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Allen M. Gahler
Ohio State University

Matthew Hofelich
Ohio Agricultural Research and Development Center, Fremont

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Northern Ohio Pepper Variety Trial — 2014

Allen M. Gahler, Ohio State University Extension, Sandusky County
Matthew Hofelich, Ohio Agricultural Research and Development Center, Fremont

Peppers are an important crop in both the fresh market and processing market in Sandusky County and throughout North Central Ohio, where a significant percentage of Ohio vegetables are grown. Many different varieties of peppers are grown by producers with fresh market roadside stands, and still others are grown for mid- and late season shipping and processing markets, meaning growers demand a diverse selection of pepper varieties and maturities. Growers have indicated this diversity should include bell, banana, jalapeno, and poblano varieties with different stages of maturity, and bell peppers that offer a variety of mature colors. Many new varieties are becoming available to meet these grower demands, and this study sought to determine which ones would perform acceptably in northern Ohio and which would have the desired traits growers are seeking. For this trial, 23 varieties of bell peppers were grown in four replicated plots at the Ohio State University's North Central Agricultural Research Station near Fremont.

Materials and Methods

The purpose of this trial was to evaluate a significant number of newer varieties of bell peppers, which will help seed companies determine which varieties would be suitable to continue breeding and developing for commercial seed sales and will help growers determine which currently available varieties would be best suited for their specific market demands, including fresh market, shipping, and processing.

The trial examined multiple varieties of bell peppers. Growers and seed companies suggested the varieties to be grown with a strong preference for including new and experimental varieties for comparison alongside industry standard varieties. The evaluation used four replicated plots grown under best management practices to give growers a fair comparison of the different varieties grown on lake bed soils within a normal northern Ohio pepper growing season. Plots consisted of 20-foot rows, replicated four times, with randomized variety location within each replication.

The trial was conducted on Colwood fine sandy loam soil on field BN at the North Central Agricultural Research Station. Best management practices were utilized prior to and during the trial. A wheat cover crop was broadcast seeded on the trial field following a deep chisel on October 2, 2013. Peppers were seeded in the greenhouse on May 9, and fertilized with 20-20-20 at 200 ppm on April 28, May 2, and May 5. On May 8, the field received a broadcast application consisting of 400 lbs./A 0-0-60, 200 lbs./A of 11-52-0, 200 lbs./A 46-0-0, and 7 lbs./A of 14% granular boron. Raised beds were formed on May 9, and on May 13 the field received an herbicide application: 16 oz./A Dual Magnum, 6 oz./A Interlock. Plants were moved outdoors in trays on May 12, and received Ag Streptomycin at 200 ppm on May 16, followed by 20-20-20 fertilizer at 200 ppm on May 19. Transplant occurred on May 23, with 12-inch plant spacing in the row, and 0.7 quart of 10-34-0 per 50 gallons of transplant water. Fourteen insecticide and fungicide applications were made at approximately seven-day intervals from June 12 through September 18.

For data collection, five plants at the center of each row were marked for harvest, which occurred in bell peppers on August 12, August 27, and September 25. Peppers were evaluated at each harvest for yield including quantity and size of fruit, in both marketable and nonmarketable categories. Observations were recorded throughout the trial on overall plant performance including disease resistance, lodging, maturity, and overall quality of fruit.

Results and Discussion

Results of the harvest for each variety of pepper can be seen in the tables below, with total harvest data compiled and averaged from all four replicated plots (Table 1). Since maturity and fresh market characteristics are an integral part of the desired data, the percentage of total yield of both marketable and cull fruit from each variety is also calculated and displayed in Table 2. Finally, a chart of observations about each variety is displayed in Table 3.

The growing season for this trial was cool, with slightly below normal precipitation for Sandusky County. Rainfall was 8.7 inches from the transplant date of May 23 through the last harvest date of September 29. Rainfall in June and August was normal to above average, with below average totals recorded in July and September. In July, 0.8 inch of irrigated water was applied. The average temperature throughout the trial was 69.6°F (Weather Underground, Intellicast, USDA-NASS Ohio Crop and Weather Reports).

The near normal growing season, with very few weather extremes allowed for an overall exceptional crop of peppers with little to no insect pressure and only minor disease issues — mainly blossom end rot, which affected some varieties at first harvest, was negligible in presence at second harvest, and affected several varieties at third harvest.

