Proc. Fla. State Hort. Soc. 103:94-96. 1990.

WATERMELON PRODUCTION AS INFLUENCED BY TRANSPLANT AGE[1]

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Additional index words. pretransplant nutrient conditioning.

Abstract. **A study to evaluate 'Crimson Sweet' watermelon [*Citrullus lanatus (Thumb). Matsum. & Nakai*] yield response to transplant age was conducted at 2 locations in southwest Florida. A direct-seeded treatment and 6 commercially-grown transplant age treatments ranging from 3 weeks to 13 weeks were assessed. In another study, the effect of pretransplant nutrient conditioning on establishment and yield of various age watermelon transplants was investigated. Data from both sites indicated that use of transplants increased the number and weight of fruit at first harvest when compared to yield with the direct-seeded treatment. Transplant age had no effect on yield at consecutive harvests or on the total yield. Pretransplant nutrient conditioning as a soil drench application had no effect on fruit weight, number of fruit, or yield among the transplant age treatments.**

The optimal age for a watermelon transplant is considered to be four weeks (3). A general view of watermelon transplant literature indicates that older plants, flowering plants, or plants with poor color will not grow off properly. Recently, Lamont (4) showed that broccoli plants, grown for 278 days in their original containers before transplanting yielded comparably to transplants of "optimal age". Such information provokes the rethinking of certain horticultural concepts.

Because of weather or difficulties in meeting planting schedules, growers may postpone delivery of their transplants well beyond the scheduled delivery date. Growers often reject older transplants because holding them an extra week or two may result in a non-typical plant. However, in the event of extensive crop loss, growers desperate for resets, will take all plants regardless of age or condition.

This research was undertaken to discern what effect transplant age has on watermelon yield and quality.

Materials and Methods

Watermelon cultivar Crimson Sweet was seeded into custom 100 cell, styrofoam transplant trays at biweekly intervals resulting in the following age plants: 3, 5, 7, 9, 11, and 13 weeks. A direct-seeded treatment was also included for comparison. All transplant were grown in the same size cell to reduce root ball size variability (2). Plug mix (Heco) was used as the planting media. The plants were grown commercially (Johnny Johnson Greenhouses) under conventional overhead watering with a constant feed fertilizer program of 1 lb 20-4-17 N-P-K/300 gal water.

Due to a transplant crop failure, 11 week old transplants had to be procured from another plant house. These plants were grown in smaller cells, appeared nutrient deficient upon arrival, and were flowering when set in the field.

Two sites were utilized in this study; Immokalee and North Fort Myers, Florida. The Immokalee site was a standard polyethylene mulch culture with seepage irrigation. Raised beds (8 inches in height, 36 inches in width) were on 12 foot centers. Beds were fumigated with 98% methyl bromide-2% chloropicrin at *180* lb/acre. A total of 187-61-245 lb N-P-K/acre was applied (3630 LBF); a bottom mix of 5-6-7 N-P-K plus micronutrients at 1000 lb/acre was broadcast then bedded over to a depth of 4-5 inches. A 19-0-25 N-P-K formulation was applied as the top mix at 720 lb/acre in 2 narrow bands 10 inches to either side of the plant row.

Additionally, 3 days prior to transplanting, one-half of the plants used in the transplant study were fertilized with a solution of 20-4-17 N-P-K at 50 ppm N. This treatment, termed pretransplant nutrient conditioning (PNC), supposedly provides a fertilizer reserve from which the plants could draw until the developing root system could reach the fertilizer in the bed. Data generated from this PNC group was compared to the non-PNC group to test the hypothesis.

The North Fort Myers site was a 10 year old Bahai grass pasture. Open ground raised beds (24 inches in height, 48 inches in width) were on 12 foot centers. Beds were not fumigated. A total of 100-40-80 lb N-P-K/acre was applied (3630 LBF) from a 10-4-8 fertilizer plus micronutrients at a rate of 1000 lb/acre, broadcast. Seepage irrigation was used.

Transplants and seed (both sites) were planted on 9 Feb. 1990. Plants that did not survive transplanting were reset within 10 days. Plants that died after this time were not reset due to compensatory growth by adjacent plants.

Both sites utilized 21-foot plots with an in-row spacing of 3 feet. A 9-foot alley separated each plot. Harvest dates were 27 Apr. and 4, 15, and 25 May at the Immokalee site and 3 and 17 May at the North Fort Myers site. Harvests were assessed for marketable yield, fruit weight, and number of fruit by individual and combined harvests.

A Florida Cooperative Extension program of fungicides, and insecticides at recommended rates was applied on a preventative maintenance schedule. Each treatment was replicated 4 times in a randomized complete block design. The data were analyzed by analysis of variance with mean separations by LSD at $p < 0.05$.

