

Parthenocarpic Cucumbers are a Successful Double Crop for High Tunnels

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Introduction:

Cucumbers (*Cucumis sativus*) are a popular warm season vegetable grown throughout West Virginia. Cucumbers are very sensitive to frost, so early- and late-season production can be a challenge. In previous studies, cucumbers have been shown to be a high-yielding, early-season cash crop for high tunnels. Another cropping system scenario is for an early warm season crop such as tomatoes to be grown in the high tunnel followed by a late-season crop of cucumbers. High tunnels facilitate trellising of cucumbers which maximizes yield and quality (Figure 1). Parthenocarpic varieties, in particular, may be well-suited for high tunnel production. This evaluation examined 10 predominantly parthenocarpic cultivars of cucumbers for late-season high tunnel production in West Virginia (Table 1).

Materials and Methods:

Seeds from 10 cucumber cultivars were seeded in mid-August in 50-cell pro trays. Two-week-old transplants were transplanted within a high tunnel in central West Virginia on September 3, 2011. Each cultivar was spaced 12 inches between plants and 42 inches between rows for a total of three replications containing 5 plants per replication. The plants were established on black plastic mulch with drip irrigation. Fertilizer was applied at planting and thoroughly incorporated into the soil. Approximately 25 lbs. of 10-10-10/1000 ft² was applied prior to laying plastic and transplanting the cucumbers. Each plant was pruned to one stem and trellised on a string trellis (Figure 1). Irrigation was applied to deliver a minimum of 1.5 inches of water per acre equivalent per week. On October 10, 2011 harvest began with approximately 1-2 harvests per week until the harvest season ended on November 10 due to a freeze event. Each cucumber was weighed and graded for marketability. Length and width of random samples were also measured.



Figure 1. Cucurbits can be trellised on a mesh trellis or a string trellis for maximum production within a high tunnel.

Table 1. Cucumber cultivars evaluated within a high tunnel-2011.

Cultivar	Seed Source^z	Days to harvest	Comments^y
EXP 2856	SW; BE	56	Dark green; Excellent size and shape; Parthenocarpic
Dasher II	JS	58	Standard hybrid slicing variety. Gynoecious
Diva	JS	58	AAS Winner PM and DM tolerance; Parthenocarpic
P08040	SY	56	Dark green; Excellent size and shape; Parthenocarpic
P08051	SY	56	Dark green; Excellent size and shape; Parthenoarpic
Rocky	JS	46	Good for baby cucumbers PM tolerance; Parthenocarpic
Socrates	JS	52	Parthnocarpic beit alpha type. PM tolerance
Sultan	JS	56	Beit alpha type. PM tolerance
Tasty Green	SW	62	European/Dutch type; Monoecious; Seed coats in fruit.
Tyria	SW	58	European/Dutch type; Parthenocarpic; No seeds

^z JS=Johnny's Seed; SW=Seedway; BE=Bejo Seed; SY= Syngenta Seeds

^yPM= Powdery mildew; DM= Downy Mildew

Results and Discussion:

Cucumbers were harvested over a limited, 4-week period. An infection of downy mildew moved into the high tunnel later in the season. Had the crop been established in late July, marketable yields would undoubtedly have been much greater. Nevertheless, there were significant differences between cultivars.

The cultivars 'P08040', 'EXP 2856' and 'Socrates' produced the largest number of marketable cucumbers per plant or per linear foot of row (Table 1). The cultivars 'P08040', 'P08051' and 'EXP 2856' all had excellent quality including dark green color and a low percentage of culls per plant (Table 1; Figure 3). Although parthenocarpic varieties do not require bees for cross pollination, bees were present in the high tunnel. When parthencarpic cucumbers are cross pollinated, seeds can form and the cucumbers become misshapen. Both 'Tasty Green' and 'Tyria' had more misshapen fruit as a percentage of total marketable yield. 'Socrates' was the highest yielding beit alpha cucumber evaluated. 'Rocky' is a high-yielding, small cucumber

with market potential as a baby cucumber (Figure 2; Figure 3). ‘Tyria’ was seedless with excellent quality, but yield was not significantly high.

