Effects of Field Seeding and Transplanting on Earliness, Quality, and Yield of Cantaloupe Varieties

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Abstract. Three-week old plants of 10 cantaloupe varieties grown in 3-inch peat pots were transplanted to the field from April 15 to 24 for a 5-year period. Field seeded plots were direct seeded the same day and 7-10 days earlier.

The yield and fruit weight from transplants were significantly higher than those from field seeded plants. The total soluble solids content of fruit from transplants averaged more than 2 per cent higher than that of field seeded plants started the same date. When field seeded 7-10 days earlier, the difference was not as great; however, total soluble solids were consisently higher in fruit from transplants. Two factors were possibly responsible for the higher yields, fruit weights, and soluble solids. Because field seeded plants matured later, foliar diseases were more severe and plants were also exposed to additional cloudiness and rainfall.

Fruit of transplants matured approximately 14 days earlier than that of field seeded plants started the same date. When field seeding was accomplished 7-10 days before transplanting, fruit from field seeded plants matured only 7-10 days after the transplants.

Cantaloupe plants are tender, and the seed will not germinate at low temperatures. Therefore, planting in the field must be delayed until all danger of frost has passed and the soil has become warm, or poor stands, late maturity, and reduced yields will result. Many growers produce a part of their entire crop from plants started in the greenhouse, hotbed, or cold frame. Since the seedlings do not withstand the shock of transplanting well, they are usually grown in "peat pots", plant bands, or veneer boxes.

Melon growers cite many advantages to transplanting (1). They report that transplanting is the surest way to have melons. In addition to a perfect stand, less expense for seed, weeding, and pest control results from the practice. Ripe fruit of transplants are placed on the market 2 to 3 weeks earlier than that of field seeded plants.

Romske (3) compared cantaloupe plants started in wood veneer bands in the greenhouse with plants grown from seed planted in the field. In this experiment covering 3 years, the average yield was 5,433 pounds from the direct seeded plantings and 8,870 pounds per acre from the transplants. The harvest season was approximately 2 weeks earlier from transplanted plants. Higher yields and soluble solids, and earlier production of cantaloupes were also reported by Norton (2).

Because of favorable reports from other areas, a study was begun in Alabama to determine the effects of field seeding and transplanting on earliness, yield, and quality of cantaloupe varieties.

Ten varieties and breeding lines were grown in a split plot design with four replications to study the relative value of two planting methods. Each plot consisted of 10 hills with two plants per hill. The hills were spaced 4 feet apart in 5 foot rows. Three-week old plants in 3-inch pots grown in a greenhouse

Table 1. Mean yields per plot of transplanted and field-seeded cantaloupe varieties, Auburn, Alabama, 1961-65.

Treatment	Transplanted and Field seeded on same date							Mean of Means
	1961	1962	1963	Mean	1964	1965	Mean	
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Transplants	34.10**	39.0*	39.3**	37.5**	38.4**	77.9**	58.1**	47.80**
Field-Seeded	9.2	28.8	9.2	15.7	17.2	42.5	29.9	22.80

* Differences significant at 5% level.
** Differences significant at 1% level.

Table 2. Mean yields per plot of 10 transplanted and field seeded cantaloupe varieties, Auburn, Alabama, 1961-65.

Variety	Transplanted and Field seeded on same date 1961-63			Transplanted 7-10 days after field seeding 1964-65			Mean of Means
	Transplants	Field Seeded	Mean	Transplants	Field Seeded	Mean	
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Edisto No. 47	53.9	26.8	40.3	79.6	48.2	63.9	52.12
Seminole	44.8	13.2	29.0	86.0	36.8	61.4	45.22
Hales Best Jumbo	50.9	11.6	31.3	74.5	40.8	57.7	44.47
L-30-C-58	31.9	26.6	29.3	71.7	40.3	56.0	42.64
Florisun	38.1	19.6	28.9	65.6	35.3	50.5	39.65
134 F_1	35.8	14.0	24.9	51.6	26.8	39.2	32.03
Florida No. 1	33.0	16.4	24.7	38.7	23.5	31.1	27.88
Rio Gold	33.5	11.7	22.6	38.6	16.4	27.5	25.06
PMR 45	32.3	8.0	20.1	44.9	13.4	29.1	24.63
Edisto	20.3	9.4	14.8	30.0	17.4	23.7	19.26
Mean	37.46**	15.73	26.60	58.12**	29.87	44.00**	

**Differences significant at 1% level.

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[2]Peat pots were donated by the Jiffy Pot Company of America, West Chicago, Illinois.

Fig. 1. Transplanted and field-seeded plants. Note advanced stage of growth of transplants as compared to field-seeded.

were transplanted to the field April 15-24. Field seedings were the same date in 1961, 1962, and 1963. Since some of the effects of transplanting could possibly be overcome by early planting, the field seeded plots were planted 7 to 10 days before the transplanted plots in 1964 and 1965.

