

Table 8. Soil fertility conducted after experiment completion with bone meal and chicken manure amendment applications on jicama at the Waimanalo Experiment Station, Hawaii.

Treatment ^a	pH ^b	EC	P	K	Ca	Mg
Control	5.7	0.25	126	404	3954	1304
Chemical fert	4.8	0.27	261	700	3576	1130
Bone meal 1×	5.6	0.33	167	356	3968	1256
BM & CM	6.1	0.27	180	482	4264	1250
Bone meal 4×	5.4	0.43	463	366	4196	1208

^aFor treatment descriptions see Table 1.

^bSoil analysis conducted by the UH Agricultural Diagnostic Laboratory. Chemical fertilizer = 10N-20P₂O₅-20K₂O; CM = chicken manure at 1 ton/acre.

long-term fertility through the application of organic amendments but that it is important to monitor important variables such as the soil pH, EC, and the OM levels, to tailor fertility programs that will maintain high crop yields and quality and that will minimize nutrient imbalances or crop injury.

The results from these experiments indicate that it is possible to obtain jicama marketable yields that are equivalent or greater than those obtained with standard synthetic fertilizer applications. The results also indicate that problems that may occur with the application of synthetic fertilizers, such as nutrient imbalances from excessive applications, may also be encountered with the application of organic amendments. Thus, growers that rely on organic amendments as an important component of their fertilizer programs should also understand and periodically monitor the soil and crop nutrient status on their farms, and make organic amendment applications that will complement the existing soil fertility, and which will meet the nutrient requirements of their crops.

Table 9. Soil fertility conducted after experiment completion at the Waimanalo Station organic-farming plots, Hawaii, with a combination of bone meal and high or low rates of compost applications.

Treatment ^a	pH ^b	EC	P	K	Ca	Mg	OM
Control	7.2	0.25	55	194	6416	1454	1.78
Synthetic fert	7.3	0.32	86	88	7628	1102	1.90
Low compost (-BM)	7.6	0.33	80	206	6398	1432	1.78
Low compost (+BM)	6.8	0.38	1029	378	5884	1272	2.02
High compost (-BM)	7.6	0.35	146	624	6470	1458	2.45
High compost (+BM)	7.4	0.39	143	448	7146	1346	2.35

^aFor treatment descriptions see Table 4.

^bSoil analysis conducted by the UH Agricultural Diagnostic Laboratory.

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PERFORMANCE OF BELL PEPPER VARIETIES OVER TWO SEASONS IN SOUTHEAST FLORIDA, 1998-2000

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Abstract. Two demonstration trials were conducted to evaluate promising bell pepper varieties on sandland in Delray Beach, FL. Peppers were grown from transplants under commercial full bed plastic mulch culture using subsurface (seepage) irrigation. Fifty-four different varieties were evaluated at least once and twenty-one varieties were evaluated twice. Green fruits were evaluated from four blocks and an additional block was reserved for the evaluation of colored fruits (mature pepper). Peppers were evaluated for yield and average fruit size. Randomly selected fruits from the first pick were evaluated for length and width, lobe number, and bluntness at the blossom end. Mature (colored) fruits were counted, weighed and evaluated for deformities including softness, misshapen, rot, sunburn, and stip.

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The value of fresh market green bell peppers was \$243 million for the 1998-99 season (Fla. Agric. Stat. Serv., 2000). During that season 21.6 million 28-lb bushels were harvested from 19,000 acres for an average yield of 1,138 bushels per acre. The average price per bushel was \$11.24. Pepper production is concentrated in South Florida with 25% (4,700 acres) being produced in Eastern Palm Beach County. Bacterial spot, caused by *Xanthomonas compestris* pv. *vesicatoria*, is one of the most widespread and serious diseases affecting production of pepper in Florida (Pohronezny et al., 1993; Pernezny et al., 1998). Pepper varieties with resistance to races 1, 2, and 3 of the pathogen are now commercially available and seed companies continue to develop new cultivars with resistance to this disease (Shuler, 1993, 1995, 1996, 1997, 1998, 1999; Shuler et al., 2000). A variety demonstration was conducted each of the past two seasons to compare yield potential and plant and fruit characteristics of bell pepper varieties, preferably with resistance to bacterial spot (Shuler, 1999; Shuler et al., 2000).

Materials and Methods

All of the varieties were resistant to bacterial spot races 1, 2, and 3, except PR 93-2-1 (resistant to race 2 only) and Paladin (no resistance). Varieties were replicated in a randomized complete block design with four replications for evaluation of green peppers (immature) and one block for evaluation of colored (mature) peppers. Blocks were single raised beds which had been fumigated with methyl bromide/chloropicrin and covered with polyethylene mulch. Transplants were set two rows per bed in rows 18 inches apart. Subsurface (seepage) irrigation was used. Color of plastic used, bed spacing, within-row plant spacing, plant population, and staking and tying varied with the grower (Table 1). Diseases, insects, and weeds were managed by the growers.

Transplants were grown by LaBelle Plant World, LaBelle, FL. Dead and dying or weakened transplants were counted within 15 days of transplanting and replaced with original transplants. Plots were monitored for either dead or weakened plants throughout the growing season and at each harvest. Green peppers were picked and marketable fruits were counted and weighed. At first pick, 10 peppers each from two blocks were randomly selected and measured for length and width. The number of lobes were counted, and the number of fruits having a pointed or blunt blossom end were recorded. Incidence of bacterial spot was generally low and plants were only rated for the disease in the 1999-2000 demonstration.

Colored peppers were evaluated from one block. Colored fruits were counted and weighed and evaluated for softness (shriveling), sunburn, flat and misshapen, wet and dry rot, stip, and for being completely colored with no green showing.

Fall 1998, Transplanted 25 November, 1998, DuBois Farms, Delray Beach, FL (Tables 2 and 3). The demonstration had five blocks with beds spaced 6 feet apart and plots 8 feet long.

Within-row plant spacing was 8 inches (12 plants per row or 24 plants per plot, 21,780 plants per acre). Soil type was a Myakka sand. Plants were seeded 13 October and were 43 days old when transplanted on 25 November. Black polyethylene mulch was used. Plants were staked and tied twice. Green peppers were picked four times: 22 Feb., 18 Mar., 7 April, and 3 May 1999 (a 44 day period). Colored fruits were picked two times: 17 and 30 Mar. from the fifth block.

