Planting cut sweet potato roots at the rate of 12 pieces per sq ft resulted in best yields of transplants in San Bernardino County tests.

Effect of Seed Piece Spacing on the Production of SWEET POTATO TRANSPLANTS

F. H. TAKATORI · N. C. WELCH · J. I. STILLMAN

CUT SWEET POTATO roots produce more shoots per unit area of bed space than whole roots when equal weights are planted. Most producers of transplants, plant whole roots as compactly as possible, in propagating beds, with little or no spacing between the roots. The question of whether cut roots planted in similar manner would show some crowding effects to subsequent shoot production, had not been determined. Plants grown under crowded conditions have a tendency to be spindly and appear tender, consequently they are difficult to handle and less apt to survive in the field. This condition reduces the production of serviceable transplants and minimizes advantages gained from cutting the roots.

Spacing trials were conducted in 1961 and 1962 to determine the effects of seed piece spacing on subsequent shoot production. Roots of the Velvet variety were sprouted in bean straw propagating beds. Cylindrical roots 6 to 8 inches in length and weighing an average of 0.3 lb were selected from grower seed lots and cut transversely in half for these tests.

In 1961, each treatment contained 50 cut seed pieces, replicated four times. Spacings were obtained by altering the plot size from 3 sq ft to 6 sq ft. In 1962, the size of the plots was kept constant at 3 sq ft and the number of cut roots within each treatment varied from 13 to 50 pieces. The minimum or closest spacing used in these tests was .06 sq ft per seed piece. At this spacing, all the seed pieces were touching adjacent seed pieces and were comparable to planting 8 whole roots or 16 half pieces per sq ft of propagating bed. Spacings of .06, .09, .12 and .23 sq ft per seed piece were tested in the trials. These were comparable to plantings of 16, 12, 8 and 4 seed pieces per sq ft of propagating bed.

The performance of cut sweet potato roots planted at various spacings was evaluated by the yield of serviceable transplants. Because the use of any single criterion such as plant weight, height, or hardiness, is limited in evaluating a good transplant, the selection of serviceable transplants was made by the grower's picking crew.

In 1961, adverse weather caused the emergence of shoots to be erratic and yields were low. The largest initial yields of shoots were obtained with spacings of .06 and .09 sq ft per cut piece or 16 and 12 cut pieces per sq ft of bed spacing. After 3 harvests, the largest total yields were obtained by planting 12 cut pieces per sq ft. Planting less than 12 pieces per sq ft reduced both the initial and total yields. The greatest number of immature shoots remaining in each treatment when the trials were terminated was in the closer spacings, as shown in Table 1.

In 1962, growing conditions were favorable, and high yields were obtained. As in 1961, planting 16 or 12 cut seed pieces per sq ft gave the highest initial yield. Planting less than 12 cut pieces per sq ft depressed both the initial and total yields considerably. For both years, very little difference in weight of shoots was observed among the plants from the various spacings, as shown in Table 2.

The number of serviceable transplants harvested from each seed piece increased at the wider spacings. In 1961, an average of 5.1 shoots were harvested from each seed piece when planted 16 per sq

TABLE 1. THE EFFECT OF SEED PIECE SPACING ON THE YIELD AND WEIGHT OF SWEET POTATO TRANSPLANTS, 1961

	Number of whole roots per sq ft of bed		Number of cut seed pieces per sq ft of bed					
	8		16		12		8	
	Shoots/sq ft		Shoots/sq ft		Shoots/sq ft		Shoots/sq ft	
	Number	Weight (gram)	Number	Weight (gram)	Number	Weight (gram)	Number	Weight (gram)
Harvest 1	35.0	7.75	49.3	8.30	50.3	7.30	24.0	7.30
Harvest 2	63.6	7.75	65.3	7.75	74.0	7.30	52.0	7.30
Harvest 3	82.3	8.30	81.7	7.75	93.7	7.30	75.0	7.30
Remainder after third harvest	17.0	1.80	33.3	3.65	29.7	3.65	29.3	2.74
Total yield	97.0	7.75	115.0	6.38	121.3	6.38	104.3	6.38

TABLE 2. THE EFFECT OF SEED PIECE SPACING ON THE YIELD AND WEIGHT OF SWEET POTATO TRANSPLANTS, 1962

	Number of cut seed pieces per sq ft of bed							
	16		12		8		4	
	Shoots/sq ft		Shoots/sq ft		Shoots/sq ft		Shoots/sq ft	
	Number	Weight (gram)	Number	Weight (gram)	Number	Weight (gram)	Number	Weight (gram)
Harvest 1	79.3	5.47	79.3	5.02	57.0	5.93	30.7	6.38
Harvest 2	149.3	5.02	128.0	5.02	87.3	5.47	50.7	5.47

CALIFORNIA AGRICULTURE
Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

William W. Paul.....*Manager*
Agricultural Publications

Jerry Lester.....*Editor*
California Agriculture

California Agriculture will be sent free upon request addressed to: Editor, *California Agriculture*, 207 University Hall, 2200 University Avenue, Berkeley 4, California.

