

Variety Trials

Pennsylvania Statewide Bell Pepper Cultivar Evaluation

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SUMMARY. Sixteen cultivars of green bell peppers (*Capsicum annuum*) were evaluated on the basis of yield in three locations across Pennsylvania during the growing seasons of 2008–09. Cultivars were evaluated in comparison with the cultivar Paladin. In central Pennsylvania, all the cultivars trialed had marketable yields (based on weight) not different than ‘Paladin’ except ‘Lynx’, ‘Socrates’, and ‘Escape’. In terms of fruit number, all cultivars were not different than ‘Paladin’ except ‘Socrates’. For large-sized fruit, all the cultivars trialed are recommended. In southeastern Pennsylvania, all the cultivars trialed except SP-05–47 had marketable yields not different than ‘Paladin’. For large-sized fruit, ‘Revolution’ outperformed all other cultivars, including ‘Paladin’. In southwestern Pennsylvania, all the cultivars trialed except Lynx and SP-05–47 produced comparable marketable yields to ‘Paladin’. None of the cultivars evaluated, including Paladin, consistently outperformed Revolution in terms of large fruit. Statewide, all the cultivars, except Lynx and SP-05–47, are recommended on the basis of marketable yields. For growers looking for large-sized fruit to meet market demand the cultivar Revolution is recommended over ‘Paladin’.

Numerous options are available when selecting cultivars. It is not uncommon for a cultivar to perform well in one region or state and poorly in another. This can make selection time-consuming and leave growers unsure about how new cultivars will perform on their farms. To provide growers in Pennsylvania with regionally appropriate and statewide recommendations, a 10-year-coordinated cultivar evaluation program was started in 2008 with funding from the Pennsylvania Vegetable Research and Marketing Board.

Green bell peppers were the first crop evaluated. They were selected through a survey of growers attending the 2006 Western Pennsylvania

Vegetable and Berry Growers Seminar as being the number one crop on which they wanted research to be conducted. Bell peppers are an important crop for Pennsylvania. In fact, PA has the largest number of bell pepper growers in the United States with 1038 of 4338 vegetable growers producing them [U.S. Department of Agriculture (USDA), 2009]. They

are often grown on diversified vegetable farms and sold in the fresh market (USDA, 2009). In 2008–09, 16 cultivars, including one standard, ‘Paladin’, were evaluated in the field and judged on yield characteristics.

Evaluations were conducted in three locations: southwestern, central, and southeastern Pennsylvania. Locations were selected to represent varying environmental conditions across the state. Results from individual locations were used in establishing regionally appropriate recommendations. This approach also allowed development of statewide recommendations by determining which cultivars performed well across the evaluation sites. These cultivars can be considered widely adaptable as they exhibited consistently favorable yields when grown in the varying environments encountered at each site over the 2-year evaluation period and with diverse cultural methods employed at each location.

Materials and methods

To capture the varying environmental conditions across the state, the evaluation sites were located in central Pennsylvania at the Russell E. Larson Research and Education Center, Rock Springs (lat. 40°42’45.04”N, long. 77°57’12.44”W), in southeastern Pennsylvania at the Southeast Agricultural Research and Extension Center, in Manheim (lat. 40°07’05.11”N, long. 76°25’45.69”W), and in southwestern Pennsylvania at two grower’s fields—Janoski Farms in Clinton (lat. 40°29’38.18”N, long. 80°18’40.88”W) in 2008 and Triple B Farms in Monongahela (lat. 40°13’41.42”N, long. 79°56’42.66”W) in 2009 (Fig. 1).

