THE INFLUENCE OF ROW SPACING AND TIME OF HARVEST ON CERTAIN PLANT, FRUIT AND KERNEL CHARACTERISTICS OF SPANISH PEANUTS

By

WILBUR N. TRIPP

Bachelor of Science

Oklahoma State University

Stillwater, Oklahoma

1956

Submitted to the faculty of the Graduate College
of the Oklahoma State University
in partial fulfillment of the requirements
for the degree of
MASTER OF SCIENCE
July, 1967

THE INFLUENCE OF ROW SPACING AND TIME OF HARVEST ON CERTAIN PLANT, FRUIT AND KERNEL CHARACTERISTICS OF SPANISH PEANUTS

Report Approved:

_____

Report Adviser

_____

_____

Dean of the Graduate College

ACKNOWLEDGMENTS

The author is sincerely grateful to personnel at the Caddo Peanut Research Station near Fort Cobb, Oklahoma, for assistance in preparing and harvesting test plots for this study and to personnel of the Statistical Laboratory for statistical analyses of the data.

Special appreciation is extended Dr. Ralph S. Matlock, Department of Agronomy, Oklahoma State University, for advice and assistance in the study.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE INFLUENCE OF ROW SPACING AND TIME OF HARVEST ON CERTAIN PLANT, FRUIT AND KERNEL CHARACTERISTICS OF SPANISH PEANUTS

INTRODUCTION

Peanut growers have tried row spacings ranging from 18 to 42 inches between rows for irrigated and non-irrigated peanuts. Row spacings from farm to farm have varied in an effort to increase yields and to use the same seeding and cultivation equipment for other row crops, such as cotton and grain sorghum.

The peanut population may be varied by changing the row spacing and the seeding rate within the row. The additional seed required by closer spacing between rows and plants increase the amount of seed necessary to plant an acre. The grower would like to know if the increased yields from higher plant populations will more than compensate for the extra seed costs.

The time of harvesting to obtain maximum yield of high quality peanuts is an important production problem. Harvesting too early results in a low yield of poor quality peanuts because of the high percentage of immature fruits and kernels. The hazards resulting from freeze damage and loss of fruit from peg rot often cause the grower to dig too early. The criteria for determining the time of digging to obtain maximum yields of high quality peanuts are not well defined.

The objectives of this study were to determine the influence of row spacing and time of harvest on certain plant, fruit and kernel characteristics for irrigated and non-irrigated peanuts.

CHAPTER II

REVIEW OF LITERATURE

Collins and Matlock (2) determined the degree of maturity by the interior hull color. They reported that kernels from immature fruit had more "off flavor" than mature kernels. Peanuts reach maturity when, although attached to a living plant, they reach an approximate maximum size and cease to increase in dry matter content. Even though a peanut is mature, it is not necessarily ripe. Ripening is a physiological change of non-growing peanuts and requires the presence of water.

Mature peanuts should require a shorter time for ripening than immature peanuts.

Yellowing of the leaves has been used as an indicator of the proper time to harvest. This varies with conditions for growth or the environment. Several factors other than maturation may cause yellowing of the leaves (1).

Time of planting or the number of days from planting to digging has been used to predict maturity with poor results (1).

The dry weights of the plant and fruit have been used to express the best time to dig for maximum yield of mature fruit (1).

The mean individual kernel weight has also been used to determine maturity in the peanut. According to Collins (1), Barr reported that the mean individual kernel weight (MIKW) and the total kernel weight became constant at almost the same time and both rose to similar final

values. Maturity may be determined by interior pericarp color. According to Collins (1), researchers found that upon reaching maturity the inside of the shell had become a mottled brown to black.

Experiments by Lipscomb et al. (4) have shown that closer row spacings may increase yields of peanuts. They reported that Dixie Spanish peanuts produced an average of 3780 pounds per acre of nuts and the closer row spacing gave higher yields in two out of three years. There was no significant difference in quality of nuts (4).

Higher yields were obtained from peanuts with close row spacings than from those planted with conventional spacings, and the differences were significant at the one percent level each year (3).

Because of the heavy vine growth in the uniformly spaced 28-inch rows, the exact location of the rows was hard to find. This caused digger congestion and resulting peanut losses. Planting three or four close rows in a bed and allowing 30 to 36 inches between the beds for equipment and tractor wheels was an effective close row arrangement (3).

