

No formal variety trials or other cultural research in okra production were conducted before 1958 from which recommendations might be made for potential growers.

Experimental Procedure

Seven varieties--Perkins Mammoth Long Pod, Dwarf Green Long Pod, Clemson Spineless, Emerald, White Velvet, Louisiana Green Velvet and Louisiana Market--were evaluated in the springs of 1958 and 1959 in variety trials at the Lower Rio Grande Valley Experiment Station.

The 1958 trials were planted on February 27. The test design was a randomized block with four replications. Plots were single rows 50 feet long and row widths were 38 inches. The okra was thinned to a final spacing of 6 inches between plants. The soil type was Willacy fine sandy loam. Fertilizers applied were 40-60-0 as a preplanting application and 40-0-0 as a sidedressed treatment when the plants began to fruit. Fifteen harvests were made from May 15 to June 15.

The 1959 test, of similar experimental design and cultural practices as the 1958 trials, was planted on February 5. It was harvested 19 times from April 28 to June 13.

The harvested pods were graded in conformity with local standards for fresh market grades. Within marketable classes, all fruits were straight and free of blemishes; pod length determined the grade with lengths of less than $1\frac{1}{2}$ inches designated as grade 1, and lengths of $1\frac{1}{2}$ to $3\frac{1}{2}$ inches as grade 2. Yield and grade data as summarized by weekly production periods are shown in Table 2. Evaluations made from field notes recorded through the production season are shown in Table 3. Final ratings based on earliness, productivity and quality of marketable fruits are listed in Table 4.

Results in 1958

Growth and development in 1958 were affected adversely by prevailing weather conditions. Fruiting was delayed approximately 1 month. Average marketable yields are shown in Table 1.

Table 1. Average marketable yields of okra varieties grown in the Lower Rio Grande Valley in the spring of 1958

Variety	Marketable yield, pounds per acre	Percent marketable
Clemson Spineless	3,338	43.4
Dwarf Green Long Pod	2,842	31.5
Perkins Mammoth Long Pod	2,837	28.4
Emerald	2,256	35.6
Louisiana Green Velvet	2,192	50.2
White Velvet	2,025	41.1
Louisiana Market	1,610	56.4
L.S.D.	.05	308 pounds
	.01	423 pounds

The fruit quality of all varieties in 1958 was poor, and only a low percentage was marketable. Louisiana Market and Louisiana Green Velvet produced the highest percentages of marketable okra, 56.4 and 50.2 percent, respectively. Perkins Mammoth Long Pod and Dwarf Green Long Pod produced the poorest quality fruits, with only 28.4 and 31.5 percent, respectively, of the harvested production in the marketable grades. Although the poor fruit quality could be attributed partly to the adverse season, these data indicate a critical need for quality improvement.

Clemson Spineless produced 3,338 pounds per acre, with significantly higher marketable yields than the other varieties tested. Dwarf Green Long Pod and Perkins Mammoth Long Pod produced higher total yields than Clemson, but had lower percentages of marketable fruits. Perkins Mammoth Long Pod and Dwarf Green Long Pod were earlier than Clemson Spineless, but the fruits were not as good in quality. Clemson Spineless matured fruits earlier than Emerald, White Velvet, Louisiana Green Velvet and Louisiana Market. The latter varieties, although lacking in earliness of maturity, produced fruits of better quality than Clemson Spineless, Dwarf Green Long Pod and Perkins Mammoth Long Pod. Emerald had smooth pods of excellent dark green color.

Results in 1958 indicated that the earlier-maturing okra varieties produced the lowest percentages of marketable fruits, and higher fruit quality was associated with later maturity. Clemson Spineless, although lacking in both comparative quality and total production, was rated as the best adapted entry of the 1958 trials.

Results in 1959

As in the 1958 trials, the 1959 production was of poor quality. More than half of the pods harvested from Perkins Mammoth Long Pod and from Dwarf Green Long Pod, the two entries with the highest total yields, were not of marketable quality. Clemson Spineless, with 73 percent of the total production graded as marketable, produced 3,317 pounds per acre, the highest yield of marketable fruits. Louisiana Market produced the highest percentage of marketable pods; however, production was late and was less than half the marketable yield of Clemson Spineless.

