

Single Row Versus Double Row Bell Pepper Yield and Quality Evaluation Demonstration

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Introduction

New Jersey ranks fifth in the nation for bell pepper production with 3,200 acres produced annually for a value of \$27,848,000 (NASS 2006). As a major vegetable crop in the state, producers are always looking for ways to maximize yield and quality of this commodity to improve farm economics. At the 2007 Rutgers New Jersey Agricultural Experiment Station Pepper Advisory Committee meeting farmers questioned the benefits of producing peppers on a double row raised bed system versus a single row raised bed system. Discussion took place about higher yields on a double row system. However, producers were concerned about reduced quality of pepper fruit when high plant populations were used in a double row system. It was uncertain if quality was reduced at closer spacings, therefore a research demonstration trial was planned for summer of 2007.

Materials and Methods

Two vegetable farms in Swedesboro, Gloucester County, New Jersey were identified in Spring of 2007 to conduct an evaluation of single row and double row field planted bell pepper. Both farms produced 'Aristotle' bell pepper and grew transplants on the farms in 72 count cell trays with Promix BX soilless mix. Farm 1 utilized single rows (SR) on raised beds with black plastic mulch and drip irrigation. The SR peppers were spaced 15 in. between plants in a row with rows spaced 5.5 ft. apart. Farm 2 planted peppers on a double row (DR) system with raised beds, black plastic mulch, and drip irrigation. The DR peppers were spaced 18 in. between plants in a row, 15 inches between rows on a bed and beds were at 5.5 ft. centers. Additionally, both farms used wooden stakes to stake peppers. Farm 1 tied plants only once and Farm 2 had 2 ties. Planting dates for Farm 1 and Farm 2 were both during the first week of May, 2 May and 3 May respectively. Water wheel transplanters with water only in the tank were used at both farms. Both farms used standard pest control and fertility practices as recommended by the 2007 Rutgers Commercial Vegetable Production Recommendations for New Jersey. Harvests began on 5 Jul with the last on 9 Sep with a total of 5 harvests per farm. Fruit were harvested every 2 weeks. Fruit were then graded for size and quality. Size categories were medium, large, extra large, and jumbo. Any fruit with shape or slight scarring defects were put into a commercial category. Fruit with any amount of insect damage, rot or excessive deformity or mechanical damage were classified as cull fruit. Green color ratings were taken using a subjective green color chart at each harvest. Additionally, fruit with silvering were counted and weighed.

Results and Discussion

DR peppers did have 7.4% higher marketable yields than did SR peppers. Total yields for DR peppers were 30.75% higher than SR peppers. Row culture did not seem to have any effect on reasons why fruit were classified as culls (see Table 2). Blossom end rot, insect damage,

sunburn, diseases and other fruit defects were similar in both row cultures. One difference in culled fruit occurred due to hail scars on Farm 2. The last harvest did contain fruit with Anthracnose spots. Anthracnose was a problem region wide during this time period. Additionally, row culture did not seem to have an effect on silvering (see Table 3).

Green color ratings showed no difference in intensity of green color of the fruit, except for the second harvest where DR fruit were less green than SR fruit, but findings were not strong enough to indicate major differences. This was most likely due to harvest of fruit from the most interior portions of the plant (in the second harvest) where sunlight is limited.

This one year study provides limited information and the research needs to be continued to find stronger conclusions on whether or not single row peppers have higher quality fruit than do double row peppers.

Table 1. Pepper yields.

	Marketable Box/Ac	Total Box/Ac
Farm 1	667.91	903.49
Farm 2	721.29	1304.53
	7.4% higher marketable yield with double row	30.75% higher total yield with double row

Table 2. Reasons for culled fruit and the percent of fruit within the culled category with specific defects

	Blossom End Rot	Insect Damage	Sun Burn	Disease	Other
Farm 1	38.28%	8.59%	25%	9.37%	18.76%
Farm 2	44.12%	4.27%	19.22%	8.18%	13.18% 11.03%- hail scars

Table 3. Percent silvering on individual harvest dates and total silvering.

	5 Jul	19 Jul	3 Aug	24 Aug	9 Sep	Total % Silvering
Farm 1	7.89%	11.51%	6.69%	48.53%	24.27%	20.88%
Farm 2	48.16%	34.48%	7.26%	10.98%	43.27%	20.62%