Ryan (5) reports higher plant population per acre produced the highest yields, with the exception of the 50-pound seeding rate in the 30-inch row spacing, which was higher than the 20-inch row spacing. Ryan reported that spacing in the row had a greater influence on yield than on seeding rates.

CHAPTER III

MATERIALS AND METHODS

Irrigated and non-irrigated experiments were conducted on the Caddo Peanut Research Station near Fort Cobb, Oklahoma.

Argentine peanuts were planted in the irrigated test May 18, 1965, at the rate of approximately four viable seed per foot. The plots were dug October 23, 1965, making a total of 158 days from planting to digging.

The non-irrigated test was planted using Argentine peanuts on June 11, 1965. The plots were dug on October 27, 1965, making a total of 135 days from planting to digging.

The size of plots harvested to determine yield on the irrigated and non-irrigated was 14.5 feet from the center bed of each plot.

The study contains four treatments with three replications in a randomized block design. Treatment 1 consisted of 9 rows, 5 inches apart on a 40-inch bed with 32 inches between beds. Treatment 2 contained five rows 10 inches apart on a 40-inch bed with 32 inches between beds. Treatment 3 had three rows, 20 inches apart on a 40-inch bed with 32 inches between beds. Treatment 4 consisted of 2 rows, 36 inches apart.

Individual plants for this study were obtained from the border beds of each replication for the four treatments in the irrigated and non-irrigated tests. The plants were dug by hand on September 18 and 25 and

October 2 and 9, 1965. On each harvest date two plants were dug from the border beds of each treatment and replication. Thus, on each harvest date 24 plants from the irrigated and 24 from the non-irrigated tests were obtained for detailed study.

Individual plants and the shells and kernels therefrom were weighed both air dried and oven dried to determine yield and plant to fruit ratio. The fruit from each plant was counted, shelled and classified as to maturity. The fruit with dark pigmentation of the interior hull was classed as mature, those with white interior hull as immature, and those between the two extremes as intermediate. The kernels were separated into two groups using the 15/64 x 3/4-inch sieve. The number of kernels riding the 15/64 x 3/4-inch sieve and those passing through the sieve were counted and weighed. The mean individual kernel weight was determined for the two size groups in each treatment. The analyses of variance were computed by personnel in the Statistical Laboratory.

The total annual rainfall of 29.02 inches was recorded at the Caddo Peanut Research Station. The amount received between May 18 and October 27 was 15.83 inches. In addition, the irrigated test received approximately 10 inches in 2-inch applications on July 7-9, July 17-18, July 25-26, August 5, and September 12-13.

CHAPTER IV

RESULTS AND DISCUSSION

Individual Plant and Fruit Weight

The mean oven-dry weights for individual plants in the irrigated and non-irrigated tests for four row spacings are shown below (Table I).

TABLE I

MEAN OVEN-DRY WEIGHTS (GRAMS) FOR ARGENTINE PLANTS FOR FOUR ROW SPACINGS AVERAGED FOR FOUR HARVEST DATES IN IRRIGATED AND NON-IRRIGATED TESTS, FORT COBB, 1965[1]

	Row Spacing (Inches) 5	10	20	36	Mean	LSD .05	C.V.%
Mean Plant Wt. (gms.)							
Irrigated	21.7	25.4	29.8	77.5	36.8	15.1	47.3
Non-Irrigated	8.5	11.2	15.6	43.3	19.7	5.2	31.8
Mean	15.1	18.3	22.7	60.4	29.1	8.8	52.3

[1]Any two means underscored by the same line are not significantly different at the five per cent level for each table.

The mean individual plant weights did not differ significantly among harvest dates for the irrigated and non-irrigated tests. The mean weights differed significantly among row spacings. The plants from the 36-inch row spacing weighed significantly more than plants from

each of the closer spacings.

The 36-inch row spacing was adequate to obtain high plant weights, but row spacings of 5, 10, and 20 inches were not sufficient to allow significant changes in plant weight, though there was a tendency for the mean plant weights to decrease with closer spacings.

The individual plant weights for the irrigated test averaged 53.5 per cent more than those for the non-irrigated tests.

The mean oven-dry weights for fruit per plant in the irrigated and non-irrigated tests for four row spacings are shown in Table II.