Clemson Spineless again produced significantly higher yields of marketable fruits than the other varieties. Marketable yields of White Velvet, Perkins Mammoth Long Pod and Dwarf Green Long Pod were not significantly different, but they were significantly better than those of Emerald, Louisiana Market and Louisiana Green Velvet.

The yield of Clemson Spineless, with 1,397 pounds per acre, was significantly higher in grade 1 fruits than the other varieties tested. White Velvet, with a yield of 1,084 pounds per acre of grade 1 okra, was not significantly more productive than Dwarf Green Long Pod but did excel significantly Perkins Mammoth Long Pod, Louisiana Market, Emerald and Louisiana Green Velvet.

The yields of grade 2 okra harvested from Clemson Spineless, Perkins Mammoth Long Pod and White Velvet in 1959 were not significantly different, although Clemson Spineless had the highest production with 1,920 pounds per acre. The yield advantage of Clemson Spineless over Emerald, Louisiana Market and Louisiana Green Velvet within this grade class, however, was statistically significant.

Table 2. Okra variety trials in the Lower Rio Grande Valley, average weekly production by grades during the 1959 season

Variety	Production period	Yields, pounds per acre				Total	Percent production by weekly periods
		Grade 1	Grade 2	Marketable	Cull		
Perkins Mammoth Long Pod	4/28-5/5	68.5	167.1	235.6	142.4	378.0	7.16
" " " "	5/5-5/12	64.9	167.1	232.0	198.0	430.0	8.15
" " " "	5/12-5/18	72.5	165.6	238.1	367.5	605.6	11.47
" " " "	5/18-5/25	146.8	306.9	453.7	600.8	1054.4	19.97
" " " "	5/25-6/1	164.2	304.5	468.7	488.2	956.9	18.13
" " " "	6/1-6/9	191.8	442.9	634.6	713.7	1348.3	25.54
" " " "	6/9-6/13	124.8	190.0	314.8	190.8	505.5	9.58
	Total	833.4	1744.0	2577.3	2701.3	5278.7	
	Percent in each grade	15.79	33.04	48.83	51.17		
Dwarf Green Long Pod	4/28-5/5	77.9	131.8	209.7	116.6	326.3	7.04
" " " "	5/5-5/12	80.4	135.2	215.6	171.3	387.0	8.35
" " " "	5/12-5/18	66.4	119.2	185.6	217.4	403.0	8.70
" " " "	5/18-5/25	129.8	193.8	323.6	577.1	900.7	19.44
" " " "	5/25-6/1	186.5	266.9	453.4	407.9	861.3	18.58
" " " "	6/1-6/9	203.3	327.8	531.1	678.5	1209.7	26.10
" " " "	6/9-6/13	133.1	189.5	322.6	223.5	546.2	11.79
	Total	877.4	1364.2	2241.6	2392.4	4634.0	
	Percent in each grade	18.93	29.44	48.37	51.63		
Clemson Spineless	4/28-5/5	66.7	66.4	133.1	41.3	174.4	3.83
" " " "	5/5-5/12	93.7	89.2	182.9	81.3	264.1	5.79
" " " "	5/12-5/18	94.3	157.4	251.7	125.2	376.9	8.27
" " " "	5/18-5/25	166.8	355.4	522.2	373.0	895.2	19.64
" " " "	5/25-6/1	380.1	269.9	650.0	193.5	843.5	18.50
" " " "	6/1-6/9	323.0	704.9	1027.9	320.2	1348.1	29.57
" " " "	6/9-6/13	272.6	276.9	549.5	107.1	656.5	14.40
	Total	1397.2	1920.1	3317.3	1241.5	4558.7	
	Percent in each grade	30.65	42.12	72.77	27.23		

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Table 2. Okra variety trials in the Lower Rio Grande Valley, average weekly production by grades during the 1959 season (continued)

