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Beit Alpha Cucumber: A New Greenhouse Crop for Florida [1]

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Dutch type cucumbers (*Cucumis sativus)* (also called European or English cucumbers), the long, thin skinned, seedless cucumbers available in most grocery stores, are one of the major greenhouse crops grown in Florida. Beit Alpha cucumbers are similar in appearance and production to Dutch cucumbers and trials indicate that they can be produced just as successfully in Florida.

Figure 1. Comparison of Beit Alpha (top)and Dutch-type (bottom) cucumber fruit

Like Dutch cucumbers, Beit Alpha cucumbers are gynoecious (producing only female flowers) and parthenocarpic, so they require no pollination. The fruit are shorter than Dutch cucumbers but seedless, smooth, and thin skinned, and are less susceptible to damage after harvest than the Dutch types (Figure 1). In addition, fruit yields can be up to 3 times higher than those of Dutch cucumbers (Figure 2).

Production Methods

Beit Alpha cucumbers can be produced in any greenhouse suitable for production of Dutch type cucumbers. For best production of either type of cucumber, the greenhouse should have high enough sidewalls to allow good air movement around the plants. Depending on the region, the greenhouse may need both cooling and heating. Dutch cucumbers prefer a temperature range of 65-90° F while Beit Alpha cucumbers are more tolerant of both low and high temperatures (50-100° F). F while Beit Alpha cucumbers are more tolerant of both low and high temperatures (50-100o F).

Both types of cucumbers can be produced in perlite, organic media such as pine bark or coconut coir, or mixes of organic media and perlite. Although

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Figure 2. Crop load on Beit Alpha cucumber (cultivar Sarig)

current practice is to use white polyethylene bags filled with media, they can be produced in pots or buckets as well as bags.

Irrigation is based on achieving a recommended rate of leachate (water loss from the container), approximately 10-20% of added water depending on the amount of sunlight. Water is piped along the rows in plastic pipe with an emitter placed at each plant. While black pipe is most common, in regions where heating of the water can cause root damage, white pipe with a black interior to reduce algal growth can be used. The plants should be fertilized at each irrigation with a complete nutrient solution. IFAS recommendations for fertilization of greenhouse cucumbers are provided in Table 1. For more information, see "Design Suggestions and Greenhouse Management for Vegetable Production in Perlite and Rockwool Media in Florida" (G. Hochmuth and R. Hochmuth, 1998, Bulletin 327) or " Florida Greenhouse Vegetable Production Handbook, Volume 3, Greenhouse Vegetable Crop Production Guide" (G. Hochmuth and R. Hochmuth, Circular SP 48), both available through the EDIS (Electronic Data Information Source) On-line Catalog (edis.ifas.ufl.edu). The pH of the nutrient solution should be maintained at 5.5 -– 6.5. Electrical conductivity (EC) can vary with water quality and source of fertilizer. Therefore EC should not be used as a method of determining correct fertility of the nutrient solution. However, it can be used as a quick check on the total soluble salts in the nutrient solution and should be maintained between 1.5 - 2.5 deciSiemens/meter (1 deciSiemen/meter = 1millimhos/centimeter = 640 parts per million). An emitter can be placed in a plastic jug to collect a sample to test the EC and pH of the solution.

Plants are individually trellised on twine hung from a horizontal support. Plastic clips are used to attach the vines to the twine at the base of the plant and along the vine as the weight of the fruit load requires. Dutch cucumbers are usually pruned to a single stem with no lateral branches (suckers). Fruit are removed up to the 6th to 8th node and the plant is then allowed to set 1 fruit per node every other node up to the horizontal support. At the top of the support wire, 2 laterals are trained over the wires. However, Beit Alpha cucumbers set multiple fruits at each node and on the lateral branches so both the fruit and lateral branches are left on the plant after the 8th node. To avoid excessive vegetative growth, lateral branches can be pruned at the second node on the lateral (Figure 3).

Disease and insect control should be applied as needed in a timely fashion following recommended practices. Insect exclusion with screening will reduce insect feeding damage and vectoring of diseases. Biological methods of control are available and effective for some of the insects and diseases affecting greenhouse cucumbers. Sanitation by removing pruning debris and damaged fruit can reduce disease losses. Removal of poor quality fruit before maturity also helps maintain continuous fruit set.

Beit Alpha cucumbers should be harvested at a diameter of 1.5 inches or less, while Dutch cultivars are harvested at a diameter of 1.25 – 1.75 inches, depending on grade and market. The minimum length at harvest of Dutch type cucumbers is 11

Figure 3. Small fruit developing on pruned lateral branch (cultivar Meitav)

inches but Beit Alpha fruit will be approximately half the length of Dutch type cultivars at an equivalent harvest stage. Unlike Dutch type cultivars, the fruit should not require plastic wrapping for protection after harvest.