TABLE II

MEAN OVEN-DRY WEIGHTS (GRAMS) FOR ARGENTINE FRUITS FOR FOUR ROW SPACINGS AVERAGED FOR FOUR HARVEST DATES IN IRRIGATED AND NON-IRRIGATED TESTS, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
Mean Fruit Wt. (gms)							
Irrigated	12.9	14.9	18.1	59.8	26.4	10.7	50.8
Non-Irrigated	1.2	1.8	3.3	14.2	5.1	2.0	49.4
Mean	7.0	8.3	10.7	37.0	15.7	5.0	56.7

There were no significant differences for fruit weights among the four harvest dates. The fruit weights were significantly different for the irrigated and non-irrigated tests among the row spacings. The fruit from the 36-inch row spacing weighed significantly more than the fruit from the closer row spacings in both tests.

There was a significant difference in fruit weights of the 5- and 20-inch row spacings of the non-irrigated test. Fruit weight tended to decrease with closer row spacing for both irrigated and non-irrigated test.

Number of Fruit

The mean number of fruit per plant in each maturity group and mean number of pops and pegs for four row spacings of the irrigated tests are shown in Table III.

TABLE III

MEAN NUMBER OF FRUITS IN EACH MATURITY GROUP AND MEAN NUMBER OF POPS AND PEGS FOR FOUR ROW SPACINGS AVERAGED FOR THE FOUR HARVEST DATES IN THE IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
No. Fruit							
Mature	9.08	10.96	12.21	37.68	17.48	21.47	146.3
Intermed.	2.61	3.79	5.53	20.27	8.04	5.52	82.36
Immature	2.88	2.88	4.42	12.03	5.54	N.S.	106.39
Pops	5.23	4.54	5.98	21.58	9.33	5.72	73.55
Pegs	6.69	5.88	9.63	26.27	12.11	6.24	61.88

There were no significant differences within maturity groups for the four harvest dates. There was no significant difference in number of immature fruit among the four row spacings in the irrigated test. There was a significant difference in the 36-inch row spacing for the number of mature and intermediate fruit and the number of pops and pegs

per plant in the irrigated tests. The number of fruit tended to decrease with closer row spacing. The coefficients of variations (C.V.) were extremely high for each of the five factors. This suggests considerable plant-to-plant variation.

The mean number of fruits in each maturity group and mean number of pops and pegs for four row spacings of the non-irrigated test are shown in Table IV.

TABLE IV

MEAN NUMBER OF FRUITS IN EACH MATURITY GROUP AND MEAN NUMBER OF POPS AND PEGS FOR FOUR ROW SPACINGS IN THE NON-IRRIGATED TESTS, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
No. Fruit							
Mature	0.17	0.46	1.50	7.63	2.43	1.88	92.44
Intermed.	0.25	0.63	1.67	6.54	2.27	0.95	50.27
Immature	0.33	0.21	0.83	2.54	0.97	0.68	82.75
Pops	1.46	4.17	3.46	6.33	3.85	1.82	56.68
Pegs	6.63	4.58	6.83	22.79	9.45	3.19	40.52

There were significant differences within the various groups among the four harvest dates for the non-irrigated tests. The number of mature, intermediate and immature fruit per plant and the number of pops and pegs were significantly higher for the 36-inch row spacing than for closer spacings. There was a significant difference in the number of fruit classed as intermediate in the 20-inch row spacing but not in the 5- and 10-inch row spacing. The number of pops in the 5-inch row was

significantly lower than those of the 10- and 20-inch and the 36-inch row spacing.

Percentage of Fruit

The mean percentage of fruit classed as mature, intermediate and immature for four row spacings of the irrigated test are shown in Table V.

TABLE V

MEAN PERCENTAGE OF FRUIT CLASSED AS MATURE, INTERMEDIATE AND IMMATURE FOR FOUR ROW SPACINGS OF THE IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches)				
	5	10	20	36	Mean
Irrigated					
Fruit Percent					
Mature	59.9	63.3	59.6	54.9	59.4
Intermed.	19.9	20.9	22.0	28.5	22.8
Immature	20.1	15.8	18.4	16.6	17.7

There appears to be no difference in percentage of mature fruit in the irrigated test for the 5-, 10-, 20- and 36-inch row spacing. The mean percentages of mature plus intermediate fruit per plant were 79.8, 84.2, 81.6, and 83.4 for the various row spacings.

The mean percentage of fruit classed as mature, intermediate and immature for four row spacings of the non-irrigated tests are shown in Table VI.