Variety	Production period	Yields, pounds per acre				Total	Percent production by weekly periods
		Grade 1	Grade 2	Marketable	Cull		
White Velvet	4/28-5/5	29.1	49.8	78.9	11.5	90.4	2.05
" "	5/5-5/12	79.2	134.7	213.9	110.4	324.3	7.35
" "	5/12-5/18	83.1	185.0	268.1	211.7	479.8	10.87
" " Green Velvet	5/18-5/25	145.6	282.3	427.9	427.9	855.8	19.39
" "	5/25-6/1	272.3	295.7	568.0	313.6	881.6	19.98
" "	6/1-6/9	225.0	502.5	727.5	472.5	1200.0	27.19
" "	6/9-6/13	250.1	190.1	440.2	141.1	581.3	13.17
Total		1084.4	1640.1	2724.5	1688.7	4413.2	
Percent in each grade		24.58	37.16	61.74	38.26		
Emerald	4/28-5/5	61.6	121.1	182.7	98.6	281.3	7.61
" "	5/5-5/12	44.9	95.2	140.1	99.5	239.6	6.48
" "	5/12-5/18	47.0	108.6	155.6	155.9	311.5	8.43
" "	5/18-5/25	91.6	231.7	323.3	404.2	727.5	19.68
" "	5/25-6/1	187.1	239.6	426.7	315.1	741.8	20.07
" "	6/1-6/9	186.7	310.3	497.0	437.3	934.3	25.28
" "	6/9-6/13	95.2	162.0	257.2	202.6	459.8	12.44
Total		714.1	1268.5	1982.6	1731.2	3695.8	
Percent in each grade		19.32	34.32	53.64	46.36		
Louisiana Market	4/28-5/5	3.2	1.8	5.0		5.0	0.23
" "	5/5-5/12	41.0	31.8	72.8	16.4	89.2	4.16
" "	5/12-5/18	46.1	76.7	122.8	44.6	167.4	7.81
" "	5/18-5/25	124.3	237.8	362.1	159.7	521.8	24.35
" "	5/25-6/1	185.9	134.1	320.0	61.9	381.9	17.82
" "	6/1-6/9	183.5	306.8	490.3	147.9	638.2	29.79
" "	6/9-6/13	158.9	119.7	278.6	60.7	339.3	15.84
Total		742.9	908.7	1651.6	491.2	2142.8	
Percent in each grade		34.67	42.41	77.08	22.92		

(continued)

Table 2. Okra variety trials in the Lower Rio Grande Valley, average weekly production by grades during the 1959 season (continued)

Variety	Production period	Yields, pounds per acre				Total	Percent production by weekly periods
		Grade 1	Grade 2	Marketable	Cull		
Louisiana Green Velvet	4/28-5/5	1.2	2.1	3.3	1.5	4.8	0.24
"	"	"	"	"	"	"	"
"	5/5-5/12	27.9	32.5	60.4	25.8	86.2	4.22
"	5/12-5/18	33.1	61.6	94.7	52.2	146.9	7.19
"	5/18-5/25	101.6	158.0	259.6	228.1	487.7	23.88
"	5/25-6/1	156.5	125.8	282.3	139.5	421.8	20.66
"	6/1-6/9	138.9	214.4	353.3	208.2	561.5	27.50
"	6/9-6/13	138.6	118.4	257.0	76.0	333.0	16.31
	Total	597.8	712.8	1310.6	731.3	2041.9	
	Percent in each grade	29.28	34.91	62.19	35.81		
	Grand average	892.5	1365.4	2257.9	1565.5	3823.4	
	Percent	23.34	35.71	59.05	40.95		
	L.S.D.	.05	221.9	397.3	572.5	1053.4	
		.01	303.9	544.2	784.3	1443.0	

Perkins Mammoth Long Pod produced the highest total yield in the 1959 trials with 5,279 pounds per acre. This yield was not significantly better, however, than that of Dwarf Green Long Pod, Clemson Spineless and White Velvet. Louisiana Market and Louisiana Green Velvet produced yields that were significantly lower than those of the other varieties.

