2006
BELL PEPPER
VARIETY EVALUATION
TRIALS

In

San Joaquin County

University of California
Cooperative Extension
420 South Wilson Way
Stockton, CA 95205

2006 BELL PEPPER VARIETY EVALUATION TRIAL
In San Joaquin County

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California is the largest producer of bell peppers in the United States with 23,000 acres in production in 2005 (1). According to the 2005 Agricultural Report for San Joaquin County produced by the Agricultural Commissioner's Office, San Joaquin County had about 1,226 acres of all types of peppers (primarily bell peppers) for both fresh market and processing. That acreage is estimated to have increased slightly for the 2006 growing season. A look at the ten-year trend in pepper production in the County shows that acreage has steadily declined while crop value has remained about the same (Figure 1). Most of the production in this area occurs during midsummer into late fall.

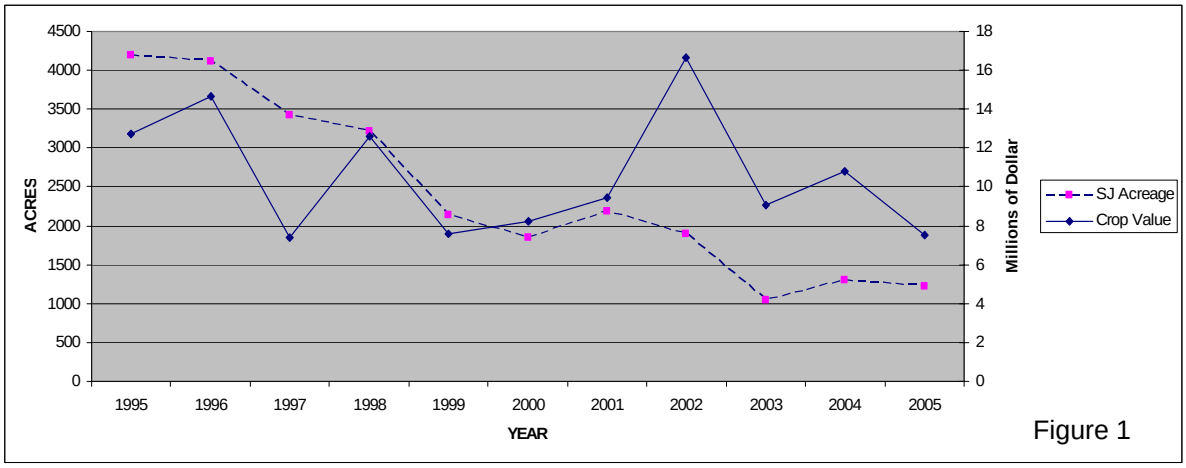


Figure 1

Being grown under short day, cool night conditions means that disease pressure is greater on our peppers here than in other drier locations. Drip irrigating is one way to help control disease establishment and spread under our growing conditions. Under furrow irrigated conditions it is important to closely monitor the field for the development of Phytophthora root rot, which can develop from over application of water; or powdery mildew, whose development is favored by humid conditions. With drip irrigation the aforementioned conditions are mitigated by precise application of water to the root zone. In our field this year we only noted minor insect damage and physiological disorders (stink bug stings and Pepper Spot).

Seed companies continue to test and release new pepper cultivars which address the issue of diseases such as Black Mold, Powdery Mildew, Phytophthora, certain viruses, and physiological disorders such as Pepper Spot and Blossom end rot. The requirement for varieties that have high yield potential and possess excellent horticultural characteristics is essential to the continued economic health of the pepper industry. All the bell pepper varieties in this year's trial contained virus resistance to at least one, and in some cases several, virus(es). Even some of the specialty peppers have incorporated certain virus resistance.

The complex of virus diseases (cucumber mosaic, pepper mottle, tobacco etch, potato virus Y, ring spot, and/or tobacco mosaic virus) that have plagued this area for the past 15+ years and that led to many growers abandoning pepper production have not been bad since 1996. There is no evidence as to whether this is due to lower virus pressure, the planting of more virus-resistant varieties or the fact that the few pepper fields that remain are isolated from viral vectors. But perhaps the reduction in viral problems will stimulate a resurgence in cultivating peppers.