Results and Discussion

No significant reduction in plant stand between treatments were found at either site ($p < 0.05$).

Fort Myers site. Data from the Fort Myers site are presented in Table 1. Watermelon yields among transplant

[1]Florida Agricultural Experiment Station Journal No. N-00357.

Table 1. Watermelon yield data from the Fort Myers transplant age trial spring 1990.

Age of transplant	Harvest 1st	2nd	Total
	----------- CWT/acre -----------		
Seeded	245.0	351.5	596.6
03 weeks	352.5	300.1	652.6
05 weeks	405.5	302.1	707.8
07 weeks	317.7	386.3	704.2
09 weeks	377.2	240.5	617.6
11 weeks	229.5	258.4	487.9
13 weeks	371.1	299.8	670.7
LSD 5%	150.4	NS	NS
	--------- no. fruit/acre ---------		
Seeded	1235	1784	3020
03 weeks	1601	1327	2928
05 weeks	1922	1235	3157
07 weeks	1372	1830	3202
09 weeks	1738	1190	2928
11 weeks	1098	1235	2333
13 weeks	1601	1372	2974
LSD 5%	692	NS	NS
	------------- lb/fruit -------------		
Seeded	19.6	18.6	19.5
03 weeks	22.0	22.3	22.2
05 weeks	21.3	24.0	22.2
07 weeks	23.7	20.9	22.0
09 weeks	21.7	19.5	21.1
11 weeks	19.7	20.9	20.6
13 weeks	23.3	22.4	22.6
LSD 5%	3.8	3.2	2.6

treatments was not significantly different except at first harvest. Plants from the direct-seeded treatment and the 11-week-old transplant treatment produced significantly lower yields at first harvest than the 5-week-old transplant treatment. No other differences in transplant treatment occurred at first harvest though the 5-week-old transplants did produce the highest yield.

Plants from the direct-seeded treatment might be expected to yield lower than those from most transplant treatments due to the earlier start given the transplant. The difference between watermelons from the tranplant treatments and the direct-seeded treatment, however, was expected to be larger. One explanation might be that several weeks elapsed before the seepage irrigation was properly implemented at this site. Though modest rainfall allowed growth, the transplants may have been at a disadvantage in supporting more foliage thus reducing the competitive advantage of an advanced age over plants from direct-seed age.

The 11-week-old transplant was decidedly different in appearance than plants from the other treatments and was expected to perform differently.

Second harvest and the total yield showed no differences with respect to yield among treatments. The 3, 7, 9, 11, 13 week old transplants, and seeded crop produced 92%, 99%, 87%, 69%, 95%, and 84% of the total yield produced by the 5 week old transplants (707.8 cwt), respectively.

Number of fruit per acre was influenced by transplant age in a similar pattern as fruit weight (Table 1). Again, differences between treatments occurred only at the first harvest and only between the direct-seeded plants and 11-week-old transplants and the 5-week-old transplants. Furthermore, at the second harvest and the total yield differences between treatments were not significant.

The 11-week-old transplants produced 73% of the fruit produced by 7-week-old transplant (greatest number of fruit = 3202). However, with all other treatments, total number of fruits per acre was greater than 90% of that with the 7-week-old transplant.

Concerning the average fruit weights of watermelons grown at the Fort Myers site, the 7-week-old transplants (23.7), the 5-week-old transplants, and the 13-week-old transplants produced the heaviest watermelons at first, second, and total harvests, respectively. Plants from the direct-seeded treatment produced the lightest weight fruit.

Immokalee site Pretransplant Nutrient Conditioning. Pretransplant nutrient conditioning as a soil drench treatment vs. a non-soil drench fertilizer treatment had no effect on watermelon yield (data not shown). Pretransplant nutrient conditioning apparently had no effect on transplant age with respect to yield.

These data are in agreement with Dufault and Melton (1) who found that early tomato transplant growth was influenced by pretransplant nutrient conditioning but not final yield. Pretransplant nutrient conditioning had no effect on watermelon fruit number or fruit weight.

Transplant age. The effect of transplant age on watermelon growth at the Immokalee site was approximately the same as that observed at the Fort Myers site. Conditions were optimum at the Immokalee site and the competitive advantage of the transplant was observed at the first harvest (Table 2). All transplants out-yielded the plants from direct-seeded treatment at first harvest. The 11-week-old transplants yielded significantly lower than the 13-week-old and the 5-week-old transplants.

Differences among treatments for the second, third, and fourth harvests and total yield were not significant. Plants from the direct-seeded treatment produced 85% of the total yield produced by the 5-week-old transplants

Table 2. Watermelon yield data from the transplant age trial at Immokalee in the spring of 1990.

