

'SUE-LINDA TEMPLE'

A. P. PIERINGER

*IFAS Agricultural Research and Education Center
Lake Alfred*

Abstract. The 'Sue-Linda Temple' originated at Merritt Island, Florida as a single tree within a commercial planting of "Temple" oranges. In January of 1973, 4 or 5-year-old trees propagated from the original tree were shown to the author by the owner and discoverer.

Internal fruit characteristics differ from 'Temple' by having fewer seeds, earlier maturity, a deeper flesh and juice color, and a greater juice content. External fruit characteristics, color, size, shape, and texture are similar to the standard 'Temple.'

Pollen of this selection is viable and fruit set is not dependent on pollinator plants. The effect of other pollens on seediness has not been established.

Indexing has shown the selection to be positive for tristeza, xyloporosis, and exocortis, but negative for psorosis virus.

Within the range of its adaptation, the citrus cv. 'Temple' produces fruit of outstanding quality and attractiveness. The selection of 'Temple' described herein produces fruit with characteristics which further enhance the attractiveness of this cv.

History. Recurring observations of "seedless" 'Temples' at a family-operated specialty fruit business of Mr. and Mrs. Robert L. Schlernitzaur of Rockledge, Florida resulted in finding a tree that produced 'Temple' fruit with fewer seeds than normal. Limited propagations for use in their groves were made from the original tree using budwood contiguous to fruit with the least number of seeds. On January 23, 1973, when the propagated trees were approx 5 years old, the Agricultural Research and Education Center at Lake Alfred was asked to determine the value of this selection and if worthy to introduce it to the citrus growers of Florida. The owners retained the privilege of naming the selection and have chosen the name 'Sue-Linda Temple' in honor of their daughters.

Origin. The original tree is approx 35 years old and is on sour orange rootstock. It is presently several feet taller than the other 'Temple' trees in the planting. One limb at the southwest corner of the tree is obviously off-type with more typical mandarin-type leaves. Neither of these characteristics attract attention to the tree. Genetic differences seem plausible because of apparently thicker leaf blades. This characteristic supplemented with information concerning larger stomate size suggests the possibility of a higher ploidy than the diploid state of standard 'Temple.' Chromosome counts of foliar tissue however, confirmed the diploid condition.

Procedure. The following descriptions and comparisons were made over the past 3 cropping years from fruit samples grown in the same commercial grove at Merritt Island, Florida on sour orange rootstock. Except as noted, the 'Sue-Linda Temple' fruit samples were collected from 2 selected trees; the exceptions are from other trees propagated from the same source, of the same age, and planted in the same area. These exceptions are listed under the table headings "Other." These "Other" 'Sue-Linda Temple' trees provided fruit for the yield data and the second sample of 'Sue-Linda Temple' fruit used in 1974-75.

The standard 'Temple' was represented by trees of about 10 to 12 years of age and fruit samples were composed of fruit collected randomly from 2 rows of this planting. The 1974-75 samples were collected from the same 2 rows, but were picked randomly from each of the 2 rows so that the samples are listed as Row 1 and Row 2.

Brix and acid determinations were made in the laboratory using respectively a hand refractometer and a direct reading burette.

Fruit size and shape. No visual differences have been observed in the external characteristics of the fruit. 'Sue-Linda Temple' looks like a 'Temple.' The average size of the fruit measured during 2 cropping seasons differed by approx 1/16 inch. A sample of 323 'Temple' fruit averaged 2.773 inches (ca. 2-25/32 inches); 364 'Sue-Linda Temple' fruit averaged 2.842 inches (ca. 2-27/32 inches).

Color. No differences in external color of the fruit have been observed.

Internal color of the 'Sue-Linda Temple' is a deeper orange that is found in both the flesh and the juice. It persists throughout the entire

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season. Table 1 shows the color characteristics of 'Temple' and 'Sue-Linda Temple' for 2 sampling dates of the 1972-73 crop. Both the yellow (CY) and the red (CR) values increase with time as does the color score. The greater amount of red color in the 'Sue-Linda Temple' is responsible for the higher color score, a method used in industry to score citrus juice colors (1). Subsequent sampling of the 2 fruit types showed the same darker flesh and juice, but the color score was not determined because of the obvious visual differences.