Cultivars evaluated were selected on the basis of their potential to produce higher yields than the standard cultivar Paladin (Table 1). ‘Paladin’ has been the only cultivar listed yearly as a recommended cultivar in the Commercial Vegetable Production Recommendations guide since 2001 (Orzolek et al., 2001). Additionally, it has resistance to phytophthora root rot, an

Units

To convert U.S. to SI, multiply by	U.S. unit	SI unit	To convert SI to U.S., multiply by
0.3048	ft	m	3.2808
2.54	inch(es)	cm	0.3937
0.4536	lb	kg	2.2046
1.1209	lb/acre	kg·ha ⁻¹	0.8922
0.0254	mil	mm	39.3701

important disease in pepper production. All the cultivars evaluated were blocky in shape and harvested green.

The cultivars were arranged in a randomized complete block design with four replications and 20 plants per cultivar in a block. Black embossed plastic mulch (1 mil; Sigma Plastics Group, Allentown, PA) with drip tape (T-Tape model 508-12-450; John Deere, Moline, IL) centered on 3-ft-wide and 6-inch-high raised beds, was applied before transplanting at all locations. Pests were managed in accordance with recommendations for commercial production of green bell peppers (Orzolek et al., 2008).

At the central Pennsylvania site, field planting of \approx 10- or 6-week-old transplants occurred on 13 June 2008 and 20 May 2009, respectively. Plants were spaced 12 inches apart in a single row staggered to the drip line on beds on 7-ft centers. Harvest began on 25 July 2008 and 7 Aug. 2009 and ended on 29 Sept. 2008 and 14 Sept. 2009. The soil was a Hagerstown silt loam. Adhering to commercial recommendations for Pennsylvania, nitrogen (N) was applied both years at a rate of 75 lb/acre N (Orzolek et al., 2008). Sixty percent was applied preplant as urea and 40% was applied via fertigation in five weekly applications using 20N-4.4P-16.6K (Peat-Lite Special; Olympic Horticultural Products, Mainland,

PA). Preseason soil analysis revealed phosphorus (P) and potassium (K) soil levels to be within optimum ranges in both years.

At the southeastern Pennsylvania site, field planting of \approx 7-week-old transplants occurred on 3 June 2008 and 2009. Plants were arranged in a double row with 18-inch spacing between plants in a row and between rows. Beds were spaced on 10-ft centers. Plants were staked both years using a modified Florida weave system. Harvest began on 29 July 2008 and 3 Aug. 2009 and ended on 14 Oct. 2008 and 1 Oct. 2009. The soil was a Hagerstown silt loam. Nitrogen was applied both years at a rate of 75 lb/acre N (Orzolek et al., 2008) through weekly fertigation events beginning 2 weeks after transplanting. Phosphorus and K were applied throughout the season based on tissue test results.

In southwestern Pennsylvania \approx 8-week-old transplants were placed in the field on 2 June 2008 and 1 June 2009. The first harvest occurred on 31 July 2008 and 3 Aug. 2009 and the last harvest was on 1 Oct. 2008 and 17 Sept. 2009.

Cultural practices varied in each year of the evaluation in southwestern Pennsylvania. In the 2008 planting at Janoski's Farm, plants were placed in single, nonstaked rows with 12-inch spacing between plants. Beds were on 5-ft centers. In addition, 700 lb/acre of 19N-8.3P-15.8K were added preplant to supply 133 lb/acre N to the Dormant silt loam.

The 2009 planting system at Triple B Farms used a double row with plants staggered on each side of the drip line with 12-inch spacing in each row of the pair. Beds were on 5-ft centers. Plants were staked with a modified Florida weave system. The field consisted of a Guernsey silt loam. Soil analysis revealed pH, P, and K soil levels to be below the optimum range. Adhering to recommendations, 150 lb/acre P and 150 lb/acre K were broadcast preplant, along with pelleted lime at 200 lb/acre before rototilling and laying plastic. Nitrogen was applied at a rate of 150 lb/acre with 58% applied preplant as urea and 42% applied via fertigation in weekly applications.

Fruit were harvested every 10-14 d as they reached maturity with data collected from 10 plants. Fruit was categorized as marketable or unmarketable,

counted, and weighed. Marketable fruit were graded by size: 4-inches diameter or greater was categorized as large, 3- to 4-inches diameter as medium, and <3-inches diameter as small. Unmarketable fruit were blemished or misshapen.

