

Final Report - Colored Bell Pepper High Tunnel Variety Trial 2011

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Introduction

Due to increased consumer demand and higher prices per pound (than green bells), colored bell peppers have great potential to be a profitable crop. However, because they require longer in the field they have the disadvantage of coming into the local market relatively late in the season. Due to the prolonged ripening time, most growers experience high packing losses from disease and environmental conditions during this extended maturity period. High Tunnel production of colored bells has the potential to solve both problems, thus creating a supply of high quality and high return colored bell peppers for the local marketplace when field grown green bells typically dominate.

Materials and Methods

Twelve varieties of red, five varieties of yellow, and three varieties of orange bell peppers were planted in a 96' high tunnel at the Penn State SE Agricultural Research and Extension Center on June 1, 2011. There were three 6-plant replicates of each variety. Plants were established on raised beds using the plasticulture system. There were two staggered rows on each bed and the plants were staked and spaced on 18" centers. Standard fertility and pest management practices were used.

Fruit were harvested at full color (90% or more) and graded into #1, #2 and cull groups. Each group was then counted and weighted. Data were analyzed using the SAS program (PC version).

Results and Discussion

Hunter had the greatest weight of #1 fruit followed by Tomcat, PS 0994, Edison, Snapper and Vanguard (Table1). Vanguard had the largest #1 fruit followed by PS 0994, Snapper, Tomcat, Islamorada and Hunter. Chesapeake, Edison, Triple 4 and 35-145 had the smallest #1 fruit. There was no difference between the varieties in weight of #2 fruit and little difference in size of #2 fruit. Hunter had the highest total marketable weight of fruit followed

by Tomcat, 35-145, Edison, PS 0994 and Snapper. There were no differences in total harvested weight among the red varieties.

The standard field varieties of red bell pepper (Hunter, PS 0994, Tomcat) performed well in the high tunnel environment. While Vanguard, a new field variety, had the largest fruit it may be limited in usefulness for tunnel production by a somewhat muddled color and slightly lower yields. Edison and Triple 4, greenhouse varieties, performed well and had good color (although not as dark as the field varieties) but their fruit size was smaller. Islamorada seemed particularly susceptible to blossom end rot which reduced yields in all categories for this variety. Variability between replicates of some varieties may have prevented measurement of significant differences in the traits observed.

There were no significant differences in weight or number of #1 or #2 fruit in the yellow varieties (Table 2). Lafayette had the largest fruit followed by Moonset in both groups. There were also no differences in total marketable weight and total harvested weight among the yellow varieties.

Variability within the yellow varieties was greater than in the reds and may also have prevented measurement of significant differences in the traits observed. We were impressed with the yield and appearance of Flavorburst in this color group.

Magno had the highest total harvested weight in the orange peppers; there were no significant differences in the other traits measured (Table 3). The numbers within the three orange varieties were similar but again variability may have prevented measurement of significant differences between these varieties.

There is no data from an outdoor planting of these colored pepper varieties. The field plot was established in Franklin but unfortunately it was destroyed by groundhogs. If the trial is repeated in 2012 we will have a comparable outdoor plot, at least of the best varieties from 2011.

Table 4 contains data from single plots of red, orange and yellow varieties of bell peppers developed for production in a greenhouse. Several of these varieties performed well enough to have been in the upper levels within their respective color groups in our replicated trial.

We hope to repeat this study in 2012. The number of replications will be increased from 3 to 4. This should increase the sensitivity of the trial to measure significant differences between the varieties for the various traits measured within each color grouping. Hopefully there will also be a way to look at some of the promising greenhouse varieties in a replicated planting. Space is a limiting factor, however, at the Research Farm under current conditions.

Table 1. Average and total yield, total marketable weight, and average fruit size for #1 and #2 fruit for 12 varieties of red bell peppers grown in a high tunnel in Lancaster County, PA in 2011.

Variety	Weight #1 Fruit (lb)*	Number #1 Fruit	Average Fruit (#1) Weight (lb)	Weight #2 Fruit (lb)	Number #2 Fruit	Average Fruit (#2) Weight (lb)	Total Marketable Weight (lb)	Total Harvested Weight (lb)
35-145	10.6 b	25.3 abc	0.42 cde	7.7	21.0 a	0.37 ab	18.3 abc	22.9
Chesapeake	10.3 b	27.3 abc	0.38 e	5.6	16.3 ab	0.34 b	15.9 bc	21.0
Edison	12.3 ab	31.7 a	0.39 e	6.1	16.3 ab	0.37 ab	18.3 abc	22.0
Hunter	16.1 a	30.0 ab	0.54 abc	5.5	8.3 bcd	0.65 a	21.6 a	24.8
Islamorada	10.0 b	18.3 bc	0.55 ab	3.1	6.0 cd	0.54 ab	13.2 c	18.6
PS 09941819	12.5 ab	21.0 abc	0.61 ab	5.4	10.3 bcd	0.53 ab	17.8 abc	23.8
Red Knight	10.9 b	21.0 abc	0.52 bcd	4.4	9.0 bcd	0.49 ab	15.4 bc	22.0
Snapper	11.2 ab	19.0 bc	0.59 ab	5.0	9.7 bcd	0.52 ab	16.2 bc	21.7
Socrates	9.1 b	18.0 c	0.51 bcde	6.0	13.3 abcd	0.45 ab	15.1 bc	20.4
Tomcat	14.1 ab	25.0 abc	0.56 ab	4.9	10.0 bcd	0.50 ab	19.0 ab	21.9
Triple 4	10.3 b	25.3 abc	0.41 de	5.7	15.7 abc	0.37 ab	16.0 bc	21.9
Vanguard	11.0 ab	16.7 c	0.66 a	4.7	7.7 cd	0.61 ab	15.7 bc	21.0
				ns				ns