There were significant differences in fruit size, appearance, and maturity in terms of color across the varieties within each species of peppers, some of which is reflected in the data tables and/or observations. Pictures were taken to record maturity in terms of color in the peppers and can be accessed by contacting the researchers. Plant lodging was a nonissue across the entire trial, and fruit lodging was insignificant through the first two harvests. There were only minor drop in bell peppers prior to third harvest, most notably in varieties 1 (Dashen) and 5 (SW 48). It should be noted that dropped fruit was not collected or included in the evaluation, which in some cases (such as the two varieties mentioned above) may have skewed the data on cull fruit, especially at third harvest. In this instance, there were few culls, but some varieties such as these did have would-be culls on the ground. We do not believe it would be statistically significant had we included culled fruit, but this merits closer observation on future trials.

As the results displayed in the tables show, and as expected with the parameters of this trial, what is determined to be the most successful variety may be in the eyes of the breeder, the grower, or the marketer, depending on their goals. For the purpose of the study to highlight differences in varieties in terms of early yields, consistent seasonlong producers, late yields, and good ratios of marketable vs. cull fruit, this was certainly accomplished. Without a full color picture show to accompany the tables, it is difficult to describe which varieties would excel for certain markets in terms of color, quality, and quantity, but conclusions can be drawn based on the data and observations alone.

For producers seeking a one-time harvest of predominantly green peppers, varieties 9 — Bastille (Figure 1) — and 13 — PS09954288 — easily showed the best ratio of first harvest marketable fruit, but variety 13 also carried a large quantity of culls. In terms of simply topping the tonnage chart for marketable fruit, varieties 6 (SQ6517), 9 (Bastille), 19 (Karisma), and 15 (Sprinter,

Figure 2) all set themselves apart with more than 90 pounds of fruit produced on the three combined harvests of the five plants used for data collection. When that is compared to the total pounds of cull fruit off the same varieties, 9 (Bastille) easily has the best ratio.



Figure 1. Pepper variety Bastille.

When looking for varieties that will produce consistently all season long, variety 2 (Abay, Figure 3) and variety 15 (Sprinter) stood above the rest in terms of a high quality pepper and significant weight of fruit across all three harvests. Each of these varieties was very low in the cull weight all season long as well, and with their vibrant color and thick flesh, both should excel on the fresh market.



Figure 2. Pepper variety Sprinter.



Figure 3. Pepper variety Abay.

While disease pressure did not present a serious problem throughout the season, some varieties did seem to have more issues, mainly with blossom end rot. Almost all culls in the third harvest were a result of blossom end rot, and varieties 5 (SW 48), 11 (Cutlass), 13 (PS09954288), and 22 (SV3964PB) had not only some of the highest cull weights, but suffered from more blossom end rot than the other varieties.

Finally, for those seeking a late-season pepper that matures late and provides a good portion of its yield later in the season, variety 15 (Sprinter) again was a leader in quantity and quality, and variety 5 (SW48) showed a great bump in yield and quality on harvest three despite exhibiting disease and quality issues early in the season.

Additional conclusions and useful information can be drawn from the observation comments in conjunction with the data present in the tables on what was generally a high-quality, high-yielding pepper crop.

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M. Hofelich managed field operations. Hofelich, F. Thayer, R. Shaw, and North Central Agricultural Research Station seasonal staff assisted with fieldwork and data collection. M. Mylander assisted with data analysis.

Table 1. Weight and quantity of marketable and nonmarketable fruit for 23 varieties of bell peppers. Data represent combined counts and weights from three harvest dates of all four replicated plots: August 12, August 27, and September 25.

Variety	Variety #	# of Marketable Fruit	Marketable Fruit Weight (lbs.)	# of Cull Fruit	Cull Fruit Weight (lbs.)	Average Mkt Fruit Weight (lbs.)	Average Cull Fruit Weight (lbs.)
Dashen	1	128	64.65	72	24.46	0.51	0.34
Abay	2	155	77.15	51	18.80	0.50	0.37
E2	3	149	69.60	85	27.15	0.47	0.32
E3	4	146	77.35	53	18.50	0.53	0.35
SW 48	5	112	54.30	90	33.35	0.48	0.37
SQ 6517	6	174	98.50	50	19.15	0.57	0.38
Blitz	7	141	76.85	80	26.75	0.55	0.33
9.2	8	102	50.15	87	28.95	0.49	0.33
Bastille	9	160	94.90	37	14.20	0.59	0.38
Bayonet	10	117	62.40	69	25.85	0.53	0.37
Cutlass	11	156	81.70	68	25.10	0.52	0.37
Rampart	12	159	84.35	72	25.55	0.53	0.35
PS 09954288	13	114	55.60	108	32.55	0.49	0.30
PS 9928302	14	127	62.25	75	27.85	0.49	0.37
Sprinter	15	196	88.45	46	16.60	0.45	0.36
Catriona	16	191	79.85	52	14.60	0.42	0.28
Summer Sweet	17	133	65.35	58	20.25	0.49	0.35
Aristotle	18	149	79.85	38	15.40	0.54	0.41
Karisma	19	183	91.90	59	21.95	0.50	0.37
Vanguard	20	163	85.10	70	26.10	0.52	0.37
Currier	21	160	83.85	36	13.30	0.52	0.37
SV3964PB	22	137	73.25	89	31.60	0.53	0.36
SV9325PB	23	119	65.10	66	23.20	0.55	0.35
	averages	146.57	74.89	65.70	23.10	0.51	0.36

Table 2. Percentage of marketable and nonmarketable fruit for each of three harvest dates for 23 varieties of bell peppers. Data represent combined weights from all four replicated plots of all three harvest dates: August 12, August 27, and September 25.