Data were analyzed with General Linear Model Analysis of Variance using SAS (version 9.1.3; SAS Institute, Cary, NC). When significant effects at $P \leq 0.05$ were detected, Duncan's least significant difference test was used to separate cultivar means. Data from each site were analyzed separately, to account for different cultural methods used at each site.

Results and discussion

CENTRAL PENNSYLVANIA. In 2008, the number of marketable fruit produced was not different between cultivars (Table 2). In 2009, the cultivars Summer Sweet no. 209, Excursion II, Karisma, Revolution, and Lantern produced more fruit than the standard cultivar Paladin, whereas cultivar Socrates produced fewer fruit.

In 2008, yields by weight from 'Lynx' were less than from 'Paladin'. In 2009, the cultivars Summer Sweet no. 209, Excursion II, Karisma, and Revolution yields by weight were greater than from cultivar Paladin, whereas cultivars Escape, Lynx, and Socrates were lower.

In both years, all cultivars produced a similar number of large fruit to 'Paladin' (Table 2). In 2008, no differences were observed in the weight of large fruit compared with 'Paladin'. Differences were observed in 2009 where the weight of large fruit from 'Karisma' and 'Revolution' was greater than from 'Paladin'.

Very few peppers were unmarketable (Table 2). Differences in unmarketable yields between cultivars were not detected in either year of the evaluation.

Numerically, marketable and large yields in 2008 were lower compared with 2009. Spring 2008 was wet due to rain events that delayed planting until transplants were 10-weeks old, whereas, in 2009 6-week-old transplants were field planted. However, researchers have found that compared with 8-week-old transplants, planting 11-week-old transplants resulted in a higher number of fruit produced or did not affect yield (McCraw and Grieg, 1986). Early in the 2008 season, issues with the irrigation system were encountered, which resulted in water stress to the

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Use of trade names does not imply endorsement of the products named or criticism of similar products not named.

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Fig. 1. Bell pepper cultivar evaluation sites in southwestern, central, and southeastern Pennsylvania in 2008–09.

Table 1. Cultivars and seed sources of green bell peppers grown in central, southeastern, and southwestern Pennsylvania in 2008–09.

Yr tested	Cultivar	Seed company
2008, 2009	Lantern	Enza Zaden (Salinas, CA)
2008, 2009	Paladin	Rogers/Syngenta Seeds (Boise, ID)
2008, 2009	Revolution	Harris Moran Seed (Modesto, CA)
2008, 2009	Aristotle	Seminis Vegetable Seeds (St. Louis, MO)
2008, 2009	Snapper	Enza Zaden
2008, 2009	Red Bull	Sakata Seed America (Morgan Hill, CA)
2008, 2009	Socrates	Seminis Vegetable Seeds
2008, 2009	Summer Sweet no. 209	Abbott & Cobb (Feasterville, PA)
2008, 2009	ACR 285	Abbott & Cobb
2008, 2009	Escalade	Abbott & Cobb
2008, 2009	Early Excursion	Abbott & Cobb
2008, 2009	Excursion II	Abbott & Cobb
2008, 2009	Escape	Abbott & Cobb
2008, 2009	Polaris	Western Seed (Naaldwijk, The Netherlands)
2008, 2009	Lynx	DP Seeds (Yuma, AZ)
2008, 2009	SP-05-47	DP Seeds
2008	Legionnaire	Rogers/Syngenta Seeds
2008	Stiletto	Rogers/Syngenta Seeds
2009	Karisma	Harris Moran Seed
2009	PS1819	Seminis Vegetable Seeds
2009	Intruder	Rogers/Syngenta Seeds

plants which could explain the differences in yields between 2008 and 2009.