*Mean separation within a column is by Tukey's Studentized Range (HSD) test, ns = non-significant at the 5% level.

Table 2. Average and total yield, total marketable weight, and average fruit size for #1 and #2 fruit for 12 varieties of yellow bell peppers grown in a high tunnel in Lancaster County, PA in 2011.

Variety	Weight #1 Fruit (lb)*	Number #1 Fruit	Average Fruit (#1) Weight (lb)	Weight #2 Fruit (lb)	Number #2 Fruit	Average Fruit (#2) Weight (lb)	Total Marketable Weight (lb)	Total Harvested Weight (lb)
Catriona	10.8	30.0	0.34 c	4.3	14.0	0.31 b	15.2	20.9
Flavorburst	12.0	30.0	0.40 bc	5.8	21.3	0.29 b	17.8	21.5
Lafayette	9.6	16.0	0.60 a	5.4	9.3	0.57 a	15.0	22.8
Moonset	10.7	23.3	0.48 b	3.9	10.7	0.37 b	14.5	20.5
Sympathy	9.5	24.0	0.40 bc	4.1	12.7	0.33 b	13.7	17.1
	ns	ns		ns	ns		ns	ns

*Mean separation within a column is by Tukey's Studentized Range (HSD) test, ns = non-significant at the 5% level.

Table 3. Average and total yield, total marketable weight, and average fruit size for #1 and #2 fruit for 3 varieties of orange bell peppers grown in a high tunnel in Lancaster County, PA in 2011.

Variety	Weight #1 Fruit (lb)*	Number #1 Fruit	Average Fruit (#1) Weight (lb)	Weight #2 Fruit (lb)	Number #2 Fruit	Average Fruit (#2) Weight (lb)	Total Marketable Weight (lb)	Total Harvested Weight (lb)
Delerio	12.1	32.3	0.37	3.7	11.0	0.34	15.8	22.5 b
Magno	13.1	29.7	0.44	4.8	12.7	0.37	17.8	26.8 a
Milena	10.0	25.0	0.40	4.6	13.0	0.35	14.6	19.9 b
	ns	ns	ns	ns	ns	ns	ns	

*Mean separation within a column is by Tukey's Studentized Range (HSD) test, ns = non-significant at the 5% level.

Table 4. Average and total yield, total marketable weight, and average fruit size for #1 and #2 fruit for 17 varieties of red, orange and yellow bell peppers grown as single (observational) plots in a high tunnel in Lancaster County, PA in 2011.

Variety	Weight #1 Fruit (lb)	Number #1 Fruit	Average Fruit (#1) Weight (lb)	Weight #2 Fruit (lb)	Number #2 Fruit	Average Fruit (#2) Weight (lb)	Total Marketable Weight (lb)	Total Harvested Weight (lb)
<u>Red</u>								
Ady	15.9	40	0.38	6.1	18	0.34	21.9	28.0
Dakar	10.9	25	0.43	4.9	12	0.41	15.8	22.7
Dana	11.2	19	0.58	5.8	10	0.58	16.9	21.8
Gandal	12.7	32	0.37	3.8	12	0.32	16.5	22.5
Godzilla	19.9	32	0.60	7.1	12	0.59	26.4	32.8
Maria	18.8	40	0.45	5.8	14	0.41	24.6	28.1
Rosalia	15.7	33	0.46	7.1	18	0.39	22.7	26.5
Zamboni	12.5	30	0.39	6.1	16	0.38	18.6	21.5
<u>Orange</u>								
Gourmet	12.9	23	0.53	3.1	10	0.31	15.3	18.8
Lucaina	16.4	44	0.37	6.1	21	0.29	22.5	26.0
Orangery	13.8	32	0.43	5.5	14	0.39	19.3	24.4
Sympathy	15.3	35	0.44	3.5	11	0.31	18.8	20.4
<u>Yellow</u>								
Baselga	13.4	26	0.49	6.4	14	0.45	19.7	23.5
Gretsky	12.7	30	0.41	4.0	11	0.36	16.7	19.1
Satrapo	10.1	22	0.46	4.2	9	0.48	14.4	21.5
Taranto	13.1	26	0.57	7.6	10	0.46	20.7	25.2
Valentina	15.6	34	0.45	3.2	8	0.48	18.8	23.1