Cultivar Evaluation

The results of a comparison of 6 Beit Alpha cucumber cultivars and 2 Dutch type cultivars evaluated in 2 seasons are presented in Table 2. More detailed information can be found in the Proceedings of the Florida State Horticultural Society (Volume 113, 2000) or at http://www.hos.ufl.edu/protectedag/BeitAlphaCuc.pdf The cucumbers were grown in an Israeli sawtooth design, passive ventilated greenhouse covered with double layer polyethylene, located in Gainesville, FL. The sidewalls were 12 ft high and the peak was 26 ft high. The 3-ft roof vent and sidewalls were covered with 0.02-in screen for insect control. The Beit Alpha types were Alexander, Dishon, Sarig, and Suzan (available from Hazera Seeds, Inc., 745 Balboa St., Grover Beach, CA 93433) and Ilan and Rambo (available from Zeraim Gedera, P.O. Box 103, Gedera 70750, Israel). The Dutch types were Bologna (available from Rijk Zwaan Export B.V., P.O. Box 40, 2678 ZG DeLier, The Netherlands) and Kalunga (available from Enza Zaden, 407 Front Street, Salinas, CA 93901). Three transplants at 3 weeks old were planted in 1 ft x 3 ft white polyethylene bags filled with perlite, typical for hydroponic production of Dutch cultivars in Florida. The bags were slit about 1 inch above the ground to allow excess water to leach out and to provide airspace for the roots. The Fall 1999 season ran from September 26 to January 26, planting to final harvest. In Spring 2000, seeds were planted on February 16 and the final harvest was April 28.

Beit Alpha cultivars produced 2-3 times as many marketable fruit, on a per season basis, as the Dutch cucumber cultivars (Table 2). In Spring, when temperatures increased, the yields of the Beit Alpha cultivars rose, while those of the Dutch cultivars did not, because of the greater heat tolerance of the Beit Alpha cultivars. Average fruit weight was greater for the Dutch cucumbers because of the greater fruit length at harvest. Beit Alpha cucumbers, while always shorter than Dutch cultivars, vary in length. Sarig is an example of a short cultivar while Alexander is a longer type. Average fruit weight and length were greater in Fall than in Spring for both types of cucumbers.

Culls were less than 10% of total fruit number for Beit Alpha cultivars compared to 20% of total fruit number for the Dutch types. Uniformity (fruit length, diameter, and shape) was high for all cultivars. All Beit Alpha cultivars had smoother skin than the Dutch types, with Ilan having the smoothest skin and Alexander and Rambo having the most wrinkled skin. Both Dutch type cultivars have reported resistance to powdery mildew. When chemical controls (Dithane or sulfur) were used, only Ilan had more severe symptoms than the Dutch type cultivars. When no chemical controls were used, all cultivars of both types had more powdery mildew symptoms but the Beit Alpha cultivar Alexander showed disease levels similar to the more resistant Dutch types.

Dutch cucumbers are shrink-wrapped in plastic after harvest to prevent damage to the skin and water loss. The thicker skins of the Beit Alpha cucumbers, while still thin enough to not require peeling, are better able to survive postharvest handling and marketing. Preliminary local marketing tests showed

that the Beit Alpha cucumbers were well received by the Florida consumer.

Table 1. Table 1. Nutrient solution for greenhouse cucumber production

Nutrient	Parts per million
N after transplant	100
N after first harvest	180
P	50
K	150
Ca	135
Mg	50
S	65
Fe	3
Cu	0.2
Mn	0.8
Zn	0.3
B	0.7
Mo	0.06

Table 2. Table 2. Comparison of cultivars

	Marketable fruit per season		Average fruit weight (oz)		Length of fruit (in)		Diameter of fruit (in)	
Cultivar	**Fall 1999** 30 harvests	**Spring 2000** 20 harvests	**Fall 1999**	**Spring 2000**	**Fall 1999**	**Spring 2000**	**Fall 1999**	**Spring 2000**
Beit Alpha type								
Alexander	28	40	6.7	4.8	7.5	6.7	2.0	1.5
Dishon	32	43	6.1	4.7	6.7	6.3	2.0	1.5
Sarig	37	44	5.5	4.3	5.5	5.9	1.5	1.5
Suzan	32	42	6.1	4.6	7.1	6.3	2.0	1.5
Ilan	33	34	8.7	5.1	7.1	7.1	2.0	1.5
Rambo	36	36	7.0	4.8	7.1	6.7	1.5	1.5
Dutch type								
Bologna	19	13	14.7	10.9	14.6	12.6	2.0	2.0
Kalunga	24	14	13.8	10.4	12.6	10.2	2.0	2.0