For growers marketing bell peppers on the basis of weight, all trialed cultivars except ‘Lynx’, ‘Socrates’, and ‘Escape’ are recommended. For those marketing based on number, all cultivars except Socrates are recommended. All evaluated cultivars are recommended for those interested in large-sized fruit. The cultivars Legionnaire, Stiletto, Karisma, PS1819, and Intruder showed potential; however, as they were only evaluated 1 year, definitive conclusions cannot be drawn.

SOUTHEASTERN PENNSYLVANIA. In 2008, no differences were detected between ‘Paladin’ and the other entries in terms of number or weight of marketable fruit (Table 3). In 2009, ‘Early Excursion’ produced a larger number and greater weight of marketable fruit than ‘Paladin’, whereas ‘SP-05-47’ produced fewer fruit, which resulted in significantly less marketable weight.

Revolution was the only cultivar that yielded more large fruit in terms of

Table 2. Number and weight of marketable, large [>4 -inches (10.2 cm) diameter], and unmarketable fruit of several cultivars of green bell peppers grown in central Pennsylvania in 2008–09. Values are the means of four replications.

Cultivar	Mean marketable fruit (no./10 plants)		Mean marketable fruit wt (lb/10 plants) ^z		Mean large fruit (no./10 plants)		Mean large fruit wt (lb/10 plants)		Mean unmarketable fruit (no./10 plants)	Mean unmarketable fruit wt (lb/10 plants)
<i>2008</i>										
Escape	81.3	—	23.4	a ^y	36.5	—	13.5	a–e	4.00	0.925
Legionnaire	79.8	—	24.7	a	41.0	—	16.2	ab	2.75	0.750
Paladin ^x	74.8	—	20.6	ab	36.3	—	12.5	a–e	1.50	0.400
Revolution	72.8	—	23.9	a	49.0	—	18.4	a	3.00	0.550
Escalade	71.8	—	22.3	a	32.5	—	12.3	a–e	1.25	0.300
Aristotle	70.5	—	21.9	a	35.8	—	13.4	a–e	1.25	0.450
SP-05–47	70.3	—	20.5	ab	47.8	—	14.5	a–d	1.25	0.225
Lantern	69.8	—	20.5	ab	35.0	—	12.7	a–e	4.00	0.550
Socrates	68.3	—	19.2	a–c	37.0	—	12.7	a–e	2.75	0.400
Polaris	67.0	—	23.3	a	37.3	—	15.3	a–c	2.00	0.375
ACR 285	66.3	—	19.4	a–c	35.5	—	12.5	a–e	3.75	0.875
Stiletto	64.3	—	17.0	a–c	27.8	—	8.95	c–e	2.00	0.175
Snapper	64.0	—	18.7	a–c	35.5	—	12.7	a–e	0.500	0.0725
Red Bull	58.3	—	18.5	a–c	28.5	—	10.8	b–e	2.00	0.275
Summer Sweet no. 209	48.3	—	13.0	bc	21.5	—	7.70	de	1.00	0.150
Lynx	42.5	—	13.7	c	18.8	—	7.08	e	2.50	0.525
<i>2009</i>										
Summer Sweet no. 209	123	a	53.8	ab	89.5	a	45.8	a–c	3.75	1.33
Excursion II	103	b	52.1	a–d	85.8	ab	46.5	a–c	2.50	0.725
Karisma	102	b	55.5	a	88.6	a	52.0	a	3.00	1.03
Revolution	100	bc	52.8	a–c	86.5	a	48.0	ab	5.25	1.63
Lantern	100	bc	44.8	c–f	90.3	a	41.6	a–d	3.75	1.33
ACR 285	99.3	b–d	46.9	b–e	74.8	a–d	38.6	b–f	3.25	1.05
Escalade	96.0	b–d	48.6	a–e	81.8	a–c	43.2	a–c	4.00	1.03
SP-05–47	93.5	b–e	40.7	e–g	73.5	a–d	35.7	c–f	3.75	0.925
Snapper	92.3	b–f	46.4	b–e	87.3	a	44.2	a–c	4.00	1.35
Red Bull	91.0	b–f	46.6	b–e	73.5	a–d	40.0	b–e	0.750	0.100
Early Excursion	90.5	b–f	45.6	b–f	83.8	a–c	43.4	a–c	3.50	1.03
Aristotle	85.8	b–g	47.2	b–e	70.0	b–d	37.9	b–f	4.00	1.10
PS1819	82.8	c–g	44.0	d–f	76.8	a–c	42.2	a–d	4.00	1.28
Paladin	80.8	d–g	43.2	ef	73.0	a–d	36.8	c–f	3.75	1.08
Polaris	76.0	e–h	40.9	e–g	63.8	cd	38.0	b–f	2.00	0.550
Intruder	74.3	f–h	37.8	fg	65.0	b–d	35.9	c–f	3.50	0.725
Escape	68.8	gh	34.6	gh	55.0	d	30.4	ef	3.25	0.950
Lynx	67.5	gh	33.8	gh	63.5	cd	31.0	d–f	5.50	1.28
Socrates	58.3	h	29.3	h	54.3	d	28.5	f	3.75	0.875