Weather conditions were considered generally favorable for crop growth. Rainfall was moderate in the fall and early winter. Extremely dry conditions followed from late February through late April. Plant stand was good; however, early seedling growth was slower in the plot area than in the surrounding commercial pepper. Severely weakened transplants which had lost leaves were counted on 30 Nov. and replaced with original transplants. Several budless plants were also replaced. Plots were evaluated for either dead or weakened plants on 10 and 23 Dec. and at each harvest. At the seedling evaluation on 10 Dec., there were no missing or weak plants. Plants which had been reset on 30 Nov. were growing well. At the evaluation on 23 Dec., many plants on the east rows of the beds were smaller (weakened) with some of the smaller plants having a yellow edge around some of their older leaves. Plants received supplemental fertilizer several times along the top and sides of the beds via an injector wheel. Bacterial spot developed in some varieties by first pick and may have affected the yield of those varieties. Incidence of bacterial spot was relatively low for most varieties and varieties were not rated for the disease. Samples of bacterial spot were collected from leaves of several varieties and tested to be race 6. Race 6 has been the most prevalent race found in the last two years on varieties resistant to races 1, 2, and 3 (Pernezny et al., 1998). Plant height was measured on 19 Feb. as the distance from the top of the bed to the average height of the top leaves.

Fall 1999, Transplanted 26 October, 1999, Thomas Produce, Delray Beach, FL (Tables 4 and 5). The demonstration had five blocks with beds spaced 5 feet apart and plots 9 feet long. Within-row plant spacing was 9 inches (12 plants per row or 24 plants per plot, 23,232 plants per acre). Soil type was a Myakka sand. Plants were seeded 9 Sept. and were 47 days old when transplanted on 26 Oct. The beds had been fumigated with methyl bromide/chloropicrin 67/33, and white on white polyethylene mulch was used. Severely weakened and dying plants were counted on 28 Oct. and 4 and 10 Nov. and replaced with original transplants. Plots were also evaluated for either dead or weakened plants on 18 Nov. and at each harvest, but these plants were not reset. Stakes were set out for the plants; however, since plant growth was decreased, the plants were left untied. Green peppers were picked three times: 26 Jan., 16 Feb., and 9 Mar. 2000. Colored fruits were picked four times: 8, 17, and 29 Feb. and 10 March from the third block. The third block consisted of an east bed containing varieties #1 through #22 separated by the middle drive

Table 1. Summary of horticultural practices for bell pepper variety demonstrations in Southeast Florida, 1998-2000.

Demonstration	Bed spacing (feet)	Within row spacing (inches)	Plant per A	Stake and tie	Transplant date	Days to first harv.	No. of harv. green/colored	Harvest period	Harv. duration (days)
1998-99 DuBois F.	6	8	21,780	yes	25 Nov.	89	4/2	22 Feb.-3 May	70
1999-2000 Thomas	5	9	23,232	no	26 Oct.	92	3/4	26 Jan.-10 Mar.	44

Table 2. Summary of yield and fruit characteristics for a bell pepper variety demonstration, DuBois Farm, One Mile Road, Delray Beach, Florida, 1998-99.^z

Variety	Seed source	B. spot race resistance	Number of 25-lb crtns/A		Avg. fruit crtn	Fruit per plant	Plant ht. (kn.) ^y	Length × width (inches) ^x	Ratio 1 × w ^{x,w}	3 & 4 lobes (%) ^x	Avg. no. lobes ^x	Blunt pointed (%) ^{x,v}
			First pick	Total								
Crusader, 6110	Rogers	1,2,3	1333	2291	58.5	6.16	21.2	3.68 × 3.61	1.02	95	3.7	15
Lafayette, 5044 ^u	Rogers	1,2,3	1339	2248	55.1	5.81	20.2	3.76 × 3.73	1.01	95	3.7	10
Orion	Enza	1,2,3	1273	2201	56.3	5.69	21	3.48 × 3.68	0.94	75	4.1	0
Boynton Bell	Pepper Res.	1,2,3	1220	2103	65.2	6.29	17.8	3.76 × 3.26	1.15	95	3.2	35
SPP 6112	Sakata	1,2,3	1251	2071	61.8	6.00	19.8	3.71 × 3.33	1.11	95	3.5	0
ACX 222	A & C	1,2,3	1158	2058	69.3	6.58	21.2	3.51 × 3.34	1.05	100	3.5	45
Enterprise	Asgrow	1,2,3	1277	2038	62.5	5.97	20.6	3.44 × 3.51	0.98	85	3.4	5
PR 9701R-4	Pepper Res.	1,2,3	1325	2013	59.1	5.63	19.4	3.70 × 3.39	1.09	95	3.6	15
Commandant	Rogers	1,2,3	1217	1997	57.6	5.28	22.2	4.35 × 3.38	1.29	95	3.4	30
Early Sunsation ^u	Petoseed	1,2,3	1130	1990	63.4	5.91	20	3.44 × 3.43	1.00	100	3.6	0
Legionnaires, 6089	Rogers	1,2,3	1196	1989	61.4	5.72	21.2	3.67 × 3.49	1.05	100	3.7	5
RPP 6079	Rogers	1,2,3	1187	1986	60.8	5.54	21.4	3.34 × 3.48	0.96	100	3.6	20
PR 93-2-1	Pepper Res.	2	1307	1962	59.1	5.46	20.4	3.62 × 3.59	1.01	100	3.8	0
Paladin	Rogers	—	1234	1942	61.1	5.51	19	3.80 × 3.57	1.06	100	3.6	10
33706 ^u	Enza	1,2,3	1167	1937	58.7	5.51	21	3.51 × 3.48	1.01	90	3.4	15
XPP 7121	Sakata	1,2,3	1161	1936	65.0	5.78	18.2	3.70 × 3.17	1.17	100	3.6	0
ACX 215	A & C	1,2,3	1124	1928	64.8	5.74	21.8	3.92 × 3.52	1.12	95	3.3	30
Lexington	Asgrow	1,2,3	1230	1917	61.3	5.40	21	3.39 × 3.47	0.98	95	3.4	10
Yorktown	Asgrow	1,2,3	1195	1889	63.1	5.50	18.2	3.83 × 3.34	1.15	95	3.2	15
ACX 209	A & C	1,2,3	1171	1853	62.4	5.73	20.4	3.92 × 3.52	1.12	95	3.5	5
PR 9701R-3	Pepper Res.	1,2,3	1128	1838	63.2	5.51	16.8	3.74 × 3.28	1.14	90	3.3	35
SPP 7118	Sakata	1,2,3	1206	1817	64.8	5.46	20	3.59 × 3.28	1.10	100	3.6	0
Brigadier	Rogers	1,2,3	1203	1812	61.2	5.20	18.2	3.71 × 3.40	1.09	100	3.7	0
Bravo	Enza	1,2,3	1212	1798	61.7	5.20	20.4	3.59 × 3.46	1.04	90	3.6	10
Ex 12273	Asgrow	1,2,3	1143	1791	66.4	5.46	20	3.62 × 3.38	1.07	95	3.5	20
SSweet 880	A & C	1,2,3	966	1788	74.5	6.11	17.6	3.43 × 3.29	1.04	100	3.3	50
X3R Wizard	Petoseed	1,2,3	1126	1770	56.9	4.67	18.4	3.85 × 3.40	1.13	90	3.6	30
PS 213896	Petoseed	1,2,3	1141	1712	65.3	5.15	17.4	3.67 × 3.34	1.10	100	3.7	0
X3R Aladdin ^u	Petoseed	1,2,3	1001	1691	69.0	5.35	21.8	3.48 × 3.30	1.06	80	3.8	5
Ex 12274 ^u	Asgrow	1,2,3	1154	1664	63.0	4.92	18.8	3.54 × 3.45	1.03	90	3.4	5
X3R Camelot	Petoseed	1,2,3	972	1664	66.8	5.12	18.8	3.93 × 3.26	1.21	100	3.5	10
PS 223796	Petoseed	1,2,3	1204	1636	60.0	4.51	19.8	3.73 × 3.31	1.13	100	3.8	5