TABLE VI

MEAN PERCENTAGE OF FRUIT CLASSED AS MATURE, INTERMEDIATE AND IMMATURE FOR FOUR ROW SPACINGS OF THE NON-IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean
Non-Irrigated					
Fruit Percent					
Mature	19.5	31.3	37.3	50.1	34.5
Intermed.	28.4	36.4	42.5	35.8	35.8
Immature	52.2	21.0	20.2	14.2	26.9

There appears to be a difference in percentages of mature fruit for the non-irrigated tests. In the 5-, 10-, 20- and 36-inch row spacings, respective percentages of fruit classed as mature plus intermediate were 47.9, 67.7, 79.8 and 85.9. The later planted non-irrigated test showed an increase in percentage of mature fruit with the wider row spacing. There was a corresponding decrease in the percentage of immature fruit with the wider row spacing. Rains caused this sudden surge of fruit development, particularly in the close row spacing.

The mean percentages of fruit classed as mature, intermediate and immature for four harvest dates in irrigated and non-irrigated tests are shown in Table VII.

TABLE VII

MEAN PERCENTAGES OF FRUIT CLASSED AS MATURE, INTERMEDIATE AND IMMATURE FOR FOUR HARVEST DATES IN IRRIGATED AND NON-IRRIGATED TESTS, FORT COBB, 1965

	Harvest Dates			
	9-18	9-25	10-2	10-9
Irrigated				
Percent Mature				
Mature	45.2	52.6	62.1	77.8
Intermed.	33.4	25.1	20.2	12.7
Immature	16.4	22.3	17.8	9.5
Non-Irrigated				
Mature	9.8	12.4	29.8	86.0
Intermed.	55.8	57.0	30.6	11.0
Immature	34.3	30.6	39.5	3.0

There appears to be a marked increase in the percentage of mature and intermediate fruit and a corresponding decrease in the percentage of immature fruit for both tests between the October 2 and October 9 harvest dates.

The mean percentages of mature plus intermediate fruit were 82.3 and 90.5 for the October 2 and October 9 harvest dates in the irrigated test and 60.4 and 97.0 per cent for the October 2 and October 9 dates in the non-irrigated test.

There was very little difference in mean percentage of immature fruit on the first three harvest dates for the irrigated and non-irrigated tests.

These data suggest that at least 151 days from planting to harvest were required in the irrigated test to obtain 90 per cent mature fruit and at least 128 days were required to obtain 97 per cent mature fruit in the non-irrigated test.

Kernel Weight and Number

The mean individual kernel weights (MIKW) of large and small kernels for four row spacings and two size groups for the irrigated test are shown in Table VIII.

TABLE VIII

MEAN INDIVIDUAL KERNEL WEIGHTS (GRAMS) OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS OF THE IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean
MIKW					
Grams					
Held on 15/64	0.36	0.35	0.34	0.32	0.34
Through 15/64	0.13	0.16	0.15	0.15	0.15
Mean	0.25	0.26	0.25	0.24	0.25

There appears to be no difference in the mean individual kernel weights of the large fruit at the different row spacings and no difference in the small kernels at different row spacings for the irrigated test.

The mean individual kernel weights for large and small kernels for four row spacings in the non-irrigated test are shown in Table IX.

TABLE IX

MEAN INDIVIDUAL KERNEL WEIGHTS OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS IN THE NON-IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean
MIKW					
Grams					
Held on 15/64	0.43	0.31	0.32	0.44	0.37
Through 15/64	0.12	0.17	0.20	0.17	0.16
Mean	0.28	0.24	0.26	0.30	0.27

There appears to be a difference among row spacings for the mean individual kernel weight of the large kernels in the non-irrigated test. The mean kernel weights for the 5-inch and 36-inch row spacings were similar and the kernel weights for the 10- and 20-inch row spacings were similar. The individual kernels held on the 15/64-inch screen for the 5-inch and 36-inch treatments were approximately 0.12 grams heavier than those of the 10-inch and 20-inch. The small kernels for the 5-inch row spacing averaged 0.05 to 0.08 grams per kernel lighter than those of 10-, 20-, and 36-inch row spacings.

The mean number of large and small kernels for four row spacings in the irrigated test is shown in Table X.

