hatching and/or larval growth and development, that populations of insect predators and parasites were affected by plant density, or that the nutritional value of the plant tissue was affected. Perhaps, the increase in early yield and yield concn and the decrease in plant size that results from increased plant density (2) increased the searching efficiency of young larvae for fruit tissue. This would not only increase the proportion of the fruit found by the larvae, but would also increase larval survival if fruit tissue is more palatable than leaf tissue. A similar relationship between plant density and insect damage has recently been noted in southern peas (1).

Interest in this plant density-fruitworm damage relationship arises from our desire to improve selection efficiency for fruitworm resistance. Since fruitworm resistance is of major importance in our breeding program, progress is directly related to the efficiency of selection techniques. This fruitworm-plant density relationship needs to be taken into account when evaluating resistance of single plants grown in a spaced planting. These results also suggest that the recent trends toward increased plant densities in direct-seeded tomatoes may increase the incidence of fruitworm damage.

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Cage Size and Tomato Performance[1]

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Abstract. **Plants of tomato (*Lycopersicon esculentum* Mill. cv. Manalucie) grown in wire mesh cylindrical enclosures (cages) produced fruit with greater soluble solids content when cage diameter increased from 31 to 62 cm. Cage diameter or height did not influence juice pH, color, yield, or harvest labor input.**

Increasing labor cost has forced fresh market tomato growers to new production methods. The field production of unstaked and unpruned (ground) tomatoes is not possible in areas of high rainfall because fruit rots and soil discoloration of fruit result in low marketable yield. A production system using wire mesh "cages" to support tomato plants has received increasing attention from growers because of low labor input and high marketable yields (1, 2, 4, 5).

This study was initiated to compare soluble solids, color, juice pH and yield of tomatoes produced in varying cage sizes. Cages (cylinders enclosing individual plants) were constructed of 10 gauge reinforcing wire with 15.2 × 15.2 cm "mesh" as described by Weikel (5). The 6 cage size treatments were based on all combinations of 2 diameters (31 and 62 cm) and 3 heights (31, 62, and 93 cm). Cages were placed over each plant immediately following transplanting.

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Eight-week-old greenhouse-grown transplants of 'Manalucie' tomato were transplanted into field plots fertilized with 908 kg per ha of 10–4.3–8.3 (N–P–K) fertilizer and with a soil pH 6.5. Transplants were spaced 1.23 × 1.23 m in the plots. Plots were fumigated with methyl bromide 2 months before transplanting. At transplanting, roots of the transplants were immersed in a 200 ppm solution of 20–8.6–16.6 (N–P–K) water soluble fertilizer containing minor elements.

Irrigation was applied when needed with a twin wall drip hose; all plants were sprayed weekly with an insecticide and fungicide combination. The experimental design was a randomized complete block with 4 replications. Each experimental unit consisted of 9 plants bordered by guard rows.

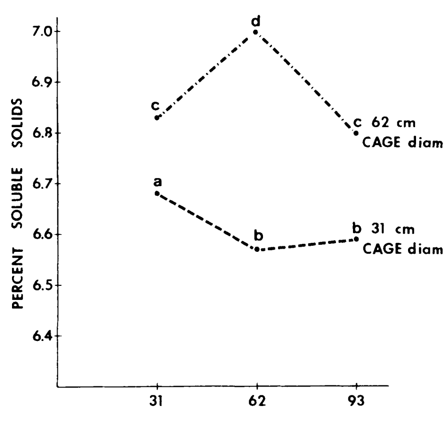

Fig. 1. The effect of cage height and width on soluble solids of 'Manalucie' tomatoes. Means followed by the same letter are not statistically different at the 5% level of probability.

Two or three fruit from each plant in each block was used for quality determinations on each harvest date. Soluble solids determinations were made on a Baush and Lomb Abbe refractometer; juice pH was determined by the method of Kramer and Smith (3). Records of total yield and time required for harvest were made.

Cage size had no significant affect on juice pH, fruit color, yield, or time required for harvest (Table 1). The yield data compare favorably with those of other studies (1, 2). However, the data concerning time required for harvest do not agree with the suggestion of Carolus and Price (1) that increasing cage diameter makes early fruit harvest difficult. Increased difficulty for early fruit harvest of the wider cages was not reflected in a significantly increased total harvest time (Table 1). Soluble solids were significantly higher from 62 cm diam cages than from 31 cm diam (Fig. 1). A possible explanation is greater foliage spreading in the larger diam cages allowed better sunlight penetration to the lower leaves. Although spreading of foliage occurred, the larger diam cages did support the plants in an upright position. There was significant interaction between cage height and diameter (Fig. 1). Plants grown in cages of intermediate height (62 cm) produced fruit with the greatest soluble solids content but the reason for this is not apparent.

Table 1. The effect of cage size on, juice pH, color, yield and time for harvest of 'Manalucie' tomatoes.

	Cage size (cm): ht x diam[z]					
Variable	31x31	62x31	92x31	31x62	93x62	62x62
pH	4.61a	4.64a	4.59a	4.60a	4.58a	4.60a
Color (% transmittance)	62.75b	63.82b	64.69b	63.63b	63.38b	62.94b
Total yield (kg/plant)	9.8a	9.4a	9.0a	9.4a	9.1a	9.7a
Harvest time (min/kg fruit)	.79a	.77a	.68a	.77a	.68a	.88a

[z]Means followed by the same letter in rows are not statistically different at the 5% level of probability.

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