^z1 lb = 0.4536 kg.

^yValues followed by different letters within a column are significantly different using Duncan's least significant difference test at the 5% level.

^xStandard cultivar to which all other means are compared.

number and weight than 'Paladin' in 2008 (Table 3). The cultivars Stiletto, Red Bull, ACR 285, Lynx, Escalade, Lantern, Aristotle, and SP-05–47 produced fewer large-sized fruit than 'Paladin'. By weight, the cultivars Stiletto, ACR 285, Lynx, Escalade, Lantern, Aristotle, and SP-05–47 yields were less than from 'Paladin'. In 2009, 'Revolution' produced more large fruit in terms of number and weight than 'Paladin'.

The majority of unmarketable fruit were as a result of them being misshapen. In 2008 'SP-05–47' and 'Escalade' produced a higher number of unmarketable fruit than 'Paladin' (Table 3). In terms of weight, the cultivars SP-05–47, Escalade, and Snapper produced more unmarketable fruit than 'Paladin'. Differences in unmarketable yield were not observed in 2009.

On the basis of marketable weight and number all cultivars, except SP-05–47 are recommended. 'Revolution' produced higher yields of large-sized fruit than 'Paladin'. The remaining cultivars produced yields of large-sized fruit that were comparable or lower than 'Paladin'. The cultivars Stiletto, Legionnaire, Karisma, Intruder, and PS1819 showed potential based on marketable yields; however, as they were only

Table 3. Number and weight of marketable, large [>4 -inches (10.2 cm) diameter], and unmarketable fruit of several cultivars of green bell peppers grown in southeastern Pennsylvania in 2008–09. Values are the means of four replications.