^zAverage of four replications. Single bed plots, 6' × 8'. Two rows per bed, 12 plants per row, 24 plants per bed, 21,780 plants/A (eight inch within-row spacing). Transplanted 25 Nov. 1998 (transplants grown by LaBelle Plant World), 89 days to first pick.

^yPlants measured 19 Feb. 1999 (three days before first harvest). Measured from the top of the bed to the average top of the plants. Average of five replications.

^xAverage of 20 fruits, 10 each from beds 2 & 3, first pick, 22 Feb. 1999.

^wScale: 1.00 = blocky, width same as length. >1.00 = degree of elongation, length greater than width. <1.00 = degree of flatness, length less than width.

^vFlat or pointed at blossom end with very little indentation of lobes.

^uGreen to yellow.

road from the west bed containing varieties #23 through #43. Plants on the west bed were significantly stunted. The potential yield was not maximized in the plots with weakened plants.

Weather was considered moderately favorable for crop growth. On 15 Oct., after the beds were made, Hurricane Irene passed through bringing strong winds and heavy rainfall with temporary flooding which may have leached out some of the preplant fertilizer. After two weeks, leaves of some plants had a light yellow cast and the plants seemed to stop growing. After three weeks the yellowing seemed to be confined mostly to the lower, older leaves. This yellowing/stunted response seemed to be associated with specific plant rows. By the third week most of the plants had darker green

foliage and had resumed growth. All varieties of two blocks for green harvest (blocks #1 and #4) had one row of stunted plants, and half of the varieties of the other two blocks for green harvest (blocks #2 and #5) had one row of stunted plants. On 1 Dec., five weeks after transplanting, broadmite injury was noticed on leaves of a few plants scattered throughout the test area. On 13 Jan., 79 days after transplanting, a stem and leaf disease was noticed in the tops of some of the plants. Severely damaged and wilted plants were pulled out at each pick. Bacterial spot developed in some varieties after first pick and may have reduced the yield slightly for those varieties. Incidence of bacterial spot was relatively low for most varieties; varieties were rated for the disease on 27 Jan. (one day after first pick).

Table 3. Pepper yield for a variety demonstration, DuBois Farm, One Mile Road, Delray Beach, Florida, 1998-99.