Fertilizer of 8-8-8 grade was banded in the bed at the rate of 1,000 pounds per acre prior to planting. An additional application of 500 pounds per acre was made 3 weeks after planting. When heavy rains and excessive leaching occurred, an additional 100 pounds of ammonium nitrate was applied.

Plants were sprayed with Lindane and Zineb at weekly intervals throughout the season. The plants were vigorous and free of disease until the first week of July at which time downy mildew became prevalent on susceptible lines and Hales Best Jumbo variety. The crop was cultivated and irrigated as needed to maintain good growth. By mid July, foliage of all susceptible plants was severely damaged by diseases.

The fruits were harvested from mid-June through early August. Total weight and number of marketable melons were recorded for each plot. Two melons from each plot for four to five harvests were taken to the laboratory for evaluation. Per cent soluble solids for each fruit was determined with a Bausch and Lomb refractometer.

Yields from transplants were significantly higher than those from field seedings made the same date and also from field seedings made 7-10 days earlier, Tables 1 and 2. Failure of the results of field seeded plants to show any increase in yield from earlier plantings was possibly the result of low soil temperatures.

Effects of seeding methods on yield and fruit varied with varieties (Table 3). Yield and fruit weight from transplants were significantly higher than from field seeded plants for all varieties. However, less differences were recorded between transplants and field-seeded plants for the more disease-resistant varieties. The plants that gave the highest yield were Edisto No. 47, Hales Best Jumbo, Florisun, Seminole, and L-30-C-58. Lower yielding varieties were Florida No. 1, 134 F7, Rio Gold, P. M. R. 45, and Edisto. Edisto No. 47, Florida No. 1, Edisto, L-30-C-58, and Florisun produced the largest fruit. The remaining varieties had small fruit.

Edible quality as indicated by total soluble solids content of fruit, was significantly higher in fruit from the transplanted plants (Table 4). Less variation between fruit from transplants and field seeded plants was recorded in the more disease resistant than from susceptible varieties. Acceptable solids content in field-seeded varieties were found in Fla. No. 1, Seminole, Florisun, Edisto 47, Edisto and L-30-C-58. Two factors are possibly responsible for the lower solids in fruit from field seeded plants. Because of later maturity, foliar diseases were more severe; rainfall and

Table 3. Fruit weight of 10 transplanted and field seeded cantaloupe varieties, Auburn, Alabama, 1961-65.

Variety	Transplanted and Field seeded on same date 1961-63			Transplanted 7-10 days after seeding 1964-65			
	Transplants	Field Seeded	Mean	Transplants	Field Seeded	Mean	Mean of Means
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Edisto No. 47	2.4	2.2	2.3	2.8	2.5	2.6	2.46
Hales Best Jumbo	2.4	1.8	2.1	2.9	2.4	2.7	2.38
Edisto	2.4	1.8	2.1	2.5	2.3	2.4	2.25
Florida No. 1	2.4	1.2	1.8	2.6	2.3	2.5	2.14
Florisun	2.0	1.8	1.9	2.2	2.0	2.1	2.01
L-30-C-58	2.2	1.6	1.9	1.7	1.4	1.6	1.74
Rio Gold	1.6	1.4	1.5	2.1	1.7	1.9	1.69
134 F_1	1.5	1.4	1.5	2.0	1.7	1.8	1.66
Seminole	1.5	1.4	1.4	1.9	1.8	1.9	1.65
PMR 45	1.5	1.2	1.3	1.7	1.4	1.5	1.43
Mean	2.00**	1.59	1.79	2.23	1.94	2.09*	

*Differences significant at 5% level.
**Differences significant at 1% level.

Table 4. Per cent soluble solids content of fruit of 10 cantaloupe varieties, Auburn, Alabama, 1961-65.

Variety	Transplanted and Field seeded same date 1961-63			Transplanted 7-10 days after field seeding 1964-65			
	Transplants	Field Seeded	Mean	Transplants	Field Seeded	Mean	Mean of Means
Florida No. 1	14.5	12.3	13.4	14.7	13.5	14.11	13.75
Seminole	13.1	10.8	12.0	13.9	12.5	13.20	12.56
Florisun	12.8	10.3	11.6	12.9	11.4	12.20	11.87
Edisto No. 47	11.0	8.5	9.7	11.4	10.1	10.80	10.25
134 F_1	10.9	8.3	9.6	11.1	10.3	10.70	10.13
Edisto	10.7	8.1	9.4	11.1	10.1	10.60	9.99
L-30-C-58	10.2	8.0	9.1	10.7	9.7	10.20	9.64
Rio Gold	8.1	5.5	6.8	8.7	7.5	8.10	7.47
PMR 45	8.5	4.9	6.7	8.5	7.3	7.90	7.28
Hales Best Jumbo	7.7	3.5	5.6	7.8	6.9	7.30	6.44
Mean	10.74**	8.01	9.38	11.08	9.91	10.50*	

*Differences significant at 5% level.
**Differences significant at 1% level.

cloudiness were also greater on the field seeded plants.