TABLE X

THE MEAN NUMBER OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS IN THE IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
Irrigated							
No. Kernels							
Held on 15/64	23.5	29.3	36.1	114.8	50.92	20.7	48.7
Through 15/64	6.0	4.5	6.8	29.3	11.63	12.0	123.8
Total	29.5	33.7	42.9	144.1	62.5		

There were significantly more large and small kernels per plant for 36-inch compared with closer row spacings for the irrigated test. There were no significant differences in number of kernels among the 5-, 10-, and 20-inch row spacings.

The mean oven-dry weights of large and small kernels for four row spacings for the irrigated tests are shown in Table XI.

TABLE XI

THE MEAN OVEN-DRY WEIGHTS (GRAMS) OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS FOR IRRIGATED TEST, FT. COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
Oven-Dry Kernel Wt. (gms.)							
Held on 15/64	8.5	10.2	12.1	36.3	16.77	6.2	44.5
Through 15/64	0.8	0.7	1.0	4.3	1.70	1.8	126.9
Total	9.3	10.9	13.1	40.6	18.5		

The oven-dry kernel weight of the 36-inch row spacing was significantly more than the 5-, 10-, and 20-inch row spacings. There was an average difference of 20 grams between the 36-inch row spacing and that of the 5-, 10-, and 20-inch row spacing for the large kernels and an average difference of 3.5 grams between the 36-inch row spacing and the 5-, 10-, and 20-inch row spacing of the small kernels.

The mean number of large and small kernels for four row spacings in the non-irrigated test is shown in Table XII.

TABLE XII

THE MEAN NUMBER OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS IN THE NON-IRRIGATED TEST, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
No. Kernels							
Held on 15/64	1.6	2.6	5.1	27.3	9.17	4.2	54.9
Through 15/64	1.4	1.2	3.1	6.0	2.93	1.5	59.6
Total	3.0	3.8	8.2	33.3	12.10		

There was a significant difference in the number of large kernels for the 36-inch row spacing of the non-irrigated test compared with the 5-, 10- and 20-inch row spacings. The number of small kernels in the 36-inch row spacing was significantly more than that of the 5-, 10-, and 20-inch row spacings. The number of small kernels in the 20-inch row spacing was significantly more than that of the 5- and 10-inch row spacing.

The mean oven-dry weights of large and small kernels for four row spacings in the non-irrigated tests are shown in Table XIII.

TABLE XIII

THE MEAN OVEN-DRY WEIGHTS OF LARGE AND SMALL KERNELS FOR FOUR ROW SPACINGS IN THE NON-IRRIGATED TESTS, FORT COBB, 1965

	Row Spacings (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
Oven-dry Kernels Wt. (gms.)							
Held on 15/64	0.5	0.8	1.6	10.2	4.02	1.8	54.6
Through 15/64	0.2	0.2	0.6	1.0	0.51	0.3	61.2
Total	0.7	1.0	2.2	11.2	4.53		

The oven-dry weights per plant for the large kernels for the 36-inch row spacing were significantly heavier than those of the 5-, 10-, and 20-inch row spacings. The kernels for the 36-inch row spacing averaged 7.3 grams heavier than the 5-, 10-, and 20-inch row spacing.

The oven-dry weights for the small kernels for the 36-inch row spacing were significantly heavier than those of the 5-, 10-, and 20-inch row spacings. The weight of the small kernels in the 20-inch row spacing was also significantly more than that of the 5- and 10-inch treatments.

The mean number of large and small stained kernels from the four harvest dates for the irrigated test is shown in Table XIV.

TABLE XIV

THE MEAN NUMBER OF LARGE AND SMALL STAINED KERNELS FOR FOUR HARVEST DATES, IRRIGATED TEST, FORT COBB, 1965

	Harvest Dates						
	9-18	9-25	10-2	10-9	Mean	LSD.05	C.V.%
No. Stained Kernels							
Large	0.767	1.042	1.608	20.583	6.000	12.89	258.06
Small	3.433	1.042	2.417	15.333	5.556	5.79	125.12
Mean	2.100	1.042	2.012	17.958	5.778		

There was no significant difference for the number of stained kernels among row spacings, but there was a significant difference in the mean number of stained kernels among harvest dates for the irrigated test. There were significantly more stained kernels, both large and small, for the October 9 compared with earlier harvest dates.

Stained kernel information was included in this report because there was an apparent correlation between kernel staining and silting and soil compaction due to heavy rains of 1.86, 0.77, and 2.32 inches, respectively, on September 19, 20, and 21.

