

## Response of Bell Pepper to Planting Date

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Yields of Iowa grown bell peppers are variable from year to year. On-farm transplant production has enabled growers to have more control over plant growing and planting. Most transplants are grown in peat-based growing media in containers (cells) of various sizes. Plants are set in the field as early as May 1st. Fall-sown cereal rye windbreaks are used to protect young plants from wind and wind-blown sand for early plantings. Most growers plant double staggered rows with plant populations ranging from approximately 10,000 to 14,000 plants per acre. Plastic mulch with drip irrigation is used to improve irrigation and fertilization management. Some growers are using an integrated crop management approach for nutrient, irrigation, and pest management. Improved postharvest handling practices include chlorination of wash water and cooling.

These intensive practices are associated with high costs. But an earlier and longer production season of high quality fruit has lowered the cost per package most years. The consistency during the season of large-sized fruit is an advantage.

Despite the high management culture system yields are erratic from year to year, mostly as a result of flower and flower bud drop. Pepper flower production and fruit set is susceptible to many factors, principal of which are: high temperature, drought stress, the presence of rapidly growing fruit on the plant, and disease and insect pests. Disease and insect pests can be controlled through integrated pest management practices. Drought and infrequent water stress can be overcome by timely irrigation practices - either drip or solid set sprinkler. High temperature effects can be reduced by using less-susceptible varieties identified for the growing region. There is also a possibility of reducing the high daytime plant canopy temperature by frequent, but short, overhead irrigations using low rates of water application. A larger problem in Iowa, than the high day temperatures, is the high night temperatures (>70 °F) that can occur during the middle of the growing season. The high temperature hastens the formation of the cell layer in the abscission zone. Combining high temperature and moisture stress further increases flower and fruit bud drop. Optimum average day temperature conditions seem to be 80 °F with a night temperature of 10 to 12 °F less. These conditions rarely exist in July. Even in a field experiment in New York State with 90/60 °F (day/night) many varieties suffered complete loss of flowers and buds.

A planting timing trial was established with eight bell type varieties at the Horticulture Station, Gilbert. The plants were grown with a synthetic soil mix in a large cell tray, 72-cells/flat, for 5 to 7-weeks. The transplants were set through black plastic mulch with a single line source drip irrigation system. Planting arrangement was twin rows on the 4-foot wide plastic, 14 inches apart, with plants spaced 18 inches in-row to give a

plant population of 9700 plants/acre. There were only 2 replications so this is considered an observational trial. The planting dates were; June 4, 22, and 29th.

Fruit was harvested at the mature green stage and graded into marketable US #1, or better, and unmarketable. Unmarketable was determined as misshaped, damaged, diseased, or sunscald. Fruit size and length/width ratio were determined for the marketable category.

### **Conclusions**

Variety performance from the June 4 and June 22 plant date is shown in Table 1. Yield is represented by 3 harvests (August 8, 17, and 27th) from the June 4 plant date and 2 harvests from the June 22 plant date (August 21 and 31st). The Lafayette variety was the best on both plant dates with Boynton Bell the least productive. The other 6 varieties were variable in yield performance depending on plant date. For example, from the June 22 planting RPP 6088, Brigadier, and Legionnaire yielded < 1/2 that of the June 4th planting. But, Commandant and Crusader were not greatly affected. Cull yield was not high, but it is worthy of note that Lafayette produced no cull fruit at any planting date.

The yield on the first harvest date gives an indication of relative earliness for that variety (Table 2). From planting to first harvest represented 65, 60, and 63 days for the June 4, June 22, and June 29 planting dates, respectively. From the June 4 plant date Lafayette and Brigadier produced the earliest fruit, while from the 2nd plant date Crusader, Lafayette, X3R Wizard, and Commandant were similar. From the 3rd plant date (June 29th) Brigadier clearly had the largest fruit production at the first harvest. Also, Crusader and Boynton Bell had no fruit by August 31st from the June 29th planting.

Fruit size also varied with planting date, particularly for Commandant, Crusader, and Boynton Bell (Table 3). Lafayette, RPP 6088, and X3R Wizard were consistent in appearance (similar L/D ratios) across planting dates, while Brigadier, Legionnaire, Commandant, and Boynton Bell tended to elongate.

**Table 1.** Bell pepper variety comparison from planting June 4 or June 22. Yield from 3 harvests from the June 4 plant date - August 8, 17, and 27th; and 2 harvests from the June 22 plant date - August 21 and 31.

Variety	Yield, bu/acre				Cull, %		Fruit Size, oz.		L/D Ratio
	Marketable		Total		June 4	June 22	June 4	June 22	June
	June 4	June 22	June 4	June 22	June 4	June 22	June 4	June 22	June
Lafayette	552	338	552	338	0	0	5.8	5.3	0.92
RPP 6088	489	154	489	158	0	2.5	5.9	5.4	0.96
Brigadier	420	152	432	152	2.7	0	5.8	5.4	1.00
Legionnaire	405	156	432	170	5.0	3.9	4.7	5.2	1.07
Commandant	402	298	423	310	6.3	8.2	4.9	5.8	1.29
Crusader	399	240	426	240	6.3	0	6.2	4.6	1.18
X3R Wizard	399	182	432	194	7.6	6.2	5.4	5.5	1.17
Boynton Bell	333	84	336	88	0.9	4.5	5.0	3.7	0.88

**Table 2.** Early fruit production by variety at the first harvest date from three planting dates. Marketable yield in bu/acre ( a bushel equals 28 pounds).

Variety	Planting Date		
	June 4 (harvest Aug. 8)	June 22 (harvest Aug. 21)	June 29 (harvest Aug. 31)
Lafayette	199	133	108
RPP 6088	92	72	54
Brigadier	139	92	170
Legionnaire	66	71	26
Commandant	33	131	76
Crusader	85	170	0
X3R Wizard	81	133	78
Boynton Bell	38	54	0

**Table 3.** Fruit size and appearance as affected by planting date.

<u>Variety</u>	----- June 4 -----			----- June 22 -----			<u>Fruit Size, oz.</u>	
	<u>Length</u>	<u>Width</u>	<u>Ratio</u>	<u>Length</u>	<u>Width</u>	<u>Ratio</u>	<u>June 4</u>	<u>June 22</u>
Lafayette	3.22	3.44	0.94	2.83	2.90	0.98	5.8	5.3
RPP 6088	3.04	2.94	1.03	2.96	2.82	1.05	5.9	5.4
Brigadier	3.15	3.12	1.01	3.22	2.88	1.12	5.8	5.4
Legionnaire	3.25	3.02	1.08	3.62	2.72	1.33	4.7	5.2
Commandant	3.63	2.79	1.30	3.58	2.61	1.37	4.9	5.8
Crusader	3.94	3.32	1.19	2.96	2.67	1.11	6.2	4.6
X3R Wizard	3.41	2.99	1.14	3.15	2.81	1.12	5.4	5.5
Boynton Bell	2.79	3.02	0.92	2.86	2.78	1.03	5.0	3.7

**Note:** L/D ratio is a measure of fruit shape. A value near 1.0 indicates blocky fruit, > 1.0 elongated fruit, and < 1.0 squatty fruit shape.