Variety	Seed source	Number of 25-lb crtns/A					Number of fruit/crtm				
		Pick # 1 Feb 22	Pick # 2 Mar 18	Pick# 3 Apr 7	Pick # 4 May 3	Total	Pick # 1 Feb 22	Pick # 2 Mar 18	Pick # 3 Apr 7	Pick # 4 May 3	Avg
Crusader, 6110	Rogers	1333	260	439	259	2291	49.3	66.4	67.4	83.2	58.5
Lafayette, 5044 [†]	Rogers	1339	357	350	202	2248	47.8	63.4	66.9	69.8	55.1
Orion	Enza	1273	278	285	365	2201	49.6	61.8	65.2	69.7	56.3
Boynton Bell	Pepper Res.	1220	316	324	243	2103	59	72.5	73.4	78.5	65.2
SPP 6112	Sakata	1251	286	319	215	2071	55	68.1	75.0	77.0	61.8
ACX 222	A&C	1158	208	482	210	2058	61.7	76.7	77.4	85.4	69.3
Enterprise	Asgrow	1277	286	362	112	2038	56.0	65.5	78.9	79.0	62.5
PR 9701R-4	Pepper Res.	1325	229	243	216	2013	52	67.6	74.6	76.8	59.1
Commandant	Rogers	1217	229	299	252	1997	50.8	57.7	67.4	79.3	57.6
Early Sunsation [‡]	Petoseed	1130	320	336	205	1990	56.8	70.9	71.1	75.4	63.4
Legionnaires, 6089	Rogers	1196	322	309	161	1989	54.6	66.5	71.7	81.6	61.4
RPP 6079	Rogers	1187	317	310	172	1986	56.3	67.5	59.1	79.2	60.8
PR 93-2-1	Pepper Res.	1307	273	205	176	1962	52.6	71.8	78.7	68.3	59.1
Paladin	Rogers	1234	180	304	224	1942	54.1	65.1	76.0	76.9	61.1
33706 [‡]	Enza	1167	311	324	135	1937	53.9	63.4	66.5	70.7	58.7
XPP 7121	Sakata	1161	212	288	275	1936	58.2	68.0	76.8	79.3	65.0
ACX 215	A & C	1124	220	365	218	1928	57.4	70.9	74.8	81.0	64.8
Lexington	Asgrow	1230	189	308	189	1917	56.1	63.2	74.0	73.1	61.3
Yorktown	Asgrow	1195	195	252	247	1889	56.7	73.8	72.4	78.2	63.1
ACX 209	A & C	1171	127	358	196	1853	54.6	69.7	74.5	79.7	62.4
PR 9701R-3	Pepper Res.	1128	243	293	174	1838	59.3	64.0	71.9	76.9	63.2
SPP 7118	Sakata	1206	195	188	228	1817	60.4	64.3	75.1	79.7	64.8
Brigadier	Rogers	1203	145	277	187	1812	55.4	71.2	74.3	72.9	61.2
Bravo	Enza	1212	134	300	152	1798	55.6	75.4	76.5	76.3	61.7
Ex 12273	Asgrow	1143	128	320	199	1791	60.8	72.4	75.7	78.5	66.4
SSweet 880	A & C	966	347	352	124	1788	69.2	80.2	78.9	89.9	74.5
X3R Wizard	Petoseed	1126	175	264	204	1770	50.8	65.2	64.9	73.5	56.9
PS 213896	Petoseed	1141	169	194	207	1712	60.3	67.8	77.0	81.0	65.3
X3R Aladdin [‡]	Petoseed	1001	285	258	148	1691	63.7	70.9	76.8	89.1	69.0
Ex 12274 [‡]	Asgrow	1154	191	200	120	1664	57.7	70.9	75.1	81.6	63.0
X3R Camelot	Petoseed	972	180	212	300	1664	60.6	69.1	74.5	81.8	66.8
PS 223796	Petoseed	1204	139	143	149	1636	56.9	64.5	66.2	74.5	60.0

[‡]Average of four replications. Single bed plots, 6' × 8'. Two rows per bed, 12 plants per row, 24 plants per bed, 21,780 plants/A (eight inch within-row spacing). Transplanted 25 Nov. 1998 (transplants grown by LaBelle Plant World), 89 days to first pick.

[†]Green to yellow.

Results and Discussion

Green Fruit

Varieties are listed in order of total yield for green fruit (Tables 2, 3, 4, 5, and 6). For most of the columns of data, values for the top ten varieties are in **bold face**. Desirable characteristics include high yields, large fruit (low numbers of fruit/carton), ratio of length to width near 1.00 (blocky), a high percentage of 3 and 4 lobed fruit with the average number of lobes near 4.0, and a low percentage of blunt or pointed fruit. Fruit characteristics (length and width, number of lobes, and blunt or pointed fruit) were only evaluated for the first pick when fruit size is usually the largest. A low rating in any one of these areas could be a reason for not growing a variety.

Fall 1998, DuBois Farms (Tables 2 and 3). There were relatively small differences in yield between varieties with a range of 220 cartons/A for the top five varieties, a range of 68 car-

tons/A for varieties ranked 6-10, and a range of 52 cartons/A for varieties ranked 11-15. Five of the top ten yielding varieties were among the top ten in fruit size [Crusader (6110), Lafayette (5044, yellow), Orion, PR 9701R-4, and Commandant]. Of these five, Crusader and Lafayette were also among the top ten in blockiness, and lobe number. They rated high in the percentage of 3 & 4 lobed fruit (95%); all of the leading varieties in this category had 100% 3 & 4 lobed fruit. The top ten rated pepper varieties for blunted or pointed fruit had 0 to 5% while Crusader and Lafayette had 15% and 10%, respectively.

Fall 1999, Thomas Produce (Tables 4 and 5). There were relatively small differences in yield between varieties with a range of 107 cartons/A for the top five varieties, a range of 74 cartons/A for varieties ranked 6-10, and a range of 54 cartons/A for varieties ranked 11-15. Four of the top ten yielding varieties were among the top ten in fruit size (Enza 31702, Lafayette (5044, yellow), Rogers 6088, and PR 93-2-1). All of these four were considered blocky to slightly elongated except Lafayette

Table 4. Summary of yield and fruit characteristics for a bell pepper variety demonstration, Thomas Produce, Snake Farm, Bob West Road, Delray Beach, Florida, 1999-2000.^z