We welcomed back Larry Togninali into pepper production this year and established our trial at Togninali Farms near Hwy 4 and Jack Tone Road, east of Stockton, California. This year's trial sought to look at yield and fruit quality of a number of established and new bell pepper lines from commercial seed company breeders. Additionally, an observational trial of sixteen specialty sweet peppers was included to provide small, specialty pepper growers with some comparative information.

The trial was transplanted on May 8th and the field variety was Baron. The soil type at the trial site was a Stockton adobe clay and the trial field was drip irrigated throughout the season. The resulting crop stand was excellent with vigorous plant growth. An extended and very cool, wet spring caused late planting of early crops, and a subsequent heat wave in early May and again in July caused some loss of fruit set and a delay in fruit maturity. The trial contained fifteen replicated varieties on a randomized complete block and fifteen non-replicated, observational varieties. Hand harvest of the trail was on August 15, 2006, which may have been too early for some of the specialty peppers to put on the maximum amount of colored fruit, as their maturity dates varied widely. In addition to marketable red and green yield figures for bell peppers and colored and immature yield figures for specialty peppers, data on crop maturity, fruit size and wall thickness were taken. In the trial, highest yield of red plus green marketable fruit was achieved by Syngenta's RPP 9661, followed by Double Up, Baron and RPP 9650 (now called Cyprus). Best quality fruit, including blocky shape, and good fruit color and size (Extra-large to Large) was led by RPP 9650. RPP 9661 and Sakata's SPP 1103 also showed well in both size categories. Those peppers that prolifically produced Large fruits, but were lagging in Extra-large fruit production were Baron, Wizard, Excel, Affinity, Harris Moran's HMX 5634 and Seminis' PX9930413. Fruit size for most of the lines evaluated was predominately Extra-large and Large. There was a fair amount of fruit sunburn and some blossom end rot, but very little cat-faced fruit. There was virtually no worm damage in the trial, but stink bug damage was present. Very little of the fruit from any of the cultivars had Pepper Spot (STIP). **Table 3** contains complete data for the trial on marketable yield, fruit maturity at harvest, fruit size and fruit wall thickness. Graphs accompanying the table follow.

ACKNOWLEDGEMENTS

Many thanks and a great deal of appreciation are expressed to Larry Togninali (Togninali Farms) for an excellent job of crop management in a very difficult growing season. His help and cooperation in the conduct and maintenance of the variety trial was invaluable. Also much appreciation is extended to Todd and Grant Craven of Craven Transplants near Crows Landing, California, for the excellent quality transplants of all varieties provided for the variety trial. Thanks also to Lockehart Seeds Inc. and Sakata Seeds for providing the raw materials and/or monetary assistance to support the bell pepper variety evaluation program in San Joaquin County. Seeds for the observational trial were obtained from Tomato Growers Supply Company at www.tomatogrowers.com.

Table 1. BELL PEPPER VARIETIES

2006 BELL PEPPER VARIETY TRIAL

SEED LIST

Replicated Varieties		Seed Company
Affinity Encore	RPP 9650 RPP 9661 RPP 16900	Syngenta Seed (Rogers Brand)
Double Up Excel	XPP 2025 (Red Bull) SPP 1103	Sakata Seed America, Inc.
Wizard Baron	PX993042 PX9930413	Seminis Seeds
HMX 5634 HMX 5633		Harris Moran

Table 2. OBSERVATIONAL VARIETIES

Early Sunsation	Blocky, green to golden-yellow
Tawny Port	Blocky, brown
Purple Beauty	Blocky, ripe from green to purple
Vidi	Elongated bell, deep red when ripe, thin-walled
Golden Marconi	Tapered and yellow to 12 inches long
Lafayette	Blocky, green to yellow
Giant Marconi	Big, Italian sweet
Golden Calwonder	Blocky, golden yellow
Hershey	Blocky, ripe from green to deep brown
Chocolate Beauty	Blocky dark brown; mature from green to brown; med-lg
Corno Verde	Thick-walled, 6-8+ inches long; Anaheim-looking
Giant Aconcaqua	Tapered fruit to 12 inches long; thinner-walled than Corno Verde
Tequila	Blocky, lavender to yellow to orange to red
Purple Belle	Blocky, green to purple to red at maturity
Valencia	Blocky, pumpkin orange