The mean number of large and small stained kernels obtained for four harvest dates in the non-irrigated test is shown in Table XV.

TABLE XV

THE MEAN NUMBER OF LARGE AND SMALL STAINED KERNELS FOR FOUR HARVEST DATES, NON-IRRIGATED TEST, FORT COBB, 1965

	Harvest Dates 9-18	9-25	10-2	10-9	Mean	LSD.05	C.V.%
No. Stained Kernels							
Large	0.000	0.167	0.125	0.792	0.271	N.S.	315.44
Small	0.500	0.417	0.125	1.083	0.438	0.74	202.70
Mean	0.250	0.292	0.125	0.937	0.354		

In the non-irrigated test there was no significant difference in the mean number of large stained kernels among the four harvest dates. There was no significant difference in the number of small stained kernels for the September 18 and 25 and October 9 harvest dates, and there was no significant difference in the number of small stained kernels at the September 18 and 25 and October 2 harvest dates. There is a significant difference in the number of small stained kernels between the October 2 and 9 harvest dates. There was not as much stained kernel damage occurring in the non-irrigated plots due to better drainage, less silting and erosion.

The mean yield, plants harvested per plot and percentages of sound mature kernels for four row spacings in irrigated and non-irrigated tests are shown in Table XVI.

TABLE XVI

MEAN YIELD (LBS./A), PLANTS HARVESTED PER PLOT AND PERCENTAGE OF SOUND MATURE KERNELS FOR FOUR ROW SPACINGS ON IRRIGATED AND NON-IRRIGATED TESTS, FORT COBB, 1965

	Row Spacing (Inches) 5	10	20	36	Mean	LSD.05	C.V.%
Yield Per Acre (Lbs.)							
Irrigated	3927	4447	3960	3927	4065	N.S.	9.3
Non-Irrigated	570	872	1174	1073	922	N.S.	23.4
Plants Per Harvested Plot							
Irrigated	338	239	203	87	217	63	14.5
Non-Irrigated	597	411	239	91	334	124	18.5
Per Cent SMK							
Irrigated	48.7	51.7	54.0	47.3	50.4	N.S.	6.3
Non-Irrigated	33.7	45.3	61.7	67.3	51.0	N.S.	21.5

The mean yields for the four row spacings did not differ significantly in either the irrigated or non-irrigated tests when a given area was harvested for each plot. The heavy rains that occurred on September 19-21 caused considerable difficulty in digging the peanut plots. It was believed that yields derived from the individual plants may be more accurate than those reported in Table XVI.

In the irrigated test there was a significant difference in the mean number of plants per harvested plot between the 36-inch row spacing and the 5-, 10-, and 20-inch row spacing. There was no significant difference between the 10- and 20-inch row spacing. There was a significant difference in the 5- and 10-inch row spacing.

There was a significant difference in the mean number of plants per harvested plot in all four row spacings of the non-irrigated test.

There was no significant difference in the per cent sound mature kernels (SMK) in the four row spacings for the irrigated and non-irrigated test.

The mean yields computed from individual plant data for irrigated and non-irrigated tests are shown in Table XVII.

TABLE XVII

MEAN YIELD (LBS/A) COMPUTED FROM INDIVIDUAL PLANT DATA FOR IRRIGATED AND NON-IRRIGATED TESTS, FORT COBB, 1965

	Row Spacing (Inches)			
	5	10	20	36
Mean Yield Per Acre				
Irrigated	4986	2314	1643	5530
Non-Irrigated	400	369	555	935

There was an apparent difference in the yield of the four row spacings in the irrigated test. A noted difference in the 5- and 10-inch spacings and the 20- and 36-inch spacings was apparent. There was some difference in the 10- and 20-inch spacing.

The non-irrigated tests showed very little difference in the 5-, 10-, and 20-inch spacing but showed a large increase for the 36-inch row spacing compared with the close row spacings.

Yield per acre determined by individual plant selection was higher for the irrigated plots and lower for the non-irrigated plots.

Heavy rains and silting on the irrigated plots caused digging difficulty, apparently causing considerable loss in yield.

CHAPTER V

SUMMARY AND CONCLUSIONS

A field experiment was conducted to study the influence of row spacing and time of harvest on certain plant, fruit and kernel characteristics of Spanish peanuts. This experiment was conducted on the Caddo Peanut Research Station near Fort Cobb, Oklahoma.