Age of transplant	Harvest 1st	2nd	3rd	4th	total
	----------- CWT/acre -----------				
Seeded	19.4	516.6	296.4	134.2	966.5
03 weeks	275.7	502.3	189.7	123.5	1107.8
05 weeks	316.9	525.3	184.6	100.5	1127.4
07 weeks	257.9	495.8	161.8	109.9	1025.7
09 weeks	258.2	517.5	207.0	114.8	1097.4
11 weeks	191.3	538.2	165.7	143.8	1039.1
13 weeks	319.0	436.8	198.0	87.1	1040.9
LSD 5%	89.9	NS	NS	NS	NS
	----------- no. fruit/acre -----------				
Seeded	86	2651	1469	836	5042
03 weeks	1210	2391	922	864	5388
05 weeks	1354	2449	980	694	5474
07 weeks	1095	2363	864	778	5100
09 weeks	1124	2507	1127	778	5532
11 weeks	807	2680	922	893	5302
13 weeks	1325	2190	1011	553	5071
LSD 5%	403	NS	NS	NS	NS

(highest yield in the study). All the transplants yielded greater than 91% of the 5-week-old transplants yield. The 3, 7, 9, 11, and 13 week-old transplants produced 98%, 91%, 97%, 92%, and 92%, of the total yield produced by the 5-week-old transplant (1127.4 cwt), respectively.

All transplants yielded more fruit at the first harvest than the plants from the direct-seeded treatment (Table 2). The 11-week-old transplants yielded significantly fewer fruit than the 13-week-old and the 5-week-old transplants at the first harvest. The number of fruit per acre for the second, third, fourth, and total harvests were not influenced by treatment.

Treatment had no effect on individual fruit weight (data not shown). Fruits were slightly heavier at the first harvest (23.8 lb) and declined with the second, third and fourth harvests to 20.6 lb, 18.8 lb, 15.3 lb, respectively. The average 'Crimson Sweet' fruit in this trial weighed 20 lb.

These data indicate that transplant age is not as large a factor in determining maximum watermelon yield as previously thought. These data support the use of transplants for an earlier harvest advantage over direct-seed age, however, the condition of the transplant may be more important than age in determining the effects on yield as indicated by the response of 11-week-old transplants.

In both studies the 5-week-old transplants produced higher total yields, however, in both studies the differences between transplant treatments were not significant.

Pretransplant nutrient conditioning at this level, 3 days prior to setting had no effect on watermelon transplant production. Both the transplant age and pretransplant nutrient conditioning studies are preliminary experiments deserving further consideration before the findings are to be determined valid. However, such results do provoke the rethinking of certain horticultural givens.

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Proc. Fla. State Hort. Soc. 103:96-98. 1990.

SHORT DAY ONION CULTIVARS FOR NORTH FLORIDA

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Additional index words. sweet onions

Abstract. **Onions (*Alium cepa* L.) are currently produced on approximately 100-200 acres in Florida. Short day cultivars of Granex or Grano types of onions were recently evaluated at several sites in Florida. Onion yields in 4 trials in North Florida ranged from 146 to over 389 cwt/acre. Additional trials at Live Oak and Quincy, FL were conducted to further evaluate onion as an alternative crop for the North Florida region. Cultivars that consistently ranked high in terms of total yield include Granex 429, Granex 33, and Sunre 1502. 'Granex 33' and 'Granex 429' have consistently had the greatest percentage of large onions. Intermediate overall yield performance was found with 'Texas Grano 1015Y', 'Henry's Special', 'Texas Grano 502', 'Special 38', and 'Sunre 1506'. Several other cultivars are included which were evaluated 1 or 2 years.**

Sweet bulb onion production is limited to an estimated 100-200 acres in Florida. Short day cultivars of Granex or Grano types have been evaluated in several trials with promising results (2, 3, 4, 5, 6). Marketable onion yields have ranged from 150 to over 650 cwt/acre. With adequate moisture, onions can be produced on most mineral soils (1). The climate of most of Florida is favorable for excellent production of onions. Conditions in Florida provide for reduced risk of freeze damage in comparison to current production areas of Georgia. Due to the milder temperatures in Florida, harvest can be earlier than most production areas of Georgia. Studies reported here were conducted to evaluate the performance of several onion cultivars in Live Oak and Quincy, FL.

Materials and Methods

Onions at both trial locations were seeded in the fall and transplanted to plots in the following springs (See Table 1). Onions at Quincy were grown on single rows 24 inches apart with standard bare ground culture. Onions at Live Oak were grown using a full bed black polyethylene mulch system with mulched beds on 5 feet centers with 4 rows of onions per bed. The soil at Live Oak was fumigated with a methyl bromide/chloropicrin mixture as the beds were mulched. The soil at Quincy was treated with oxyfluorfen (0.04 lbs. ai/acre) after transplants were set. In the

Univ. of Florida Agr. Expt. Journal Series No. N-00362.