

Response of Bell Pepper to Planting Date Ames 2003

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This trial is a continuation of the experimentation at Ames and Muscatine begun in 2001 to find varieties and a cultural planting system that maintains a continuous supply of high quality sweet bell peppers throughout the growing season. The trial was begun at Ames in 2001 by evaluating 8 varieties at three different planting dates. A similar effort was started at Muscatine in 2002, and continued at both Muscatine and Ames in 2003 (see previous 2001 and 2002 research reports or go to the web site at: <http://www.hort.iastate.edu> and click on the 'commercial vegetables'). For results of this year's Muscatine trial refer to the report earlier in this publication.

The major limitation under our continental climate conditions is a variety that will perform consistently under variable stress conditions characterized by high daytime temperatures (> 93 °F) and short periods of drought. Water stress can be moderated by using a plasticulture system that utilizes plastic mulch and trickle irrigation. For the Ames 2003 trial we concentrated on the best four varieties from the 2002 Muscatine work and planted three times in May and June.

Materials and Methods

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, 16-inches apart, with plants spaced 12 inches in-row. Center to center of beds was 6 feet to give a plant population of 14,500 per acre. The planting dates were May 22, June 11, and June 26 and all varieties (Aristotle, Brigadier, Lafayette, Orion) were replicated 4 times at each planting date. The necessary P and K, according to soil test report, and 150 lbs N/acre were broadcast and rotovated in prior to laying the plastic mulch. No additional N was sidedressed. Soil moisture was maintained close to 25% depletion of available water by use of tensiometers at the 6 and 12-inch depth. Pest management practices were according to FG 600, Midwest Vegetable Production Guide. It should be noted that a virus outbreak occurred in late June-early July that reduced plant size and fruit formation with a few plants at random throughout the experimental area.

Fruit was harvested approximately every 10 days at the mature green stage when firm and of large size and graded into marketable US #1, or better, and unmarketable. Unmarketable was determined as misshaped, damaged, diseased, or sunscald. Most culls were the result of misshapen fruit and blossom end rot. Fruit size and length/width ratio were determined for the marketable category. For the May 22 planting date fruit were harvested 4 times on July 24, August 1, 11, and 21st. For the June 11th planting date the 5 harvest dates were: August 8, 18, 29, September 10 and 24th. For the last planting date of June 26, the 3 harvest dates were: August 29, September 10, and September 24.

Results

The 2003 growing season was ideal for vegetable production, dry and on the cool side. The exception was mid August when there was a stretch of 8 days with day time high temperatures > 93 °F.

The four varieties performed similarly across all three planting dates. But, as expected, there were differences among the planting dates mostly because of the number of harvests (Table 1). The 2nd planting, June 11, was the highest yielding because there were five harvests from that planting, as compared with four from May 22 planting and only three from the June 26th. Interestingly, the May 22 and June 26 plantings were equivalent in production. The 2nd planting five harvests averaged the largest sized fruit at 7.1 ounce each. Fruit size from the 3rd planting was 2 ounces smaller as the result of the high daytime temperatures from August 16 to August 28th.

Aristotle and Lafayette were the consistent producers throughout the growing season (Table 2, Fig. 1). Brigadier was similar to Aristotle and Lafayette but ended to produce more cull fruit reducing the marketable yield. Compared with the other three varieties, Orion significantly ($P < .05$) yielded less and produced a smaller fruit size. Orion performed similarly at the Muscatine location. Examination of the 1st harvest from each planting date (Jul 24, Aug 8, and Aug 29 for the planting dates of May 22, June 11, and June 26, respectively) would indicate the relative earliness of the varieties. However, there was no significant differences among the varieties for earliness this year. The May 23rd planting at Muscatine indicated Aristotle produced more early fruit than the other three varieties.

Lafayette fruit shape varied the least across the three planting dates, remaining mostly blocky (Table 3). Aristotle fruit were slightly elongated during the 1st planting, but became more so (increased elongation by 11%) for planting two and three. However, Brigadier was just the opposite, changing from mostly elongated at early harvests to blocky during harvests in late August and September. Orion was similar to Brigadier.

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Table 1. Bell pepper yield and fruit size comparison from three planting dates, May 22, June 11, and June 26, 2003, Horticulture Station, Ames, IA.

<u>Planting</u> ¹	<u>Marketable</u>	<u>Cull</u>	<u>Total</u>	<u>Fruit Size, oz.</u>
	----- bushels/acre ² -----			
May 22	693 B ³	103	796 B	6.2 B
June 11	952 A	139	1091 A	7.1 A
June 26	641 B	87	728 B	5.1 C

¹ Harvest for the planting dates: May 22 = Jul 24, Aug 1, 11, and 21; June 11 = Aug 8, 18, 29, Sep 10 and 24; June 26 = Aug 29, Sep 10, and 24.

² Bushels were 28 lbs each

³ Values with similar letters in a column are not significantly different from one another by the DMRT, 5% level.

Table 2. Bell pepper variety yield and fruit size comparison across the three planting dates. Horticulture Station, Ames, IA.

<u>Variety</u>	<u>Marketable</u>	<u>Cull</u>	<u>Total</u>	<u>Fruit Size, oz.</u>
	----- bushels/acre ¹ -----			
Aristotle	866 A ²	97	964 A	6.2 AB
Brigadier	735 BC	136	871 AB	6.6 A
Lafayette	779 AB	85	864 AB	6.1 AB
Orion	669 C	119	788 B	5.7 B

¹ Bushels were 28 lbs each

² Values with similar letters in a column are not significantly different from another by the DMRT, 5% level.

Table 3. Bell pepper variety change in fruit appearance over three planting dates, Horticulture Station, Ames, IA, 2003. 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.

<u>Variety</u>	<u>1st Planting, May 22</u>			<u>2nd Planting, June 11</u>			<u>3rd Planting, June 26</u>		
	<u>Lt.</u>	<u>Width</u>	<u>Ratio</u>	<u>Lt.</u>	<u>Width</u>	<u>Ratio</u>	<u>Lt.</u>	<u>Width</u>	<u>Ratio</u>
Aristotle	3.2	2.9	1.09	3.8	3.2	1.21	3.6	3.0	1.20
Brigadier	3.6	3.2	1.14	3.4	3.1	1.11	3.3	3.2	1.02
Lafayette	3.1	3.0	1.02	3.3	3.1	1.06	3.2	3.3	0.97
Orion	3.3	2.9	1.12	3.2	3.1	1.03	3.3	3.2	1.04

Fig. 1. Aristotle and Lafayette bell pepper production throughout the 2003 growing season as a result of multiple plantings using transplants, black plastic mulch, and trickle irrigation, Horticulture Station, Ames, IA, 2003. Harvest ended September 29th.