Table 2. Yield of high tunnel cucumber: October-November 2011.

Cultivar	Marketable cukes/plant (no.)	Avg. wt (lbs.)	Unmarketable cukes/plant (no.)
EXP 2856	5.9	0.5	0.7
Dasher II	2.5	0.4	0.7
Diva	2.0	0.4	0.4
P08040	6.3	0.7	0.7
P08051	4.9	0.6	0.7
Rocky	6.9	0.2	1.5
Socrates	5.2	0.5	1.3
Sultan	2	0.5	0
Tasty Green	2.8	0.8	0.8
Tyria	1.6	0.6	0.7
SE (Mean)	0.4	0.2	0.7

‘P08040’ and ‘P08051’ had uniform length greater than 8 inches (Figure 2). Although total yields are a fraction of the potential marketable yield if the cucumbers are allowed to have a longer growing season, cucumbers are a profitable double crop for high tunnels. Occupying 65 days within a high tunnel and yielding 0.75-2.5 lbs/ft² is a realistic yield level for high tunnel cucumbers.

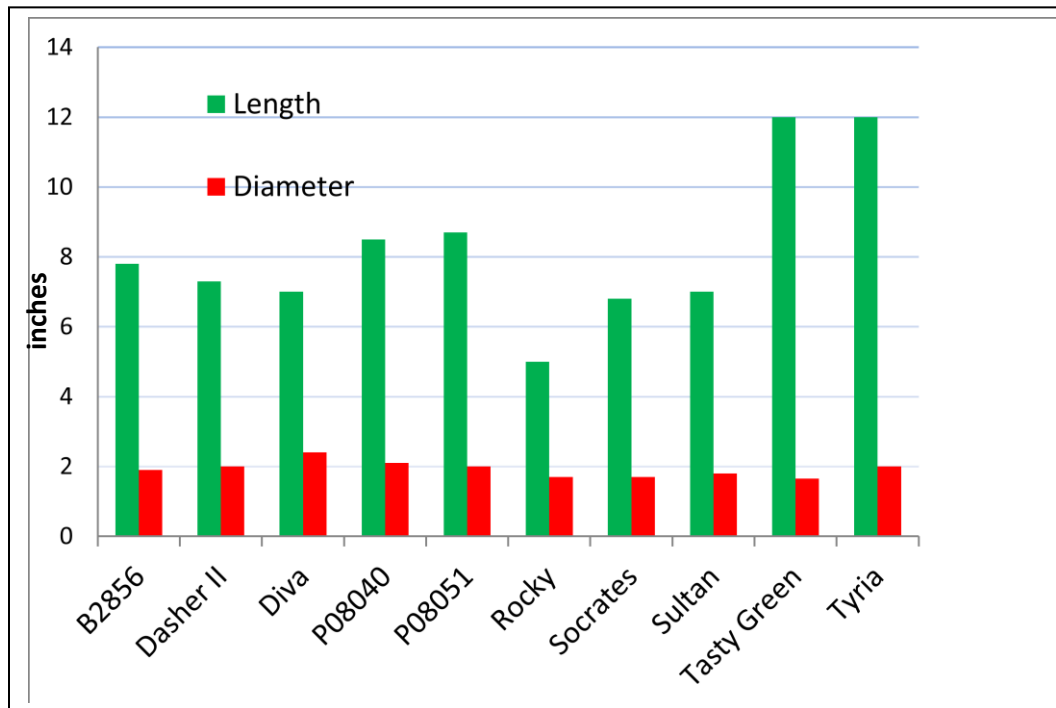


Figure 2. Length and diameter of select high tunnel cucumber cultivars.



Figure 3. Appearance of select high tunnel cucumber cultivars.

*Thanks to *Seedway Vegetable Seed* and *Syngenta Seeds* for providing seed for this trial.