

High Tunnel Hybrid Tomato Variety Study using Organic Production Methods

West Florida Research and Education Center – Jay, FL



Table 1. Experimental Conditions

Experimental Design	RCBD (5 reps)
Irrigation	Driptape
Fumigation	None
Pruning	None
Row Direction	North - South
Planting Date	3/9/2015
Plot size	10 ft. 9 in. long
Plant Spacing	18 in. between plants
Bed Spacing	5 ft. apart
Bed Width	22 in. wide
Plant population per Acre	5,808
Plants Harvest per Plot	7
1st Harvest Date	5/12/2015
Planting to 15th Harvest	7 weeks

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Six varieties of hybrid tomatoes were grown with five replications in a high tunnel system on plasticulture with fertigation. Our goal was to produce these tomatoes using organic methods; all products used were OMRI (Organic Material Review Institute) approved. Organic pre-plant fertilizer was applied in an amount estimated to provide 80% of crop needs (160 lb/A nitrogen). In addition 16-0-0 organic water soluble fertilizer was applied as needed through an injection system. Petiole sap testing was performed at various times throughout the trial to determine if nitrogen and potassium levels were in line with University of Florida IFAS recommendations for field tomatoes and fertilizer applications were adjusted as needed.

The tomato plants were staked using the Florida stake and weave method. Transplants were planted March 9, 2015. First harvest began on May 12, 2015. Fruit was harvested at or after the pink stage twice a week. Fruit was weighed and graded as #1's, #2's, and culls with direct to consumer local fresh market sales in mind.

Lepidoptera damage was found just prior to first harvest. *Bacillus thuringiensis* was sprayed on a weekly schedule to prevent crop losses. OMRI listed fungicides were applied as needed, particularly during periods of increased rainfall. Mite damage was discovered and treated with horticultural oil and later with oil plus Azadirachtin. Nine plants were culled because of tomato spotted wilt virus (TSWV). Early Girl, BHN 589, and Mountain Fresh Plus were the varieties to lose plants due to TSWV.

First harvest began nine weeks after transplant. Tomatoes were harvested twice a week at approximately a three day interval. At the end of production 5437 tomatoes had been harvested. The results were 2320 lb total, 1653 lb of #1's, 445 lbs. of #2's, and 227 lb of culls. Final harvest was June 26, 2015.

The first month's data was analyzed to determine if any of the cultivars exhibited an earliness characteristic that could be used to help small growers get product to market quicker. The data for harvest for the first month showed 'Red Morning' to be significantly greater yielding than all cultivars except 'BHN 589', which was not significantly greater than 'Dixie Red' and 'Bella Rosa'. 'Early Girl', a commonly planted early tomato and considered a standard, yielded significantly less than 'Red Morning' and 'BHN 589' but was not different from the other cultivars. There were no differences in number of tomatoes that graded #1 among the cultivars evaluated.

The total harvest data analyzed for the entirety of the trial showed different results. Production of all cultivars was significantly greater than 'Early Girl', except for 'Dixie Red'. In addition, 'Dixie Red' was not significantly different from any of the other cultivars. 'BHN 589' and 'Mountain

Fresh Plus’ had numerically greater yields of #1 grade tomatoes but were only significantly greater than ‘Early Girl’. See the Table 2 for the full harvest results.

The 87lb. per plot (60,154 lb/A) average harvest for the 7 plant per plots of ‘Red Morning’ compares favorably to conventional field yields (64,452 lb/A) in north Florida for the same year and cultivar. One of the top performing cultivars, ‘Red Morning’, could have a potential yield of 2,982 lb in the same size tunnel as used in this trial (66'x 33', 240 plants, or 360 linear bed feet). Many direct sales small farmers can command a premium of up to \$4/lb if tomatoes are available for sale before or after peak tomato season. There is great potential for high tunnel tomato production in northwest Florida. These cultivars show great promise but should be used on a trial basis until several years of data can show a consistent performance in the system. Other cultivars need to be trialed in the system as well.

Table 2. High tunnel cultivar trial in an organic system—Jay, FL 2015.

	<i>First Month of Harvest</i>				<i>Total Harvest</i>			
	Total Weight	No. 1 fruit^y	No. 2 fruit	Culls	Total Weight	No. 1 fruit	No. 2 fruit	Culls
‘Dixie Red’	19.061 bc ^z	13.986 a	3.837 c	1.216 b	72.672 ab	56.615 ab	12.228 cd	3.798 c
‘Red Morning’	29.049 a	15.667 a	7.425 a	5.988 a	87.077 a	54.102 ab	19.351 a	13.689 a
‘BHN 589’	24.251 ab	13.683 a	6.964 ab	3.895 ab	83.949 a	62.515 a	14.768 bc	6.856 bc
‘Early Girl’	17.245 c	10.884 a	3.195 c	3.3 ab	59.764 b	44.219 b	9.846 d	5.816 bc
‘Mountain Fresh Plus’	14.654 c	10.023 a	3.356 c	1.287 b	80.841 a	61.368 a	15.753 abc	4.313 c
‘Bella Rosa’	19.626 bc	9.626 a	4.342 bc	5.6 a	79.695 a	51.793 ab	16.99 ab	10.911 ab

^z Means followed by the same letter(s) in a column are not significantly different, according to Fisher’s Protected LSD (P=0.05), except for height means separated at alpha =0.10.[MJN1]

^y Grades were determined by the following with local direct sales in mind:

1s were XL to Medium and <10% of the fruit surface had blemishes.

2s were XL to Medium and <30% of the fruit surface had blemishes. Culls were >30% of the fruit surface had