.7	89.5	65.7	69.3	69.5	80.3	62.8	76.5
Total marketable fruit no./ plant (n=7)	31.7	12.4	39.0	18.5	139.9	34.3	38.1	37.4	49.0	535.5
Total mkt wt. / plant (lbs) (n=7)	15.0	11.6	14.3	13.1	16.7	13.6	16.1	17.6	12.2	10.8
Avg. marketable fruit wt. (oz) (n=7)	6.7	14.4	5.3	9.9	2.2	5.4	6.7	6.8	3.4	0.3
total green no./ plant (n=2)	20.0	6.0	24.3	10.9	66.0	32.6	19.5	33.3	35.7	35.6
Total cull fruit no./ plant (n=7)	9.8	5.2	13.6	10.3	18.2	10.5	14.7	6.6	15.6	23.3
Overall satisfaction 1=no, 9=great (n=3)	4.4	5.4	5.2	5.1	4.9	3.9	5.0	5.6	5.3	5.9
Seed Source	TGS	TGS	GI	DF	DF	TGS	DF	GI	DF	DF

GI=Gary Ibsen, TomatoFest, PO Box 628, Little River, CA 95456 (no telephone number)

info@tomatofest.com, www.tomatofest.com.

DF=David Francis, Tomato Genetics and Breeding Program, OARDC-Wooster, Wooster, OH 44691 (330) 263-3893, www.oardc.ohio-state.edu/tomato.

TGS=Tomato Growers Supply, PO Box 2237, Fort Meyers, FL 33902; www.tomatogrowers.com.