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***Effect of Three Planting Depths on Greenhouse Tomato Yield 97-14***Robert C. Hochmuth, Lei Lani Leon, George J. Hochmuth, and Charles Vavrina<sup>1</sup>**Introduction**

Greenhouse vegetables are grown in nearly 60 acres in Florida (Hochmuth and Hochmuth, 1996b). Major crops include cucumber, pepper, tomato, lettuce, and various herbs. There are more operations growing tomato than any other crop, but large operations growing cucumber and pepper make all three major crops. The most common production system used in Florida is perlite bag culture with nearly 90% of all production in Florida in this system.

Recent research in field production of tomato indicates deeper plantings have resulted in higher early and total yields (Vavrina, 1994). This trial was conducted to determine the effects of three tomato planting depths in perlite bag culture inside a greenhouse in northern Florida.

**Materials and Methods**

The trial was conducted in a double-layer polyethylene covered greenhouse at the Suwannee Valley Research and Education Center, near Live Oak, Florida. The greenhouse structure was 58 ft x 18 ft with 10 ft high sidewalls. The greenhouse was equipped with an evaporative cooling pad on one end wall and ventilation fans on the opposite end wall. The evaporative cooling pad was covered with a woven monofilament screening material “DuraScreen” by Dura Green Marketing USA, Inc., Mt. Dora, Florida. To reduce resistance to air flow, the screen covered a wooden box built on the outside of the evaporative cooling pad twice the surface area of the opening of the pad. Propane gas heaters provided a minimum temperature of 62°F. Warm air was conveyed by 12” ventilation tubes along the floor between the double rows of tomatoes. The same ventilation tubes were used to recirculate greenhouse air in the crop canopy to minimize free water from forming on the tomato plants and thereby reducing disease. In addition, horizontal air-flow fans were located above the crop and

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also used as recommended to reduce moisture on the plants and provide even temperatures throughout the greenhouse.

Seeds of the tomato cultivar 'Trust', were planted in rockwool seeding cubes (1.5 x 1.5 x 1.5 inches) on September 3, 1996. The transplants were grown in these cubes using water and nutrient solution as needed until transplanting. The transplants were planted into lay-flat bags of perlite on September 25, 1996. Bags were 10 inches in diameter and 36 inches long. The crop was grown in accordance with the University of Florida perlite production practices (Hochmuth, 1991; Hochmuth and Hochmuth, 1996a). Nutrient management followed the program as outlined by the University of Florida, beginning at 70 ppm nitrogen and increasing to 150 ppm according to crop growth stages. Standard crop maintenance practices were followed for training, suckering, pruning of lower leaves, pollination, and fruit cluster pruning (Hochmuth, 1991).

Plots with six plants each were arranged in a randomized complete block design with four replications. The three planting depths were: the top of the root ball (standard depth), the cotyledons, and the first true leaf.

Fruits were harvested at the breaker stage of maturity and graded into two categories, marketable and cull. Number and weight of fruit in each plot was recorded. Data were subjected to analysis of variance procedures.

### **Results and Discussion**

First tomato harvest was December 6, 1996 and final harvest was June 26, 1997. Early harvests were determined to be the seven harvests in December. No significant differences were found in the early harvests for marketable fruit number, marketable weight, cull weight, or average fruit weight. Total season marketable yield ranged from 22 to 24 lbs per plant, but again, no significant differences were detected in marketable fruit number, marketable weight, cull weight, or average fruit weight.

In summary, all three planting depths performed equally well for each parameter measure. The current practice of planting to the tops of the root ball in perlite bag culture will result in the same yields as planting as deep as the first true leaf.

### **Literature Cited**

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**Industry Cooperators**

Airlite Processing Corporation of Florida (perlite), 3505 65<sup>th</sup> Street, Vero Beach, FL 32967

Deruiter Seeds (seed), PO Box 20228, Columbus OH 43220

Mention of a specific company or product does not constitute endorsement over other companies or equivalent products.

**Table 1.** Effect of three planting depths on early and total yield of greenhouse tomato grown in perlite bag culture in Live Oak, FL.

Planting Depth	Marketable No.	Marketable Wt. (lbs)	Cull Wt. (lbs)	Average Fruit Wt. (lbs)
----- Early Harvest -----				
First true leaf	7.3	3.5	0.0	0.25
Cotyledon	6.5	3.0	0.1	0.23
Top of root ball	6.5	3.0	0.1	0.34
Significance (P=0.05)	NS	NS	NS	NS
----- Total Season Harvests -----				
First true leaf	57.3	21.7	1.7	0.38
Cotyledon	59.7	23.6	1.5	0.39
Top of root ball	54.1	21.6	1.5	0.40
Significance (P=0.05)	NS	NS	NS	NS