Table 3. Yield, maturity, fruit size percent and wall thickness for 15 bell pepper varieties – Farmington, CA 2006

		Marketable yield/ acre (red + green)		Crop maturity at harvest (%)[1]				Fruit size (%)[1 & 2]					Fruit wall thickness
	Variety	Tons[1]	Boxes	Red	Green	STIP	Culls	Jumbo	Extra-large	Large	Medium	Small	mm
1	RPP 9661	22.18	1774	6.5	61.9	0	31.6	25.9	33.2	32.7	8.2	0	6.0
2	Double Up	21.30	1704	13.1	57.5	0	29.4	25.1	22.3	32.9	14.8	4.9	6.3
3	Baron	20.75	1660	22.3	51.8	1.4	24.5	6.9	25.2	39.7	25.5	2.7	5.9
4	RPP 9650	20.59	1647	5.8	59.8	0	34.4	19.9	34.1	34.7	8.3	3.0	6.0
5	Wizard	20.12	1610	22.9	46.4	0	30.7	4.9	27.6	36.7	19.3	11.5	6.2
6	PX993042	20.12	1610	15.4	48.1	0	36.5	26.5	34.0	23.0	13.2	3.3	6.2
7	PX9930413	19.45	1556	10.0	51.4	0	38.6	20.1	26.8	40.7	9.9	2.5	6.3
8	Excel	18.69	1495	14.0	50.5	0	35.5	9.0	13.8	39.9	29.5	7.8	6.2
9	XPP 2025	18.18	1454	29.5	38	0	32.5	31.4	32.2	24.8	7.7	3.9	6.3
10	Encore	18.18	1454	4.4	52.3	0	43.3	48.1	27.9	18.3	5.7	0	5.7
11	RPP 16900	15.56	1245	13.1	53.8	0	33.1	10.1	14.4	30.2	30.3	15.0	6.2
12	Affinity	15.28	1222	15.9	49.7	0	34.4	19.0	15.6	35.0	20.2	10.2	6.0
13	HMX 5633	14.61	1169	10.9	58.6	0	30.5	15.3	8.0	28.5	30.3	17.9	6.0
14	HMX 5634	12.28	982	5.4	42.1	0	52.5	10.8	14.8	41.0	31.1	2.3	6.1
15	SPP 1103	10.93	874	1.2	39.9	0	58.9	13.1	32.7	34.7	12.8	6.7	6.3
	Average	17.88	1430										
	LSD[3]	6.83	546										
	C.V.	26.8%	26.8%										

[1]Values represent the average of four replications
[2]Average of four replications and five fruit randomly sampled per variety per replication
[3]Least significant difference at 5% significance level

Pepper fruit sizing data: Jumbo: >240g; Extra-large: 200 – 240g; Large: 170 – 200g; Medium: 150 – 170g; Small: <150g