Cultivar	Mean marketable fruit (no./10 plants)		Mean marketable fruit wt (lb/10 plants) ^a		Mean large fruit (no./10 plants)		Mean large fruit wt (lb/10 plants)		Mean unmarketable fruit (no./10 plants)		Mean unmarketable fruit wt (lb/10 plants)	
<i>2008</i>												
Stiletto	131	a ^y	50.1	a–d	11.5	e–g	6.22	e–i	19.5	b–d	5.96	a–c
SP-05–47	130	a	46.7	b–d	5.25	g	2.73	i	28.8	a	8.02	ab
ACR 285	139	ab	52.4	a–d	11.3	e–g	6.63	d–i	17.5	b–d	5.30	bc
Excursion II	129	ab	57.5	a	21.0	bc	12.3	b	11.5	d	4.09	c
Escalade	129	ab	54.9	ab	5.75	g	3.73	hi	25.0	ab	8.44	a
Red Bull	127	ab	53.5	a–c	11.5	e–g	6.90	c–h	13.3	d	4.15	c
Lantern	124	a–c	54.9	ab	6.50	g	3.96	hi	18.5	b–d	6.67	a–c
Early Excursion	122	a–d	51.5	a–d	15.0	c–e	8.08	c–g	15.5	cd	5.00	c
Revolution	120	a–d	53.5	a–c	29.5	a	16.3	a	19.0	b–d	6.39	a–c
Polaris	116	a–d	51.1	a–d	13.5	d–f	9.58	b–e	15.0	cd	5.41	bc
Paladin ^x	113	a–d	49.8	a–d	19.0	b–d	10.9	bc	13.8	cd	4.52	c
Aristotle	109	b–d	47.8	a–d	8.50	fg	5.18	f–i	14.0	cd	4.35	c
Escape	106	cd	44.9	cd	16.0	b–e	9.07	b–f	15.5	cd	4.72	c
Lynx	106	cd	42.7	d	8.50	fg	4.83	g–i	13.8	cd	4.69	c
Socrates	104	cd	45.3	b–d	21.8	b	12.4	b	17.5	b–d	6.46	a–c
Snapper	103	d	45.0	cd	18.5	b–d	10.5	b–d	22.5	a–c	8.02	ab
Legionnaire	102	d	43.8	cd	16.5	b–e	9.35	b–e	17.0	b–d	5.58	bc
<i>2009</i>												
Early Excursion	133	a	48.1	a	6.50	de	3.59	c–e	17.5	—	5.96	—
ACR 285	126	ab	47.1	ab	8.50	c–e	4.84	c–e	19.0	—	5.73	—
Red Bull	126	ab	47.1	ab	7.25	c–e	4.36	c–e	15.5	—	5.13	—
Socrates	120	a–c	44.8	ab	13.3	b–d	7.30	b–d	19.8	—	6.25	—
Summer Sweet no. 209	119	a–c	44.2	ab	7.25	c–e	4.02	c–e	16.8	—	5.41	—
Intruder	118	a–c	42.5	a–c	4.50	e	2.45	de	14.3	—	4.73	—
Excursion II	117	a–c	45.2	ab	8.75	c–e	5.95	c–e	19.8	—	6.84	—
Lantern	116	a–c	43.1	a–c	4.00	e	2.42	de	20.0	—	7.33	—
Escalade	115	a–c	43.0	a–c	2.75	e	1.51	e	20.8	—	6.89	—
PS1819	112	bc	45.4	ab	17.5	ab	9.95	ab	11.5	—	4.40	—
Escape	110	bc	41.3	bc	6.75	c–e	3.79	c–e	14.0	—	4.37	—
Snapper	109	bc	42.4	a–c	15.3	a–c	8.26	a–c	17.0	—	5.79	—
Paladin	107	bc	41.3	bc	9.80	b–e	5.50	b–e	16.0	—	5.68	—
Aristotle	105	cd	42.0	a–c	10.0	b–e	6.25	b–e	14.5	—	5.47	—
Karisma	105	cd	42.4	a–c	7.25	c–e	4.23	c–e	15.3	—	5.83	—
Polaris	104	cd	43.0	a–c	10.5	b–e	6.37	b–e	15.8	—	6.00	—
Lynx	104	cd	37.8	c	6.00	de	3.42	c–e	15.0	—	5.14	—
Revolution	100	cd	42.0	a–c	22.0	a	11.9	a	17.0	—	6.59	—
SP-05–47	87.8	d	31.4	d	3.25	e	1.77	e	21.3	—	6.75	—

^a1 lb = 0.4536 kg.

^yValues followed by different letters within a column are significantly different using Duncan's least significant difference test at the 5% level.

^xStandard cultivar to which all other means are compared.

evaluated 1 year, definitive conclusions cannot be drawn.

SOUTHWESTERN PENNSYLVANIA. In 2008, significant differences in the number and weight of marketable fruit between cultivars were not detected (Table 4). In 2009, 'Early Excursion' yielded higher than 'Paladin' based on number and weight. 'Lynx' and 'SP-05–47' produced fewer marketable fruit by number and weight than 'Paladin'.