Juice content. The juice content of the 1972-73 samples were compared on the basis of per cent juice by wt. Weight of the 'Temple' juice of each sample was slightly greater than 50% of the total fruit wt; 'Sue-Linda Temple' about 60% of the total fruit wt. Total juice vol of each sample was recorded during the 2 following years (Table 2). Except for 2 sampling dates, the 'Sue-Linda' samples exceeded 'Temple' in vol of juice by 40 ml to over 300 ml of juice per 20 fruit sample, or a difference of approx 2 to 15%.

Yield. Comparative data on yield is not available because 'Temple' trees of comparable age were not available in the grove. The 'Sue-Linda Temple' data (Table 3) was obtained from 2 trees and is believed to be representative of the yield of 'Temple' trees in this grove at the time they were 5 to 6 years of age.

Internal quality and maturity. Table 4 lists the % Brix, % acid, and Brix/acid ratio at intervals during 3 cropping years. The sampling procedures were changed for the 1974-75 crop as previously described, because of the erratic blooming period and numerous fruit sets.

The first year of sampling began after legal

Table 1. Differences of Hunterlab Citrus Colorimeter redness (CR) and yellowness (CY) values for 'Temple' and 'Sue-Linda Temple' juice samples collected at 2 dates during the 1972-73 cropping year.

Cultivar	Sampling date	CY	CR	Color score
Sue-Linda Temple	Jan. 23, 1973	80.1	46.9	39.1
	1973	76.9	37.9	37.3
Sue-Linda Temple	Feb. 15, 1973	83.0	48.5	39.7
	1973	83.5	41.6	38.6

Table 2. Differences in total juice vol (ml) of 'Sue-Linda Temple' and 'Temple' for individual 20-fruit samples collected at intervals during 2 cropping seasons.

Sampling date	Sue-Linda		Temple ^z	
	Select	Other	Row 1	Row 2
<u>1973-74</u>				
Nov. 29	2090	--		2050
Dec. 12	2080	--		1970
Dec. 20	2360	--		2060
Jan. 11	2500	--		2140
Jan. 25	2300	--		2250
<u>1974-75</u>				
Nov. 21 ^y	1260	1120	850	1260
Dec. 4	1870	1780	1530	1700
Dec. 18	1910	1860	1550	1820
Dec. 31	1870	2100	1650	1900
Jan. 16	2070	2070	1570	1870
Jan. 29	2000	2120	--	1460
Feb. 11	2290	2300	--	--

^zThe 'Temple' samples in 1973-74 were composed of fruit collected randomly from trees in both rows. In 1974-75 random samples were collected from each of the 2 rows.

^yNov. 21, 1974 samples were composed of 12 fruit.

maturity had been attained. Brix and acid contents of the 'Sue-Linda Temple' were higher but the Brix/acid ratio was somewhat lower than 'Temple.' During the next 2 cropping seasons (1973-74 and 1974-75), the Brix readings of 'Sue-Linda Temple' were equal to or slightly lower than 'Temple.' The acid content was generally lower; therefore, the 'Sue-Linda Temple' had a higher ratio than 'Temple.' In these 2 years, despite the erratic sampling results in 1974-75, the 'Sue-Linda Temple' attained an 8.5:1 ratio

Table 3. Yield of 2 'Sue-Linda Temple' trees in field boxes, number of fruit, and wt in pounds of fruit from 2 consecutive cropping years and breakdown of 1974 crop into size groups.

Harvest date	Tree A			Tree B		
	No. boxes	No. fruit	Lb. fruit	No. boxes	No. fruit	Lb. fruit
Feb. 7, 1974	2	426	204	2	550	226
Feb. 11, 1975	2	613	209	2+	671	241.5
No. per box	125		163	209		252
Avg. diam (in.)	3-5/16		3-1/16	2-7/8		2-5/8
No. fruit	71		201	289		181
% fruit	9.6		27.1	38.9		24.4

Table 4. Internal quality of 'Sue-Linda Temple' and 'Temple' as determined from 20-fruit samples collected at intervals over a period of 3 cropping years.

