

# Growing Cucumbers within a High Tunnel

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## Introduction:

Cucumbers (*Cucumis sativus* L.) are high yielding but frost-sensitive vegetables. They yield very well as an early-season crop, but also will produce well during the summer and fall. One method to extend the production season of cucumbers is using a high tunnel. High tunnels are unheated, plastic-covered greenhouses which capture and store solar heat during the day and are manually vented to control temperature and humidity. Unlike a greenhouse, they use no fossil fuels and have much lower start-up and operating costs.



**Table 1.** Cucumber cultivars evaluated within a high tunnel. Fall, 2005

Cultivar	Days to maturity <sup>z</sup>	Fruit type	Seed vendor
Camaro	60	European-type	DeRuitery
Dasher II	58	Slicing	Chesmore Seeds; Harris Seeds
Diva	58	Slicing	Harris Seeds
Genuine	48	Slicing	Johnny's Seeds
Hazera 456	50	Beit Alpha-type	Hazera Seeds
Indy	59	Slicing	Seedway; Chesmore Seeds
Milligon	60	European-type	DeRuitery
Socrates	52	Beit Alpha-type	Johnny's Seeds
Tasty Green	48	European-type	Seigers Seeds
Timor	45	Beit Alpha-type	Seigers Seeds
Tyria	56	European-type	Johnny's Seeds

<sup>z</sup>Days from seeding. <sup>y</sup>Retailed from: Hydro-Gardens, Inc. Colorado Springs, CO

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**Methods:**

Eleven cucumber cultivars were evaluated (Table 1). There are several types of cucumbers. Cucumbers grown for the fresh market are termed “slicers”. Slicing types produce fruit with seeds and a relatively thicker skin. European types, also called Dutch types or hothouse cucumbers, produce parthenocarpic fruit. That is, the fruit sets without pollination and does not produce seed. Burpless cucumbers do not have seed. European type cucumbers are typically long but have a smaller diameter than slicing types.

European cucumbers have a thin skin and lose fresh weight rapidly after harvest. Beit Alpha cucumbers are also parthenocarpic but tend to be blockier and have a waxy layer on the fruit which prevents significant fresh weight loss.

Three (20 ft. wide x 34 ft. long x 9 ft. high) high tunnels (Stuppy Greenhouse Mfg., Kansas City, MO) were used for this cultivar evaluation. Each high tunnel had a single layer of 6 mil plastic with 38” high sidewalls which were rolled (up or down) to manage temperature and humidity within the high tunnel.

Cucumbers were direct seeded in 50 cell trays and grown as transplants for 2.5 weeks prior to transplanting within the high tunnels on 20 August 2005. Each transplant was placed in the planting hole on black plastic which had previously been in cantaloupes.(March-August 10) The cantaloupe vines (including roots) were removed one week prior to transplanting the second crop of cucumbers. The plastic mulch, drip irrigation line and mesh trellis was left in place for the next crop of cucumbers.

Each plant was spaced 24” apart with rows on 48” centers. A single drip line was under each plastic mulched bed to provide water and soluble fertilizer to the growing cucumber plants. A starter solution (15N-30P-15K) mixed with Admire insecticide was applied to each transplant a day after transplanting. Flint fungicide was applied to control powdery mildew.

Starting 2 weeks after transplanting, the cucumber vines were trained on the trellises by using 3/4” plant clips. Water and fertilizer was applied every 3 days (8-10 lbs N/acre/week. The fertilizer used was calcium nitrate (15.5N-0P-0K-19Ca) since nitrate nitrogen is the best form of nitrogen to use for cucumbers.

Harvest commenced on 23 September and proceeded every 3 days until 8 November 2005. Each cucumber was weighed, and a subsample of each cucumber cultivar was measured for length and diameter.