141

ft as compared to 7.8 and 9.4 for spacings of 12 and 8 cut seed pieces per sq ft. In 1962, 9.3, 10.7, 10.6, and 12.7 serviceable shoots per seed piece were obtained for plantings of 16, 12, 8 and 4 seed pieces per sq ft.

To check the possibility of sugar depletion in the seed pieces—which could result in poor shoot production—sugar analysis of the seed pieces was made in 1961. Samples were taken for analysis prior to planting and again approximately two months after planting, when the study was terminated.

Sweet potato roots contained an average of 59.4% starch, 14.9% total sugars, and .27% reducing sugars on the dry weight basis prior to planting. During the period of shoot production both total sugars and the reducing sugars increased as expressed as per cent of dry weight. The starch content decreased from 59.4% to approximately 43.0%. The per cent starch content of whole roots and cut roots at the termination of the trial was very similar, as shown in Table 3.

TABLE 3. THE CHANGE IN CARBOHYDRATE CONTENTS IN SWEET POTATO ROOTS USED FOR THE PRODUCTION OF TRANSPLANTS, 1961

	Preplant	After harvest			
		No. whole roots per sq ft of bed	No. cut roots per sq ft of bed		
		8	16	12	8
		Per cent dry weight			
Starch	59.4	43.3	44.3	40.5	38.3
Total sugar.	14.9	23.8	24.5	23.9	25.0
Reducing sugar ...	.27	.50	.50	.57	.54

The results of these studies suggest that planting 12 cut pieces per sq ft would be most advantageous to the growers. From the practical standpoint this would be approximately ½ inch between seed pieces. No advantage was gained by planting 16 seed pieces per sq ft as compared to 12. At the same time, no loss of production was observed at the closer spacing, although the production per seed piece was reduced. As judged by the number of shoots remaining on the seed pieces when the trials were terminated, it appears that larger yields would be obtained from the closer spacings if subsequent pullings are to be made. Planting less than 12 seed pieces per sq ft reduced the yield of serviceable transplants.

F. H. Takatori is Associate Specialist in Vegetable Crops, University of California, Riverside; Norman Welch is Farm Advisor, San Bernardino County; and J. I. Stillman is Laboratory Technician, U.C., Riverside.

J. H. BLACK · C. S. DAVIS · V. E. BURTON · K. W. HENCH

Thrips CONTROL ON NECTARINES

In years of heavy thrips populations, the choice of proper materials, including the more effective organic phosphates, and timing of applications are extremely important to avoid damage in nectarines. In a year of low thrips populations, and especially when the one-thrips-nymph-per-blossom level does not occur until late in the bloom period, choice of material and timing of applications are not as critical; and treatment may be unnecessary or of little economic value. This report summarizes four years of research in Kern County.

FLOWER THRIPS, *Frankliniella occidentalis* (Perg.), have long been a problem in the production of nectarines. Adult thrips may move from the cover crop or other nearby crops into nectarines and deposit eggs as soon as blossoms appear. Upon hatching, nymphs begin feeding at the base of the pistil (developing fruit) and continue to feed until the calyx or jacket drops. Thrips feeding on fruit from bloom to jacket stage results in scarred fruit which lowers the market quality.

The standard treatment for thrips control on nectarines for many years was 2 lbs. 50% DDT wettable powder per 100 gallons of water. In 1958, the fruit in several orchards in Kern County receiving this treatment was severely damaged by thrips, which indicated that this treatment did not give satisfactory control. The question to be answered was whether the failure of DDT on nectarines was due to improper timing, DDT resistance or to improper application.

In 1959, a test was conducted to establish the relationship of heavy thrips populations to blossom drop. Large paper bags were sealed onto the tips of 20 branches during the pre-bloom period. Into each of ten paper bags were placed 25 adult flower thrips and the remaining ten bags were treated with DDT and parathion dust to eliminate all insect life that may have been on the branches at the time of bagging. At the end of the bloom period,

Typical scars on skin of nectarine caused by flower thrips feeding on fruit from bloom to jacket stage.