Variety	Seed source	B. spot race resistance	Number of 25-lb crtns/A		Number of fruit/crtn.	length × width (inches) ^y	Ratio l × w ^{y,x}	3 & 4 lobes (%) ^y	Avg. no. lobes ^y	Blunt pointed (%) ^{y,w}	Stip (%)
			First pick	Total							
Enza 31702	Enza	1,2,3	1526	1965 a	44.7	3.99 × 3.59	1.11	100	3.7	5	0
Orion	Enza	1,2,3	1390	1929 a-b	48.6	3.74 × 3.72	1.01	90	3.7	20	0
Lafayette ^v	Rogers	1,2,3	1476	1923 a-c	43.8	3.79 × 4.03	0.94	100	3.4	5	0
Crusader, 6110	Rogers	1,2,3	1398	1890 a-d	51.0	3.72 × 3.69	1.01	95	3.6	10	0
RPP 6088	Rogers	1,2,3	1430	1858 a-e	48.3	4.04 × 3.82	1.06	90	3.6	10	1
ACX 223	A & C	1,2,3	1326	1843 a-f	54.9	4.65 × 3.21	1.45	95	3.5	50	0
PR 93-2-1	Pepper Res.	2	1406	1825 a-g	45.9	3.89 × 3.88	1.00	100	3.7	15	0
Sentry	Rogers	1,2,3	1567	1819 a-g	48.6	3.38 × 3.77	0.90	100	3.5	0	0
Commandant	Rogers	1,2,3	1368	1785 a-h	51.9	4.26 × 3.43	1.24	100	3.5	15	0
ACX 217 ^v	A & C	1,2,3	1398	1769 a-i	49.1	3.89 × 3.76	1.03	100	3.3	5	0
Enza 31715	Enza	1,2,3	1457	1757 a-j	47.9	4.13 × 3.71	1.11	95	3.5	35	0
PR 99Y-4	Pepper Res.	1,2,3	1447	1721 a-k	49.5	4.00 × 3.53	1.13	85	3.9	10	0
Lexington	Pepper Res.	1,2,3	1413	1713 a-k	49.4	3.55 × 3.62	0.98	100	3.6	0	0
PR 99R-1A	Pepper Res.	1,2,3	1407	1707 a-k	49.2	4.34 × 3.54	1.23	100	3.2	10	0
Diego	Enza	1,2,3	1378	1703 a-k	49.0	3.66 × 3.54	1.03	100	3.2	30	0
Legionnaires,6089	Rogers	1,2,3	1264	1701 a-k	48.7	3.87 × 3.79	1.02	100	3.5	5	0
PR 99Y-3	Pepper Res.	1,2,3	1257	1694 a-k	47.8	4.30 × 3.82	1.13	95	3.2	5	0
Boynton Bell	Pepper Res.	1,2,3	1232	1674 b-k	53.5	3.83 × 3.45	1.11	90	3.4	40	0
PR 9701R-4	Pepper Res.	1,2,3	1274	1674 b-k	50.2	3.86 × 3.67	1.05	90	3.4	15	0
Bennington, 2670168	Asgrow	1,2,3	1421	1669 b-k	48.3	3.63 × 3.40	1.07	95	3.5	30	0
Early Sunsation ^v	Petoseed	1,2,3	1249	1658 b-k	52.3	3.63 × 3.57	1.02	95	3.9	0	0
Ex 12293	Asgrow	1,2,3	1304	1644 c-l	51.1	3.95 × 3.41	1.16	85	2.9	35	0
ACX 209	A & C	1,2,3	1282	1640 d-l	54.2	3.81 × 3.40	1.12	100	3.5	5	0
ACX 228	A & C	1,2,3	1131	1620 d-m	51.5	4.05 × 3.76	1.08	95	3.2	50	0
Yorktown	Asgrow	1,2,3	1291	1612 d-m	51.7	3.93 × 3.43	1.15	90	3.1	0	0
XPP 8124	Sakata	1,2,3	1316	1603 e-m	51.0	3.69 × 3.57	1.04	95	3.5	5	0
X3R Wizard	Petoseed	1,2,3	1321	1586 e-m	47.2	4.09 × 3.49	1.17	90	3.5	30	2
Defiance, 12292	Asgrow	1,2,3	1358	1581 e-m	47.9	3.83 × 3.54	1.08	90	3.2	30	0
Enza 33702 ^v	Enza	1,2,3	1100	1569 f-m	56.1	3.89 × 3.38	1.15	100	3.5	5	0
Ss 830	A & C	1,2,3	1223	1567 f-m	58.1	3.86 × 3.41	1.13	95	3.3	10	0
X3R Aladdin ^v	Petoseed	1,2,3	1343	1560 g-m	49.0	3.90 × 3.58	1.09	90	3.7	0	0
Paladin	Rogers	—	1372	1539 h-m	47.5	4.01 × 3.76	1.07	100	3.3	0	23
PR 99R-7	Pepper Res.	1,2,3	1227	1507 h-m	51.4	3.85 × 3.54	1.09	100	3.5	0	0
Brigadier	Rogers	1,2,3	1321	1504 i-m	50.8	3.70 × 3.67	1.01	90	3.7	5	0
Enterprise	Asgrow	1,2,3	1222	1478 j-m	51.4	3.53 × 3.79	0.93	100	3.3	0	0
SPP6112	Sakata	1,2,3	1270	1477 k-m	50.0	3.89 × 3.50	1.11	95	3.6	10	0
PR 9701R-3	Pepper Res.	1,2,3	1138	1468 k-m	52.1	3.88 × 3.27	1.16	95	3.3	25	0
X3R Chalice ^v	Petoseed	1,2,3	1252	1460 k-m	53.5	3.95 × 3.88	1.02	100	3.4	0	0
XPP 8125	Sakata	1,2,3	1218	1444 k-m	55.2	4.05 × 3.37	1.20	95	3.3	0	0
X3R Camelot	Petoseed	1,2,3	1223	1388 lm	53.9	4.13 × 3.42	1.20	90	3.3	15	3
SPP 7118	Sakata	1,2,3	1255	1353 m	45.1	3.87 × 3.59	1.08	95	3.2	0	2
X3R Sir Galahad	Petoseed	1,2,3	1181	1353 m	52.4	4.00 × 3.43	1.17	100	3.5	20	0
X3R Red Knight	Petoseed	1,2,3	963	1024 n	59.1	3.80 × 3.37	1.13	95	3.7	5	0

^zAverage of four replications. Single bed plots, 5' × 9'. Two rows per bed, 12 plants per row, 24 plants per bed, 23, 231 plants/A (nine inch within-row spacing). Transplanted 26 Oct. 1999 (transplants grown by LaBelle Plant World), 92 days to first pick.

^yAverage of 20 fruits, 10 each from blocks 1 & 2, first pick, 26 Jan. 2000.

^xScale: 1.00 = blocky, width same as length. >1.00 = degree of elongation, length greater than width. <1.00 = degree of flatness, length less than width. ^w Flat or pointed at blossom end with very little indentation of lobes.

^vMean separation by Waller-Duncan K-ratio T test, 5% level, means with the same letter are not significantly different.