Figure 1. Bell pepper varieties

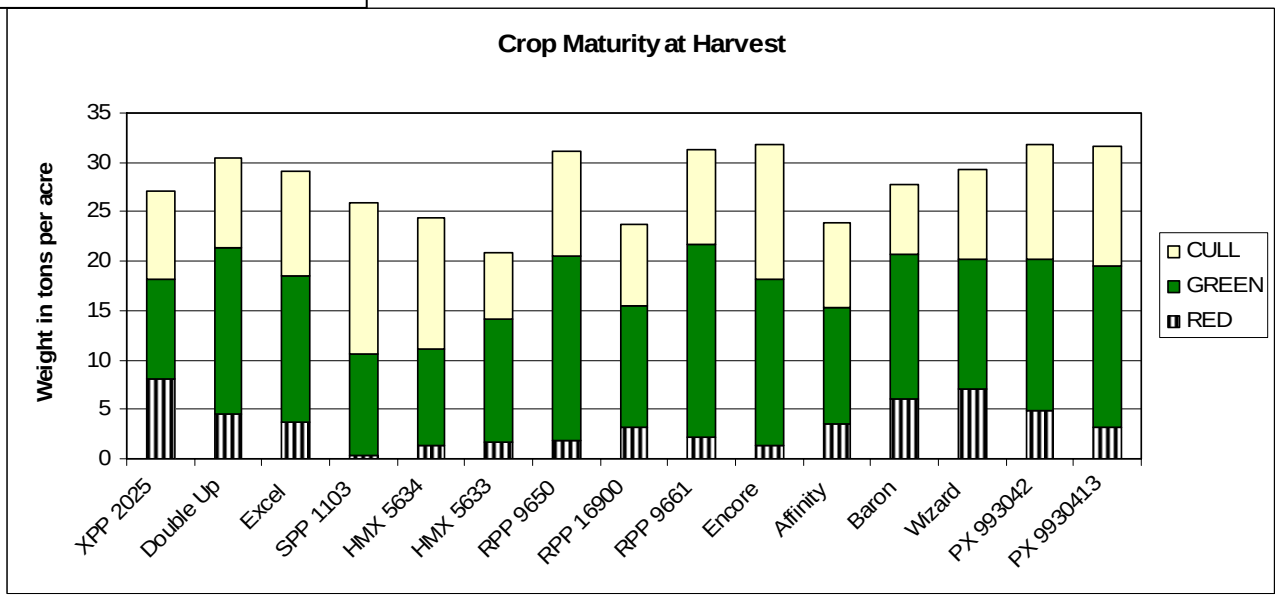


Figure 2. Saleable peppers, combined reds and greens

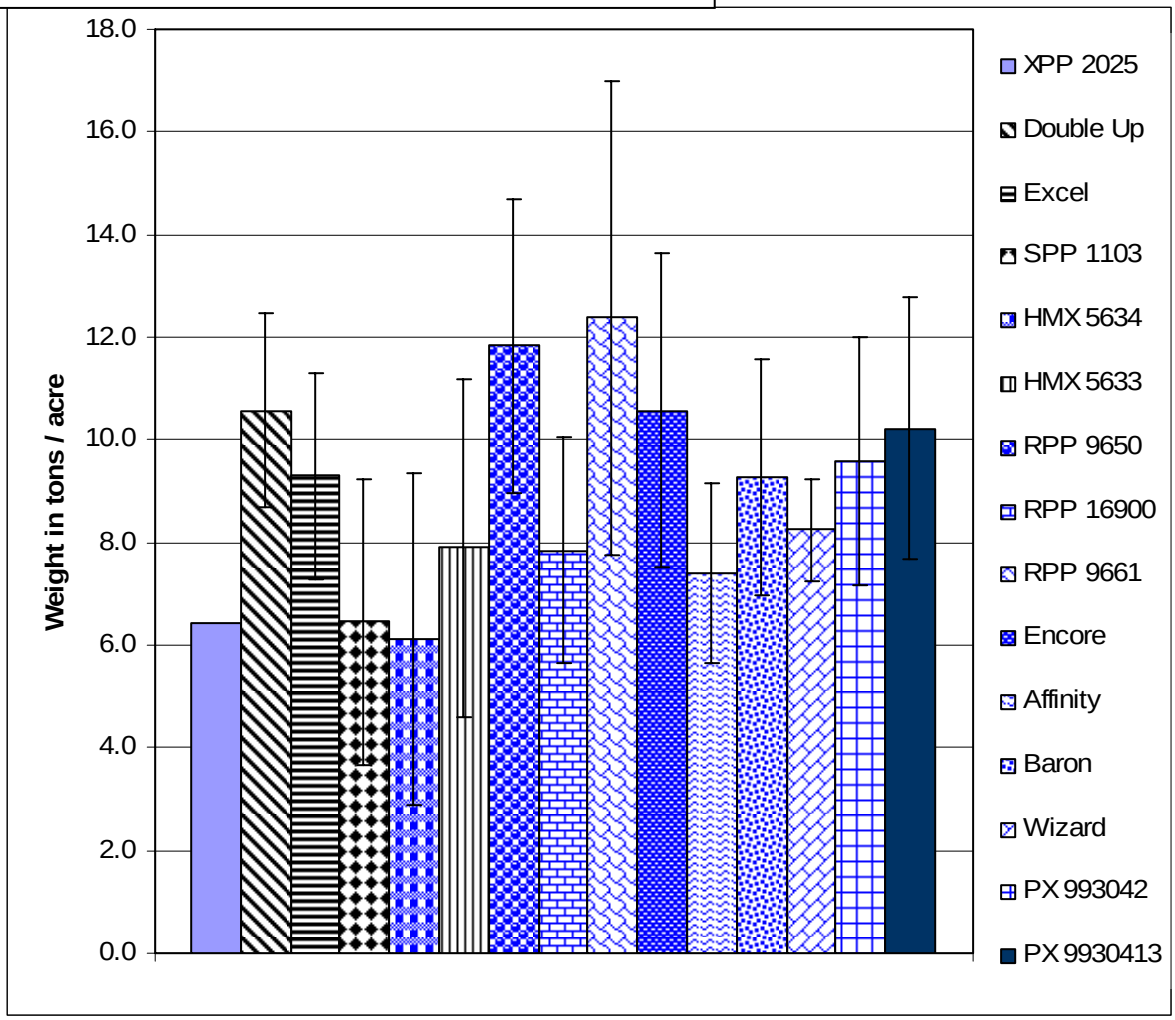


Figure 3. Specialty pepper yield by maturity class

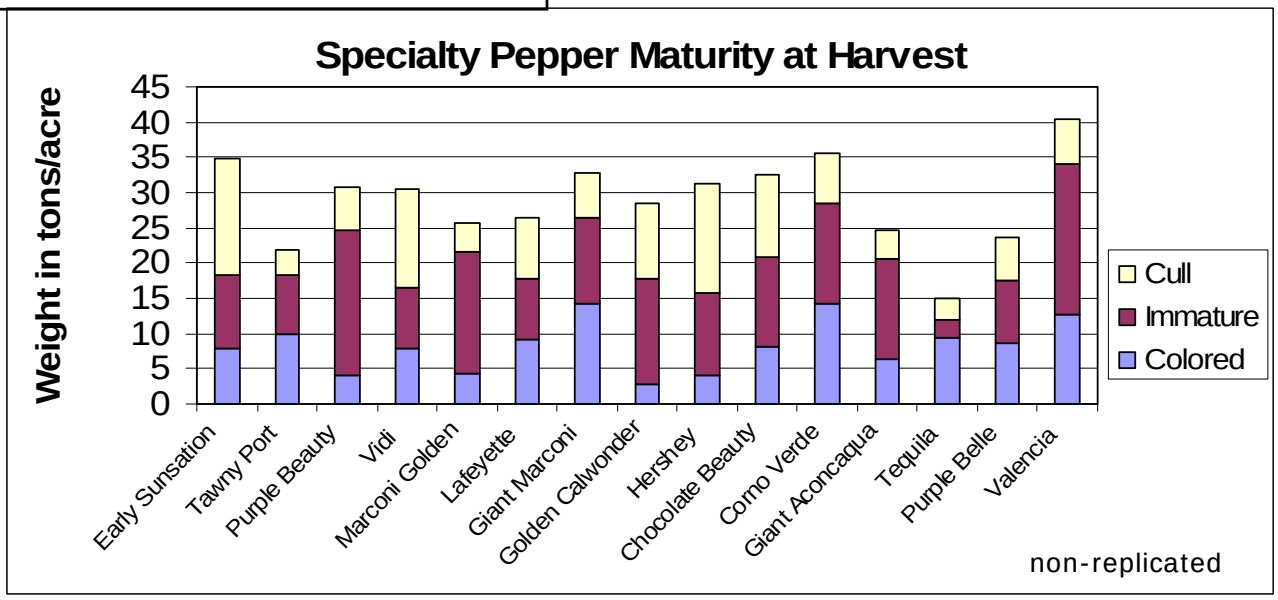


Table 4. Specialty pepper fruit size at maturity, percent of total fruit weight

			Fruit size (%)*				
	Type	**Variety**	**Jumbo**	**Extra-large**	**Large**	**Medium**	**Small**
1	Bell	Early Sunsation	17.8	30.0	11.3	13.0	5.7
2	Bell	Tawny Port	0.0	0.0	0.0	23.5	51.7
3	Bell	Purple Beauty	0.0	17.4	35.7	17.8	1.7
4	Long	Vidi	37.0	17.0	3.9	9.6	7.4
5	Long	Golden Marconi	9.6	3.0	19.1	23.9	24.3
6	Bell	Lafayette	74.3	22.2	0.0	6.1	0.0
7	Long	Giant Marconi	27.8	27.4	12.2	9.1	0.0