Variety	Variety #	1st Harvest (% of total marketable yield)	2nd Harvest (% of total marketable yield)	3rd Harvest (% of total marketable yield)	1st Harvest (% of total culls)	2nd Harvest (% of total culls)	3rd Harvest (% of total culls)
Dashen	1	55	16	29	49	33	18
Abay	2	48	28	24	61	16	22
E2	3	47	36	17	44	25	30
E3	4	56	21	24	32	25	43
SW 48	5	47	21	32	59	23	18
SQ 6517	6	57	19	24	31	29	39
Blitz	7	54	22	24	40	26	34
9.2	8	50	28	22	48	37	16
Bastille	9	66	15	19	23	22	56
Bayonet	10	58	26	16	46	26	28
Cutlass	11	38	41	21	44	21	35
Rampart	12	57	21	22	53	8	39
PS 09954288	13	62	17	21	57	12	31
PS 9928302	14	47	37	16	67	11	22
Sprinter	15	30	31	40	31	32	37
Catriona	16	36	46	17	49	16	36
Summer Sweet	17	50	34	15	32	36	33
Aristotle	18	50	32	18	53	26	21
Karisma	19	45	33	23	41	31	28
Vanguard	20	47	29	24	62	17	21
Currier	21	54	26	20	39	17	44
SV3964PB	22	49	28	24	58	18	24
SV9325PB	23	46	39	15	35	39	26
	averages	50	28	22	46	24	30

Table 3. Observations and comments on pepper varieties from throughout the trial.

Variety	Variety #	Observations
Dashen	1	Several with 3 lobes, early-maturing with yellow color dominant throughout harvests.
Abay	2	Medium maturity, yellow color in about 50% at 2nd harvest. 3rd harvest all yellow, thick-walled, excellent shipping prospect.
E2	3	Smaller than average and variable fruit size, inconsistent maturity.
E3	4	Dwindling plant health as harvest progressed with increased culls
SW 48	5	Consistent producer throughout season, but significant culls, will require sorting for fresh market, and potentially short shelf life.
SQ 6517	6	Highest yielding pepper in trial and largest fruit size, stayed green.
Blitz	7	Medium maturity, deep red color at 2nd harvest and beyond.
9.2	8	Significantly lower yielding, but average fruit size. Variable red color with streaking.
Bastille	9	Great shape and appearance at 1st harvest, blossom end rot on all culls 3rd harvest, but very few early culls.
Bayonet	10	Noticeable color early, but streaky through all harvests. Noticeable blossom end rot 3rd harvest.
Cutlass	11	Thin-walled, seems more disease susceptible than average, still green at 3rd harvest, only red all season was rotten.
Rampart	12	Significant blossom end rot at 3rd harvest.
PS 09954288	13	Heavy 1st harvest with significant drop in production and small size in later harvests. Good early-season pepper that stays green.
PS 9928302	14	Consistent producer with one of best 2nd harvest yields, but overall yield well below average.
Sprinter	15	Exceptional quality throughout trial, thick-walled, brilliant color. 1st harvest fruit was small, but early maturing with plenty of red color. Culls were only discarded because of soft touch. Good seasonlong fresh market pepper, but may not hold up well for shipping.
Catriona	16	Long, cone-shaped pepper with early yellow color and strong mid-season yield, good fresh market prospect.
Summer Sweet	17	Yellow to deep orange flesh; early, great seasonlong color.
Aristotle	18	One of the largest fruit size and good plant health with excellent marketable to cull ratio, mid-season red color, 1st harvest all green.

Continued on next page

Table 3 (continued)

Variety	Variety #	Observations
Karisma		Excellent yield by weight and quantity of fruit, yield evenly split across 3 harvests.
Vanguard	20	All 3rd harvest culls had blossom end rot with cull fruit larger than marketable.
Currier		Excellent quality with lowest weight of culls in the trial, but average yield with inconsistent fruit size. Deep red color that develops early.
SV3964PB	22	Below average yield with significant culls, and noticeable fruit drop.
SV9325PB		Thick-walled, short but heavy fruit. Low yield, mid-range color development.