^vGreen to yellow.

which was slightly flattened (length to width ratio 0.94). Each of these four had 100% 3 & 4 lobed fruit except Rogers 6088 which had 90%. Five of the top 10 yielding varieties were con-

sidered very blocky (length to width ratio 0.95 to 1.10): Orion, Crusader, Rogers 6088, PR 93-2-1, and ACX 217. There were 11 varieties which had no blunt or pointed fruit at the blossom

Table 5. Pepper yield for a variety demonstration, Thomas Produce, Snake Farm, Bob West Road, Delray Beach, Florida, 1999-2000.^a

Variety	Seed Source	Number of 25-lb crtns/A				% plant stand (first pick)	Number of fruit/crtm (25 lbs)				% defoliation (bact. spot) ^y	Fruit per plant ^x	% of rows with healthy plants
		Pick #1 Jan 26	Pick #2 Feb 16	Pick #3 Mar 9	Total		Pick #1 Jan 26	Pick #2 Feb 16	Pick #3 Mar 9	Avg			
Enza 31702	Enza	1526	193	246	1965	97	40.3	53.9	64.8	44.7	3.8 bc	3.90 a-d	75
Orion	Enza	1390	364	174	1929	99	44.7	57.2	61.2	48.6	6.4 a	4.10 a-c	62.5
Lafayette ^w	Rogers	1476	273	174	1923	95	37.7	63.8	64.1	43.8	2.2 c-h	3.82 a-f	75
Crusader, 6110	Rogers	1398	331	160	1890	98	47.1	59.9	66.4	51.0	2.8 b-h	4.23 ab	75
RPP 6088	Rogers	1430	258	170	1858	93	44.5	60.1	62.5	48.3	2.1 c-h	4.23 ab	50
ACX 223	A & C	1326	368	149	1843	98	50.6	63.7	71.6	54.9	1.5 e-h	4.45 a	62.5
PR 93-2-1	P Res.	1406	221	198	1825	93	41.7	55.7	64.8	45.9	2.1 c-h	3.89 a-e	75
Sentry	Rogers	1567	119	132	1819	98	45.1	67.0	73.1	48.6	1.7 d-h	3.88 a-e	62.5
Commandant	Rogers	1368	216	201	1785	98	47.2	62.7	72.1	51.9	2.3 c-h	4.07 a-c	50
ACX 217 ^w	A & C	1398	170	202	1769	99	45.0	59.9	68.3	49.1	2.2 c-h	3.78 a-f	50
Enza 31715	Enza	1457	178	122	1757	100	44.5	57.2	75.4	47.9	3.3 b-e	3.63 b-g	75
PR 99Y-4	P Res.	1447	164	110	1721	97	46.3	63.4	70.6	49.5	1.2 f-h	3.78 a-f	62.5
Lexington	Asgrow	1413	141	159	1713	97	45.9	63.4	68.4	49.4	2.1 c-h	3.79 a-f	50
PR 99R-1A	P Res.	1407	208	93	1707	99	47.1	53.6	70.5	49.2	1.6 e-h	3.65 b-g	50
Diego	Enza	1378	297	29	1703	96	46.4	59.5	67.1	49.0	1.9 c-h	3.75 a-f	75
Legionnaires, 6089	Rogers	1264	324	113	1701	96	44.2	59.0	68.3	48.7	2.3 c-h	3.72 a-f	62.5
PR 99Y-3	P Res.	1257	220	217	1694	92	41.8	61.5	69.2	47.8	1.7 e-h	3.81 a-f	62.5
Boynton Bell	P Res.	1232	283	158	1674	98	48.7	62.4	74.8	53.5	2.9 b-g	3.94 a-d	62.5
PR 9701R-4	P Res.	1274	184	216	1674	96	46.5	59.1	63.9	50.2	2.8 b-h	3.77 a-f	50
Bennington, 2670168	Asgrow	1421	199	49	1669	95	45.0	65.7	73.7	48.3	2.8 b-h	3.66 b-f	62.5
Early Sunsation ^w	Peto	1249	208	202	1658	97	47.5	67.6	66.0	52.3	2.0 c-h	3.88 a-e	50
Ex 12293	Asgrow	1304	218	121	1644	94	46.6	66.5	71.8	51.1	2.1 c-h	3.90 a-d	62.5
ACX 209	A & C	1282	199	159	1640	99	49.8	68.2	71.6	54.2	2.3 c-h	3.89 a-e	62.5
ACX 228	A & C	1131	308	181	1620	99	45.8	61.3	70.8	51.5	2.4 c-h	3.63 b-g	62.5
Yorktown	Asgrow	1291	242	79	1612	98	48.8	62.9	64.5	51.7	1.4 e-h	3.71 a-f	75
XPP 8124	Sakata	1316	243	45	1603	100	48.6	61.8	60.6	51.0	1.2 f-h	3.52 b-g	50
X3R Wizard	Peto	1321	179	86	1586	95	44.3	58.2	67.2	47.2	4.8 ab	3.40 c-g	50
Defiance, 12292	Asgrow	1358	144	79	1581	93	45.1	62.1	70.3	47.9	2.0 c-h	3.52 b-g	75
Enza 33702 ^w	Enza	1100	312	157	1569	97	50.2	68.2	73.8	56.1	2.4 c-h	3.91 a-d	75
Ss 830	A & C	1223	250	93	1567	99	53.6	72.6	77.7	58.1	2.1 c-h	3.96 a-d	62.5
X3R Aladdin ^w	Peto	1343	163	55	1560	95	46.7	62.5	66.4	49.0	1.4 e-h	3.47 c-g	50
Paladin	Rogers	1372	135	33	1539	97	44.6	68.3	81.8	47.5	1.8 c-h	3.25 d-g	50
PR 99R-7	P Res.	1227	234	45	1507	98	49.1	61.0	64.4	51.4	1.9 c-h	3.40 c-g	62.5
Brigadier	Rogers	1321	86	97	1504	98	48.0	72.9	70.0	50.8	1.2 f-g	3.36 c-g	75
Enterprise	Asgrow	1222	194	62	1478	92	47.9	66.1	73.8	51.4	1.4 e-h	3.60 b-g	62.5
SPP6112	Sakata	1270	135	72	1477	92	46.9	66.4	74.2	50.0	1.4 e-h	3.48 b-g	75
PR 9701R-3	P Res.	1138	248	82	1468	97	48.7	62.5	67.6	52.1	3.2 b-f	3.40 c-g	75
X3R Chalice ^w	Peto	1252	169	39	1460	91	51.2	68.8	61.6	53.5	3.7 b-d	3.71 a-f	62.5
XPP 8125	Sakata	1218	181	45	1444	100	53.5	64.1	54.7	55.2	1.6 d-h	3.43 c-g	50
X3R Camelot	Peto	1223	132	34	1388	100	52.0	64.4	79.0	53.9	0.9 gh	3.22 d-g	50
SPP 7118	Sakata	1255	52	46	1353	85	43.7	66.9	59.5	45.1	1.5 e-h	3.09 fg	50
X3R Sir Galahad	Peto	1181	159	13	1353	97	51.2	59.5	72.5	52.4	2.4 c-h	3.15 e-g	50
X3R Red Knight	Peto	963	61	0	1024	90	57.8	79.9	—	59.1	0.7 h	2.91 g	75

^aAverage of four replications. Single bed plots, 5' × 9'. Two rows per bed, 12 plants per row, 24 plants per bed, 23,231 plants/A (nine inch within-row spacing). Transplanted 26 Oct. 1999 (transplants grown by LaBelle Plant World), 92 days to first pick.