In 2008, more large fruit in terms of number and weight were produced by 'Revolution' and 'Alliance' than 'Paladin.' In 2009, 'Revolution' outperformed 'Paladin' in terms of large fruit number, whereas 'Revolution' and 'Snapper' produced heavier large fruit than 'Paladin'.

Differences in unmarketable yields between cultivars were not detected in 2008 (Table 4). In 2009, 'SP-05–47' produced a larger number of

unmarketable fruit than 'Paladin'. 'Snapper' and 'Revolution' by weight had more unmarketable fruit than 'Paladin'.

Although the weight of marketable fruit was numerically similar in both years of the study, there was a trend where the number of marketable fruit was less in 2009 compared with 2008. Each grower cooperator used their standard cultural practices that differed in plant spacing, the use of

Table 4. Number and weight of marketable, large [>4 -inches (10.2 cm) diameter], and unmarketable fruit of several cultivars of green bell peppers grown in southwestern Pennsylvania in 2008–09. Values are the means of four replications.

Cultivar	Mean marketable fruit (no./10 plants)		Mean marketable fruit wt (lb/10 plants) ^a		Mean large fruit (no./10 plants)		Mean large fruit wt (lb/10 plants)		Mean unmarketable fruit (no./10 plants)		Mean unmarketable fruit wt (lb/10 plants)	
<i>2008</i>												
Red Bull	147	—	49.8	—	4.33	b ^b	2.31	b	17.8	—	6.50	—
Summer Sweet no. 209	146	—	40.6	—	3.07	b	1.68	b	15.2	—	5.14	—
Escalade	145	—	48.0	—	2.21	b	1.16	b	15.5	—	5.66	—
Early Excursion	144	—	46.5	—	5.05	b	1.79	b	16.6	—	6.55	—
Excursion II	136	—	47.6	—	3.06	b	1.30	b	11.4	—	4.12	—
Alliance ^x	135	—	43.6	—	19.4	a	9.73	a	16.7	—	6.80	—
Revolution	134	—	44.5	—	27.4	a	12.1	a	17.5	—	6.66	—
Lantern	125	—	38.2	—	3.33	b	1.54	b	11.3	—	4.03	—
Escape	125	—	40.0	—	4.11	b	1.73	b	11.9	—	4.35	—
Socrates	121	—	35.8	—	6.27	b	2.89	b	11.1	—	3.98	—
Legionnaire	118	—	41.3	—	6.39	b	3.22	b	15.2	—	5.32	—
Stiletto	115	—	35.3	—	1.61	b	1.03	b	14.3	—	4.90	—
ACR 285	111	—	34.0	—	3.64	b	1.24	b	19.3	—	6.86	—
Lynx	109	—	37.0	—	2.25	b	1.39	b	16.1	—	5.90	—
Polaris	108	—	39.1	—	10.3	b	5.42	b	20.6	—	8.20	—
Paladin ^w	105	—	29.3	—	4.92	b	1.96	b	16.4	—	6.06	—
<i>2009</i>												
Early Excursion	94.2	a	43.7	a	7.75	b–e	4.73	b–f	12.5	e	5.60	c
Escalade	84.3	ab	37.7	a–c	0.0500	e	0.675	f	23.5	a–d	9.18	a–c
Excursion II	82.0	a–c	39.5	ab	9.00	b–d	5.77	b–e	14.7	de	7.27	bc
ACR 285	79.8	a–c	37.5	a–c	6.00	c–e	3.98	c–f	16.8	c–e	7.20	bc
PS1819	77.3	bc	38.2	a–c	14.0	b	8.53	a–c	18.0	b–e	8.47	a–c
Paladin	77.0	bc	35.3	b–d	7.50	b–e	3.95	c–f	18.3	b–e	7.78	bc
Revolution	75.8	bc	35.1	b–d	21.8	a	12.2	a	27.5	ab	12.3	a
Lantern	75.7	bc	33.6	b–d	2.67	de	1.57	ef	18.7	b–e	7.90	bc
Snapper	74.3	bc	38.8	a–c	13.0	bc	8.67	ab	25.7	a–c	12.3	a
Polaris	71.0	b–d	34.7	b–d	5.00	de	3.33	d–f	14.0	de	6.13	c
Intruder	70.5	b–d	34.2	b–d	3.50	de	1.85	d–f	12.8	de	5.60	c
Summer Sweet no. 209	69.3	b–d	29.1	de	3.50	de	1.95	d–f	22.0	b–d	9.10	a–c
Escape	66.3	c–e	32.5	c–e	10.0	b–d	5.93	b–e	14.3	de	6.80	c
Aristotle	65.8	c–e	34.5	b–d	10.0	b–d	6.45	b–d	19.3	b–e	8.48	a–c
Lynx	58.0	de	26.8	ef	2.67	de	1.87	d–f	14.0	de	5.83	c
SP-05–47	52.8	e	22.0	f	1.50	e	0.850	f	32.5	a	11.4	ab