Fruit of transplanted plants matured approximately 14 days earlier (Table 5). Hales Best Jumbo and Florisun were the earliest varieties. Florida No. 1 matured fruit about 1 week after Florisun. Edisto 47 followed Florisun in maturity by approximately 2 weeks.

Table 5. Maturity dates for cantaloupe varieties and breeding lines at Auburn, Alabama 1961-65.

Variety No.	Name	Date of first mature fruit: Transplants	Field seeded 1/ 1 week before	Field seeded same date 2/
	Hales Best Jumbo	6-15	6-22	6-29
	Florisun	6-15	6-22	6-29
	PMR 45	6-22	6-29	7-5
	L-30-C-58	6-22	6-29	7-5
	Florida No. 1	6-22	6-29	7-5
	134 F_1	6-22	6-29	7-5
	Rio Gold	6-22	6-29	7-5
	Edisto	6-27	7-5	7-11
	Edisto 47	6-27	7-5	7-11
	Seminole	6-27	7-5	7-11

1/ Field seeded 1 week before plants were transplanted.

2/ Field seeded same date as plants were transplanted.

Literature Cited

1. Anonymous. 1964. The use of peat pots on vegetable crops. *Tech. Bul. No. 11, Vegetables.* Jiffy Pot Company of America. West Chicago, Ill.
2. Norton, J. D. 1964. Effects of field seeding and transplanting on cantaloupe production. *Ala. Agri. Expt. Sta. Highlights of Agri. Res.* Vol. 11, No. 1.
3. Romske, F. A. 1954. Studies of plant production methods for vegetable crops - - cabbage, tomato, onions, melons, cucumbers. *Okla. Agri. Expt. Sta. Bul.* B 421.

Progress with Persistent-Green Color and Green Seed-Coat in Snap Beans (*Phaseolus vulgaris* L.) for Commercial Processing[1]

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Abstract. Persistent-green color has been incorporated into curly top and common bean-mosaic virus resistant snap beans. Cooperative observation and processing trials throughout the United States indicate wide adaptability and good commercial potential for several lines. Release, during 1968, of one or more of these snap beans, to commercial seedsmen for seed increase is anticipated.

The green seed-coat character of common bean (*Phaseolus vulgaris* L.) as it occurs in the French cultivar "Flageolet a Grain Vert" has been known for many years (1). The possibility of transferring this character to a non-fibrous snap bean has appealed to many bean breeders. Processors have considered white seed-coat more desirable than colored seed-coat among snap beans, and green seed-coat appears to be an improvement over white. It has been suggested that the associated persistent-green color in the pods might produce a more attractive dark green color with improved uniformity of pod color within a processed pack[3].

The inheritance of green cotyledons in mature lima bean (*Phaseolus lunatus* L.) was reported by Magruder and Wester (4) in 1940. The inheritance of green seed-coat in lima bean has been reported by Tucker (5). The occurrence and inheritance of persistent-green color in asparagus (*Asparagus officinalis* L.) has recently been reported by Irizarry et al (3).

Hoffman and Kanapaux (2), investigating the chlorophyll content of 10 "normal" maturing bean cultivars, found that 5-sieve pods consistently contained less chlorophyll per unit of pod tissue than did 3-sieve pods. They postulated that this might be due either to a decrease of the ratio of the production to the destruction of chlorophyll in the pod or to a dilution effect as a result of increasing pod and seed size. Highly significant correlations between visual color ratings for fresh bean pods and their chlorophyll content were also found.

As maturation progresses in the "normal" bean pod, the chlorophyll content apparently declines even though the pod is still in a prime state for processing. It is probable that accelerated degeneration of chlorophyll may begin before such pods grow to maximum sieve size. As the developing seed approach maturity, deterioration of the green color becomes obvious and the pod changes to a light brown or tan color.

Among the persistent-green beans the color remains green even in the dry pod and seed-coat. The dry cotyledons may be either green or creamy white. The green color of the developing pods may remain relatively stable regardless of physiological age. Approaching seed maturity among persistent-green bean types cannot be readily determined by pod color change as is possible among normal-maturing beans. Loss of turger in the persistent-green pod is not accompanied by obvious color change. Prolonged exposure to sunlight will, however, bleach the green color from both the dry pod and the seed-coat.

The separation of bean pods into various sieve sizes in commercial practice may result in a mixture of color shades for cultivars in which the pods tend, with increasing size, to become severely compressed laterally. More mature pods when laterally compressed fall into a sieve size with less mature pods and therefore contribute to a non-uniform color in the processed pack. Bean cultivars in which the chlorophyll content of the pods remains relatively stable during all physiological stages of pod growth could contribute substantially to color uniformity.

"Flageolet a Grain Vert" pods have strong suture fiber (strings) and a high content of sidewall fiber. There is a strong tendency for inadequate pod set, due to blossom drop, and for malformed

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