^yPlants evaluated 27 Jan. 2000, one day after first pick, by K. Pernezny, J. Collins, A. Carroll, and K. Shuler. Mean separation by Waller-Duncan K-ratio T test, 5% level, means with the same letter are not significantly different.

^xMean separation by Waller-Duncan K-ratio T test, 5% level, means with the same letter are not significantly different.

^wGreen to yellow.

Table 6. Summary of yield and fruit characteristics for two bell pepper variety demonstrations, DuBois Farm and Thomas Produce, Delray Beach, Florida, 1998-2000.^a

Variety	Seed source	B. spot race resistance	Number of 25-lb/crtns/A		No. Fruit/25- lb carton	No. Fruit/ plant	Plant height (in.) ^y	Length × width (inches) ^x	Ratio l × w ^{x,w}	3 & 4 lobes (%) ^z	Avg. no. lobes	Blunt/ pointed (%) ^{x,y}
			First pick	Total								
Crusader, 6110	Rogers	1,2,3	1366	2091	54.8	5.2	21.2	3.70 × 3.65	1.02	95	3.65	12.5
Lafayette, 5044 ^a	Rogers	1,2,3	1408	2086	49.5	4.8	20.2	3.78 × 3.88	0.98	98	3.55	7.5
Orion	Enza	1,2,3	1332	2065	52.5	4.9	21.0	3.61 × 3.70	0.98	83	3.9	10.0
PR 93-2-1	Pepper Res.	2	1357	1894	52.5	4.7	20.4	3.76 × 3.74	1.01	100	3.75	7.5
Commandant	Rogers	1,2,3	1293	1891	54.8	4.7	22.2	4.31 × 3.41	1.27	98	3.45	22.5
Boynton Bell	Pepper Res.	1,2,3	1226	1889	59.4	5.1	17.8	3.80 × 3.36	1.13	93	3.3	37.5
Legionnaires, 6089	Rogers	1,2,3	1230	1845	55.1	4.7	21.2	3.77 × 3.64	1.04	100	3.60	5.0
PR 9701R-4	Pepper Res.	1,2,3	1300	1844	54.7	4.7	19.4	3.78 × 3.53	1.07	93	3.50	15.0
Early Sunsation ^a	Petoseed	1,2,3	1190	1824	57.9	4.9	20.0	3.54 × 3.50	1.01	98	3.75	0
Lexington	Asgrow	1,2,3	1322	1815	55.4	4.6	21.0	3.47 × 3.55	0.98	98	3.50	5.0
SSP 6112	Sakata	1,2,3	1261	1774	55.9	4.7	19.8	3.80 × 3.42	1.11	95	3.55	5.0
Enterprise	Asgrow	1,2,3	1250	1758	57.0	4.8	20.6	3.49 × 3.65	0.96	93	3.35	2.5
Yorktown	Asgrow	1,2,3	1243	1751	57.4	4.6	18.2	3.88 × 3.39	1.15	93	3.15	7.5
ACX 209	A & C	1,2,3	1227	1747	58.3	4.8	20.4	3.87 × 3.46	1.12	98	3.50	5.0
Paladin	Rogers	—	1303	1741	54.3	4.4	19.0	3.91 × 3.67	1.07	100	3.45	5.0
X3R Wizard	Petoseed	1,2,3	1224	1678	52.1	4.0	18.4	3.97 × 3.44	1.15	90	3.55	30.0
Brigadier	Rogers	1,2,3	1262	1658	56.0	4.3	18.2	3.71 × 3.54	1.05	95	3.70	2.5
PR 9701R-3	Pepper Res.	1,2,3	1133	1653	57.7	4.5	16.8	3.81 × 3.28	1.15	93	3.30	30.0
X3R Aladdin ^a	Petoseed	1,2,3	1172	1626	59.0	4.4	21.8	3.69 × 3.44	1.08	85	3.75	2.5
SPP 7118	Sakata	1,2,3	1231	1585	55.0	4.3	20.0	3.73 × 3.44	1.09	98	3.40	0
X3R Camelot	Petoseed	1,2,3	1098	1526	60.4	4.2	18.8	4.03 × 3.34	1.21	95	3.40	12.5

^aAverage of four replications. Single bed plots. Two rows per bed, 12 plants per row, 24 plants per bed. Transplants grown by LaBelle Plant World). DuBois Farms 1998-99: Plots 6' × 8', 21,780 plants/A (eight inch within-row spacing). Transplanted 25 Nov. 1998, 89 days to first pick. Totals of four harvests, 22 Feb.-3 May. Thomas Produce 1999-2000: Plots, 5' × 9', 23,231 plants/A (nine inch within-row spacing). Transplanted 26 Oct. 26 1999, 92 days to first pick. Totals of three harvests, 26 Jan.-9 Mar.

^yPlants measured 19 Feb. 1999 (three days before first harvest). Measured from the top of the bed to the average top of the plants. Average of five replications.

^xAverage of 20 fruits, 10 each from two blocks at first pick: DuBois Farms: 22 Feb. 1999, Thomas Produce: 26 Jan. 2000.

^zScale: 1.00 = blocky, width same as length. >1.00 = degree of elongation, length greater than width. <1.00 = degree of flatness, length less than width.

^zFlat or pointed at blossom end with very little indentation of lobes.