^a1 lb = 0.4536 kg.

^bValues followed by different letters within a column are significantly different using Duncan's least significant difference test at the 5% level.

^x'Alliance' was evaluated only at this location.

^wStandard cultivar to which all other means are compared.

staking, and the rate of fertilizer applied. Discrepancies in the number of marketable fruit are likely a function of these differences. For example in 2008, a single row with 12 inches between plants was used, whereas in 2009 a double row with 12-inch spacing between plants in a row was used. Several studies have found the spatial arrangement of pepper plants to affect yield (Decoteau and Graham, 1994; Kahn and Leskovar, 2006; Locascio and Stall, 1994).

All cultivars, except Lynx and SP-05–47, are recommended in terms of

marketable yield. 'Revolution' produced higher yields of large-sized fruit than 'Paladin'. The remaining cultivars produced yields of large-sized fruit that were comparable to 'Paladin'. 'PS1819' and 'Intruder' showed potential in terms of marketable yields and 'Alliance' in terms of large yields; however, as they were only evaluated 1 year, definitive conclusions cannot be drawn.

STATEWIDE RECOMMENDATIONS. 'Paladin' has been recommended in Pennsylvania for the past 10 years because of good yielding characteristics

and phytophthora resistance. In determining whether a cultivar was suited for statewide recommendation, the criterion was that it must have produced comparable yields to 'Paladin' in a minimum of two of the evaluation sites. Several seed companies have introduced a number of new cultivars the past few years, many of those evaluated in this study performed equally or better than 'Paladin' in terms of marketable yields. However, the cultivars Lynx and SP-05–47 produced lower yields to the current standard and, therefore, are not

recommended. For growers looking for large-sized fruit to meet market demand the cultivar Revolution is recommended over Paladin. Although conclusions about the cultivars PS1819, Intruder, Karisma, Stiletto, and Legionnaire could not be drawn for each trial location because they were only observed in 1 year of the study, comparing all three sites revealed that they performed well and warrant further evaluation.

Phytophthora crown, root rot, and aerial blight caused by *Phytophthora capsici* can be a devastating disease of peppers and the use of resistant and/or tolerant cultivars is an important ecologically based management strategy (Ristaino and Johnston, 1999). The cultivars Escalade, Paladin, Revolution, and Alliance are described as having tolerance. The southwestern site experienced phytophthora root rot in 2009; however, because the incidence was minimal, *P. capsici* tolerance was not evaluated.

The pepper cultivars recommended as a result of this study are believed

to be suitable for commercial production under conditions common to the mid-Atlantic region. This is based on the performance of tested cultivars over a wide geographic area, two distinctive years, and different cultural practices. The ultimate value of a cultivar is determined by market. Cultivars recommended by the statewide trials can serve as a starting point, recognizing that performances can vary under site-specific conditions.

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