8	Bell	Golden Calwonder	0.0	11.3	35.2	27.0	3.0
9	Bell	Hershey	8.3	13.0	21.7	14.8	12.6
10	Bell	Chocolate Beauty	23.0	24.3	37.4	16.1	4.3
11	Long	Corno Verde	25.2	28.7	14.3	5.2	4.3
12	Long	Giant Aconcagua	0.0	27.4	13.0	6.5	6.1
13	Bell	Tequila	0.0	7.4	37.4	27.0	3.5
14	Bell	Purle Belle	0.0	4.3	13.9	19.6	21.3
15	Bell	Valencia	0.0	17.4	31.7	23.5	3.5

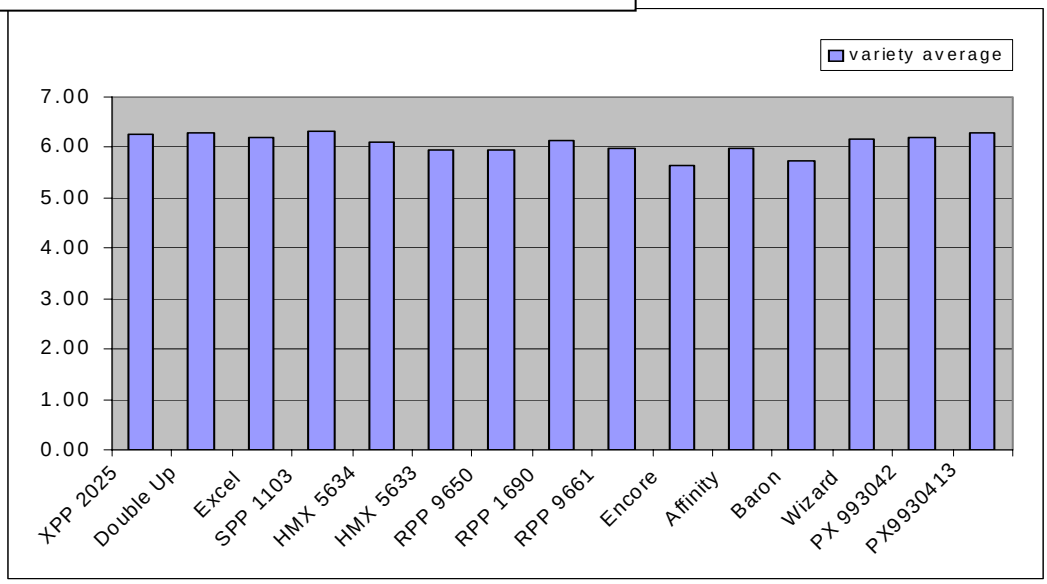
* non-replicated

Fruit sizing data:
All Long Types (except Giant Marconi) -
Jumbo 160g - 180 g
Extra Large 140g - 160g
Large 120g - 140g
Medium 100g - 120g
Small <100g

Giant Marconi-
Jumbo 200g - 220 g
Extra Large 180g - 200g
Large 160g - 180g
Medium 140g - 160g
Small <140g

Bell Types-
Jumbo 160g - 180 g
Extra Large 140g - 160g
Large 120g - 140g
Medium 100g - 120g
Small <100g

Figure 4. Wall thickness of bell peppers in mm



Wall thickness was measured in all bell and specialty peppers. There was no significant difference in wall thickness among any of the bell varieties, as seen in Figures 2. The specialty varieties Giant Marconi, Marconi Golden and Tawny Port had significantly(*) thinner walls than those of the remaining varieties. This is interesting because an anecdotal observation was that the specialty peppers Giant Marconi and Marconi Golden, and the bell types of Wizard, Baron and RP9650 seemed to be of the best quality for roasting; retaining firm meat and possessing skins which slipped easily. We hope to look further into this relationship in next year's trial.

Figure 5. Wall thickness of specialty peppers in mm