Discussion and Varietal Comparison

Since a premium is paid for early okra, early fruiting and maturity is a factor second only to yield and market quality. As shown in Table 3, three of the seven varieties compared may be classified as very early in production characteristics. These varieties, Dwarf Green Long Pod, Perkins Mammoth Long Pod and Clemson Spineless, however, often are undesirably fibrous.

Pod shape, as a factor of quality, was particularly evident in the production of Louisiana Market, White Velvet and Louisiana Green Velvet. They produced a high percentage of straight pods, but were late in maturity and low in production. Pod shape of Clemson Spineless fruits was variable, ranging from crooks to straight pods. The number of pod carpels were studied to determine any possible relationships of shape to quality. Although no consistent relationship could be established, the straighter fruits tended to have the lower number of carpels. Louisiana Market, White Velvet and Louisiana Green Velvet produce straight fruits that contain five carpels. Emerald also produces five carpeled fruits; however, the pods are curved to crooked. As noted in Table 3, the carpel fruits from Perkins Mammoth Long Pod, Clemson Spineless and Dwarf Green Long Pod varied from five to ten.

For fresh market sales, pod color is an important factor of quality. Emerald, Louisiana Market and Louisiana Green Velvet consistently produced fruits of superior dark green color. Fruits of light green color occurring in the production of other green-podded varieties tended to distract from the overall market quality. The white pods produced by White Velvet are not as acceptable as green pods. Although Emerald fruits reportedly wilt enroute to markets, the fresh pod color is superior to that of other varieties.

Leaf shape is an important varietal characteristic. Heavy solid leaves tend to cover the pods and to result in more fruits being left in the field by harvest crews. Deeply serrated leaves often are a distinct varietal advantage of Clemson Spineless, Dwarf Green Long Pod and Emerald, as compared with Louisiana Market, Louisiana Green Velvet and White Velvet which have heavy solid leaves.

Conclusion

As shown in Table 4, Dwarf Green Long Pod, Clemson Spineless and Perkins Mammoth Long Pod are rated 1, 2 and 3 in earliness. In productivity these varieties also are rated in the top three places with Clemson Spineless being rated superior to Dwarf Green Long Pod. In fruit quality, however, Clemson Spineless, Perkins Mammoth Long Pod and Dwarf Green Long Pod are rated 5, 6 and 7 in that order. The varieties of the highest quality ratings tend to be the lowest in classification for the important factors of earliness and productivity. Clemson Spineless, rated 2 for earliness, 1 for productivity and 5 for quality, again was rated as the best available variety for production in the Lower Rio Grande Valley.

Table 3. Production characteristics of okra varieties in the Lower Rio Grande Valley

Variety	Earliness	Productivity	Leaf	Pod characteristics			
				No. carpels	Color	Straightness	Tenderness
Emerald	M	P	Ser.	5	DG	C	T
Dwarf Green	VE	VP	Ser.	5,6,7,8,9,10	LG-DG	C	F
Clemson	VE	P	Ser.	5,6,7,8,9,10	LG-DG	S-C	F
Louisiana Market	L	NP	So.	5	DG	VS	F
Perkins	VE	VP	Ser.	5,6,7,8,9,10	LG-DG	C	F
White Velvet	M	P	So.	5	W	VS	T
Louisiana Green Velvet	L	NP	So.	5	DG	VS	T

Earliness: VE-very early; M-mid-season; L-late.

Productivity: VP-very productive, P-productive, NP-light producer.

Leaf: Ser.-serrated; So.-solid.

Carpels: Range indicated, numbers underlined indicate those most numerous found.

Color: LG-light green; DG-dark green.

Straightness: S-straight, C-curved.

Tenderness: T-tender; F-fibrous.

Table 4. Rating of okra varieties tested in the Lower Rio Grande Valley

Variety	Earliness	Productivity	Quality
Dwarf Green	1	2	7
Clemson	2	1	5
Perkins	3	3	6
Emerald	4	4	1
White Velvet	5	5	3
Louisiana Market	6	6	2
Louisiana Green Velvet	7	7	4

The evaluations made during the 1958 and 1959 seasons indicate the need for a breeding program to develop new strains in which desirable factors of earliness, productivity and quality are combined.