Argentine peanuts were planted at the rate of approximately four viable seed per foot in row spacings of 5, 10, 20, and 36 inches on irrigated and non-irrigated plots.

The irrigated plots were planted on May 18, 1965, and the non-irrigated plots planted on June 11, 1965.

Samples were collected from each treatment on the four harvest dates of September 18 and 25 and October 2 and 9, 1965.

Data were obtained on the individual plants, kernels, and fruit for each of four row spacings and four harvest dates. Kernels were separated into two size groups, those kernels held on a 15/64 x 3/4-inch screen and kernels passing through a 15/64-inch slotted screen. The kernels were also classified into three maturity groups of mature, intermediate and immature.

The mean individual plant weights did not differ significantly among harvest dates. The mean weights differed significantly among row spacings. Plants from the 36-inch row spacing weighed significantly more than those from closer row spacings.

There were no significant differences for fruit weights among harvest dates. The fruit weights were significantly different for the irrigated and non-irrigated tests among the row spacings. Fruit from the 36-inch row spacing weighed significantly more than the fruit from the closer row spacings.

Mean number of fruit from the 36-inch row spacing was significantly greater than for the closer row spacings in both the irrigated and non-irrigated test.

There was a marked increase in percentage of mature and intermediate fruit between the October 2 and October 9 harvest date.

There was no significant difference in yield of the four row spacings on plots harvested in both irrigated and non-irrigated tests. There was an apparent difference in yield of the four row spacings when calculated from individual plant data. The 36-inch row spacing produced higher yields in both the irrigated and non-irrigated tests.

The yield data obtained do not agree with studies conducted in 1960, 1962 and 1964. Since the detail study was conducted only one year, additional studies are needed to determine the advantages of close and wide row spacings for irrigated and non-irrigated peanuts.

LITERATURE CITED

(1) Collins, John Jerry. "The Influence of Time of Harvesting Dixie Spanish Peanuts on Maturity, Yield and Grade." (Unpublished Master's Thesis, Oklahoma State University, 1966), pp. 3-5.

(2) Collins, John Jerry, and Ralph S. Matlock. "The Influence of Time of Harvesting Spanish Peanuts on Plant, Fruit and Kernel Characteristics." Proceedings, Fourth National Peanut Research Conference, July, 1966, pp. 13-14.

(3) Duke, George B. and Morris Alexander. "Effects of Close-row Spacings on Peanut Yields and on Production Equipment Requirements." Production Research Report No. 77, United States Department of Agriculture, January 1964, pp. 2-6.

(4) Lipscomb, R. W., W. K. Robertson, and W. H. Chapman. "The Effect of Spacing and Fertility on Yield and Quality of Dixie Spanish and Early Runner Peanuts Grown on Ruston Fine Sandy Loam." Proceedings, Third National Peanut Research Conference, July 1964, pp. 61-65.

(5) Ryan, Clarence E. "The Influence of Plant Population on Yield and Grade of the Argentine Variety of Spanish Peanuts." (Unpublished Master's Report, Oklahoma State University, 1963), p. 17.

VITA

Wilbur N. Tripp

Candidate for the Degree of

Master of Science

Report: THE INFLUENCE OF ROW SPACING AND TIME OF HARVEST ON CERTAIN PLANT, FRUIT AND KERNEL CHARACTERISTICS OF SPANISH PEANUTS

Major Field: Rural Adult Education

Biographical:

Personal Data: Born at Grady, Oklahoma, November 7, 1930, the son of Roy and Lora Tripp.

Education: Received elementary education at Grady School in Jefferson County; secondary education at Oklahoma City and Ringling, Oklahoma, and Crosbyton, Texas, graduating May 1948. Attended Murray State School of Agriculture 1948-1950. Received the Bachelor of Science Degree from Oklahoma State University, Stillwater, Oklahoma, with a major in Agronomy, in May 1956. Engaged in postgraduate study toward the degree of Master of Science at Oklahoma State University, Stillwater, Oklahoma, from 1958 to July 1967.

Experience: Born and reared on a farm. Served in the United States Army from September 1950 to May 1952. Employed with the Soil Conservation Service, Canyon, Texas, from June 1956 until October 1957. Employed with Oklahoma Extension Service as Assistant and Associate County Agent in Caddo County, Oklahoma, from October 1957 to August 1965. Employed as County Extension Director of Major County, Oklahoma, since August 1965.