Sampling date	Brix				Acid				Ratio			
	Sue-Linda		Temple		Sue-Linda		Temple		Sue-Linda		Temple	
	Select ^z	Other ^y	Row 1	Row 2	Select	Other	Row 1	Row 2	Select	Other	Row 1	Row 2
<u>1972-73</u>												
Jan. 23	13.1	--	11.9		1.16	--	1.03		11.29	--	11.55	
Feb. 1	13.1	--	10.8		1.17	--	.99		11.20	--	10.91	
Feb. 8	12.6	--	11.4		1.12	--	.97		11.25	--	11.75	
Feb. 15	13.5	--	11.7		1.18	--	.96		11.44	--	12.19	
Feb. 23	14.6	--	13.0		1.18	--	1.03		12.37	--	12.62	
<u>1973-74</u>												
Nov. 29	10.8	--	11.2		1.29	--	1.48		8.37	--	7.56	
Dec. 12	11.2	--	11.5		1.26	--	1.40		8.89 ^w	--	8.21	
Dec. 20	11.2	--	11.5		1.20	--	1.43		9.33	--	9.04 ^w	
Jan. 11	12.2	--	12.1		1.17	--	1.18		10.43	--	10.25	
Jan. 25	13.1	--	12.8		1.20	--	1.16		10.92	--	11.03	
<u>1974-75</u>												
Nov. 21 ^x	11.6	12.5	12.4	11.4	1.54	1.67	2.07	1.64	7.53	7.49	6.20	6.95
Dec. 4	11.9	12.5	12.7	11.9	1.53	1.62	2.00	1.70	7.78	7.72	6.35	7.00
Dec. 18	12.2	12.8	12.8	12.1	1.39	1.50	1.83	1.47	8.78 ^w	8.53 ^w	6.99	8.23
Dec. 31	13.1	13.0	13.6	12.3	1.19	1.37	1.62	1.36	11.01	9.49	8.40	9.04 ^w
Jan. 16	13.4	13.2	13.8	12.7	1.25	1.23	1.54	1.33	10.72	10.73	8.96 ^w	9.55
Jan. 29	13.5	13.4	--	13.8	1.15	1.22	--	1.21	11.74	10.98	--	11.40
Feb. 11	13.9	14.1	--	--	1.22	1.32	--	--	11.39	10.68	--	--

^zTwo selected trees from which budwood was obtained for indexing and future propagation.

^ySeveral trees propagated from the same source, of the same age, and planted in the same area which have not been indexed for the citrus virus diseases.

^xNov. 21, 1974 samples were composed of 12 fruit.

^wLegal maturity min ratio for 'Temple' as fresh fruit 8.5:1.

(min ratio for fresh fruit) earlier than 'Temple.' The exact date of attaining legal maturity is not discernible from the data. The underlined figures in the "Ratio" column in Table 4 indicate the sample which equaled or exceeded the min ratio for fresh fruit. From these data, it can be seen that 'Sue-Linda Temple' reached legal maturity approx 2 weeks before 'Temple.'

Ascorbic acid determinations indicated the vitamin C content of 'Sue-Linda Temple' juice to be slightly less than in 'Temple' juice. This may be directly correlated to the lower total acid content of the 'Sue-Linda Temple' fruit.

Seed count. The most obvious visual characteristic of this selection is the "seedless" nature of its fruit. Number of seeds in all fruit sampled over 3 years of testing averaged 8.2 seeds per fruit for 'Sue-Linda Temple' and 19.8 seeds per fruit for the 'Temple.' Average number of seeds per fruit within individual samples throughout the testing period ranged between 5 through 10 in 'Sue-Linda Temple' and 16 through 23 in 'Temple.' The number of seeds in 140 individual fruit of 'Sue-Linda Temple' ranged from 1 through

12 with 58% of the fruit containing 6 or less seeds, 37% with 7 through 9, and 5% with 10, 11, or 12 seeds per fruit. In 120 'Temple' fruit, the seed count ranged between a min of 7 to a max of 37 seeds per fruit with 83% of the observed fruit containing 17 through 28 seeds per fruit. The remaining fruit were divided equally between the 2 extremities (7 to 16 and 29 to 37 seeds per fruit). An interesting aspect with regard to seed count is that 100 fruit from the original tree averaged 8.2 seeds per fruit.