^aGreen to yellow.

end; only one of these varieties was among the top 10 in yield, Sentry. Three of the top 10 yielding varieties had only 5% blunt or pointed fruit at the blossom end.

Average of Fall 1998 and Fall 1999 (Table 6). There were 21 varieties which were planted in both demonstrations. There was a 200 carton/A difference in yield between the top five varieties, a range of 74 cartons/A for varieties ranked 6-10, and a range of 33 cartons/A for varieties ranked 11-15. Seven of the top ten yielding varieties were among the top ten in fruit size [Crusader (6110), Lafayette (5044, yellow), Orion, PR 93-2-1, Commandant, Legionnaires (6089), and PR 9701R-4]. All of these seven were considered blocky to slightly elongated, except Commandant which was very elongated (length to width ratio 1.27). Of the seven, all had 90% or higher with 3 & 4 lobed fruit except Orion which had 83%. Four of the seven had 10% or less with blunted or pointed fruit at the blossom end: Lafayette, Orion, PR 93-2-1, and Legionnaires (6089). Commandant had 22.5% blunted or pointed fruit at the blossom end while PR 9701R-4 had 15%.

Colored Fruit

For colored fruit, varieties are listed in order of "fully colored marketable yield" (Table 7). Fruit with soft, wrinkled

sides were considered culls. If first pick had been earlier and if fruit had been picked more often, there would have been less fruit with soft sides. The relatively high percentage of fruit with soft sides for some varieties would be an indication of advanced maturity. Fruit which were picked were considered to be in some stage of color development on approximately 67% of their surface. It is not known how quickly or completely these fruit would have turned to full color.

In the Fall 1998 demonstration, a grower selected four varieties at first pick as being especially desirable for red fruit [Sakata 6112, Crusader (6110), Legionnaires (6089), and Lexington]. Of these four, when averaged over the two demonstrations, Sakata 6112 and Lexington had the highest yields of "fully colored marketable" fruit. Crusader, however, had the highest percentage of sunburned fruit (8.6%) among all varieties. In the Fall 1999 demonstration, the primary cause for culls was fruit with soft or wrinkled sides. This may indicate that fruit were over mature when picked. If fruit had been picked earlier there would have probably have been less loss to this problem. Stip was only found in four of the 21 varieties (Paladin, X3R Camelot, X3R Wizard, and Sakata 7118). Paladin had the largest number of fruit with stip with 23.2%. The severity of stip was very light to light and it was judged that many of the fruit would have been marketable.

Table 7. Colored fruit (red/yellow), summary of yield and fruit characteristics for two bell pepper variety demonstrations, DuBois Farm and Thomas Produce, Delray Beach, Florida, 1998-2000.^z

Variety	Fully colored fruit (% of total harvest) ^y	Marketable fruit (% of total harvest) ^x	Percent of total that were fully colored and marketable	Marketable yield (25-lb crtn/a)		Culls (percent)							Total (without stip)
				Total ^x	Fully colored	Fruit per 25-lb carton	Soft sides	Sun burn	Flat & mis-shapen	Soft rot	Age cracks	Stip	
SPP 6112	68	87	59	1034	711	47.7	8.8	1.0	1.5	1.0	1.0	0	13.1
Lexington	69	81	56	1077	707	49.5	15.7	2.0	1.0	1.0	0	0	19.1
ACX 209	59	85	50	1039	603	48.2	12.6	0	1.1	1.6	0	0	15.2
Enterprise	62	84	51	884	539	47.1	12.8	0	3.3	1.0	0	0	16.5
Lafayette, 5044 ^w	65	73	48	776	505	45.1	20.2	3.9	3.6	0	0	0	26.1
Yorktown	58	78	43	872	498	47.0	19.5	1.0	0	1.5	1.0	0	22.0
SPP 7118	56	71	38	906	427	43.9	18.2	1.7	7.3	2.3	0	1.0	28.9
PR 9701R-4	69	79	56	658	421	43.7	15.5	4.6	0	2.0	1.0	0	22.1
Brigadier	60	74	44	686	413	48.3	20.0	2.4	3.2	2.0	0	0	26.5
Crusader (6110)	54	77	41	882	409	42.4	13.5	8.6	0	0	0	0	23.0
Commandant	46	85	39	936	369	41.1	13.0	0	1.0	1.7	0	0	15.7
Legionnaires, 6089	53	82	45	698	330	44.4	17.1	0	1.6	0	0	0	19.7
PR 93-2-1	47	72	35	729	328	42.5	17.9	1.3	11.3	0	0	0	27.9
E. Sunsation ^w	63	69	45	517	311	50.3	28.4	0	1.0	2.0	0	0	30.9
Boynton Bell	39	79	34	733	301	49.8	13.5	6.2	1.0	0	0	0	20.7
Paladin	44	62	26	747	274	47.4	16.7	1.0	5.0	1.5	1.0	23.2	35.2
PR 9701R-3	46	71	32	626	253	47.2	21.4	0	2.2	0	5.0	0	28.1
Orion	35	84	31	979	219	39.5	11.5	1.0	0	2.0	0	0	16.6
X3R Wizard	24	69	19	654	143	42.1	26.0	2.3	0	1.3	0	1.0	30.5
Camelot	35	46	20	427	86	51.2	40.2	1.0	2.2	0	10.5	6.8	53.9
X3R Aladdin ^w	14	59	11	537	82	50.8	38.3	0	1.9	1.0	0	0	42.6

^zAverage of one block for each demonstration. Single bed plots. Two rows per bed, 12 plants per row, 24 plants per bed. Transplants grown by LaBelle Plant World). DuBois Farms 1998-99: Plots 6'×8', 21,780 plants/A (eight inch within-row spacing). Transplanted 25 Nov. 1998, 112 days to first colored pick on 17 Mar. Totals from two picks. Thomas Produce 1999-2000: Plots, 5'×9', 23,231 plants/A (nine inch within-row spacing). Transplanted 26 Oct. 1999, 105 days to first colored pick on 8 Feb. Totals from four picks.

^yRepresents all fully colored fruit (including unmarketable fully colored).

^xMarketable includes both fully colored and not fully colored.

^wMatured green to yellow.

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