### Results and Discussion:

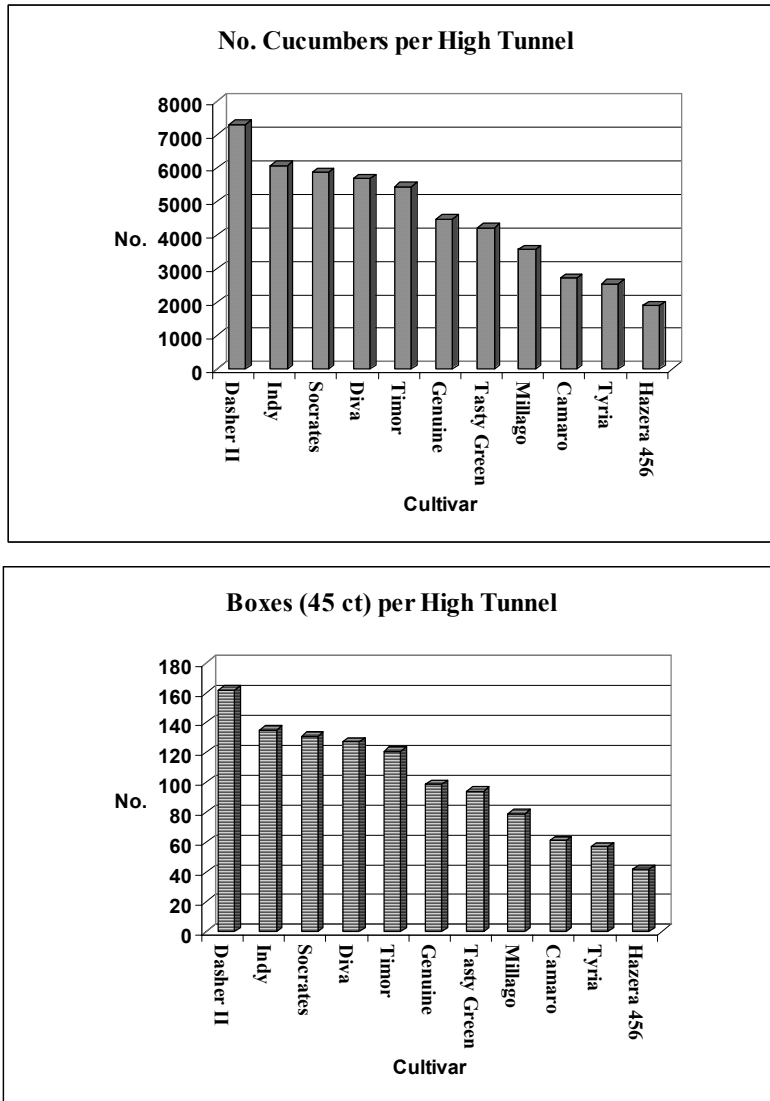
**Table 2.** Marketable yield and count of cucumbers produced within a high tunnel.-2005

Cultivar	Average fruit length (in.)	Average fruit wt. (oz.)	Fruit wt./plant (lbs.)	Fruit no./plant
Dasher II	7.5	8.0 <sup>de</sup>	12.2 <sup>ab</sup>	24 <sup>abc</sup>
Indy	7.9	8.8 <sup>cde</sup>	11.1 <sup>ab</sup>	20 <sup>abc</sup>
Tasty Green	12.0	12.4 <sup>ab</sup>	10.9 <sup>ab</sup>	14 <sup>bcd</sup>
Diva	7.1	8.1 <sup>de</sup>	9.7 <sup>ab</sup>	19 <sup>abc</sup>
Socrates	6.9	7.8 <sup>de</sup>	9.5 <sup>ab</sup>	20 <sup>abc</sup>
Genuine	8.1	10.1 <sup>b</sup>	9.4 <sup>abc</sup>	15 <sup>bcd</sup>
Timor	7.4	8.1 <sup>de</sup>	9.2 <sup>abc</sup>	18 <sup>abc</sup>
Milligon	10.0	11.4 <sup>ab</sup>	8.1 <sup>abc</sup>	12 <sup>de</sup>
Camaro	11.6	11.7 <sup>ab</sup>	6.6 <sup>cde</sup>	9 <sup>de</sup>
Tyria	10.8	10.0 <sup>b</sup>	5.3 <sup>cde</sup>	9 <sup>de</sup>
Hazera 456	5.8	4.9 <sup>f</sup>	1.9 <sup>f</sup>	6 <sup>e</sup>
<i>LSD (0.05)</i>	<i>1.8</i>	<i>2.0</i>	<i>4.1</i>	<i>7.1</i>

‘Dasher II’ produced the highest yield of all cucumbers evaluated within the high tunnel (Table 2). ‘Dasher II’ is a slicing type with excellent uniformity and good tolerance to powdery mildew. ‘Indy’ also is a slicing type but produced slightly less fruit per plant relative to ‘Dasher II’. ‘Tasty Green’ was one of the earliest maturing cultivars evaluated, and this early production resulted in a high yield. The fruit of ‘Tasty Green’ is dark green with slight ridges and average 12” in length. ‘Diva’ produced tender, crisp fruit with excellent taste. ‘Socrates’ is thin-skinned, dark green cucumber with excellent quality and yield. ‘Socrates’ is somewhat tolerant of cool weather and thus may be well suited to high tunnel production in the fall. ‘Genuine’ is an early maturing slicer, but seemed to have poor tolerance to powdery mildew.

The European or hothouse types, ‘Camaro’ and ‘Milligon’ did not perform well relative to most other cultivars evaluated. They seemed to lack good tolerance to powdery mildew, and should have a longer, warmer growing season than what is provided in an unheated high tunnel. The open environment of the high tunnel may not be suitable for optimal production of European type cucumbers.

Trellising of cucumbers significantly improves yield and quality. All long-fruited types ( $\geq 10''$ ) should be trellised to maintain good fruit shape. Slicers and beit alpha types may not be trellised, but trellising will improve yield and quality.



**Figure 2.** Yield of cucumbers per 2500 ft<sup>2</sup> high tunnel.

Slicers and beit alpha types are typically packed as 40-45 count boxes. European types are shrink-film wrapped and sold in 16 count boxes.

**Conclusions:**

Growers should consider using high tunnels for extended season cucumber production. Cucumbers are an excellent rotation crop with tomatoes. Choose a cultivar with good yield, quality and disease tolerance.