Controlled pollinations were attempted to determine the effect of pollen of various citrus cvs. on seed count of 'Sue-Linda Temple.' Pollen of 'Sue-Linda Temple' is viable and produces fruit by selfing, making pollinator plants unnecessary. The effect of other pollen on seed count has not yet been clarified, therefore, positive statements about the seed counts expected under various field conditions cannot now be made. Further studies are under way to determine this.

Shipping and handling. A simulated marketing test was conducted with 'Sue-Linda Temple' fruit picked for the 1973-74 yield data. Under the

conditions of this test, i.e. without controls consisting of standard 'Temple' fruit and only 1 year of testing, it was found that in general decay was low, comparing favorably with results obtained with 'Temple' in other tests. No abnormal peel injury and no stem-end drying even in the larger sizes was observed. Flavor of the fruit was still good 18 days after picking, only 4 days of which were under refrigeration.

Budwood. The most important reason for having limited the data of the 'Sue-Linda Temple' to the 2 selected trees is because these 2 trees provided the budwood for indexing of virus diseases by the Bureau of Citrus Budwood Registration, Budwood Certification Program of the Florida State Department of Agriculture. Indexing has shown these 2 trees to be positive for tristeza, xyloporo-

sis, and exocortis, but negative for psorosis virus. Symptoms of psorosis virus have not been observed during the past 2 cropping seasons on any of the propagated trees or in the original tree. Two years of indexing for psorosis virus have been completed with negative results. Budwood of the 'Sue-Linda Temple' is, therefore, legally available for commercial propagation.

It is proposed that the distribution of budwood be made from the 2 selected 'Sue-Linda Temple' trees under the Validation Program of the Bureau of Citrus Budwood Registration, provided interest in the variety is expressed.

Literature Cited

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SOME PHYSICAL AND CHEMICAL CHARACTERISTICS OF A DEEP, WELL-DRAINED SOIL PLANTED TO CITRUS^{1,3}

W. S. CASTLE² AND A. H. KREZDORN

IFAS Fruit Crops Department
Gainesville
and

N. GAMMON, JR.

IFAS Soil Science Department
Gainesville

Abstract. Several physical and chemical characteristics of Astatula fine sand were studied. The moisture characteristic curve of samples taken from a site in Lake County showed that the major portion of water present in saturated samples was held under very low tension and rapidly drained from the soil, decreasing the water content to only approx 6% by vol at a tension of 70 cm. The low water-retention capacity resulted from the predominance of macropores in the pore space. The distribution with depth of selected macro- and micro-nutrients and Al was determined. Organic matter content and pH decreased with depth. Poor

nutrient retention was associated with a low cation exchange capacity (CEC).

Plant available water was discussed in relation to the applicability of the term field capacity to deep, sandy soils. Measurements of soil moisture indicated that monthly mean soil water contents in the plant root zone were often greater than a commonly used field capacity value.

The central "Ridge" area of Florida, one of the most productive citrus areas of the world, is characterized by sandy soils which have low natural fertility and are somewhat overly drained. Citrus trees are very productive when these soils are properly managed (12), even though they are not generally recognized as ideal for agriculture.

Many of the physical and chemical properties of these soils are known but it is not completely understood how they relate to citrus production problems, such as the leaching loss of applied nutrients. The deep, sandy "Ridge" soils do not readily retain large quantities of mineral elements near the surface, the area generally considered the center of root activity; however, citrus trees root deeply in these soils (3). Roots exist in relatively large amounts in zones below the surface where the character of the environment has not been extensively studied. Therefore,

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²Present address: Agricultural Research and Education Center, P. O. Box 1088, Lake Alfred, Florida 33850.

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