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# Grain and Sweet Sorghums in Oklahoma

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## GRAIN AND SWEET SORGHUMS IN OKLAHOMA

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## THE IMPORTANCE OF SORGHUMS

The two main classes of sorghums, the grain and sweet sorghums, are of great economic importance in the central and southern Great Plains area due mainly to their ability to adapt themselves to the prevailing climatic and soil conditions. The sorghums are able better to endure the extremes in drought and heat so injurious to most forms of plant life.

The sorghums do not have a well defined critical period in their cycle of development as does corn. It is not uncommon that growers suffer severe losses as a result of a dry period at the tasselling time of corn. A hot wind at that time may result in the total loss of the crop. Sorghums like other crop plants are damaged by dry, hot weather. The loss to the producer will, however, not be so great as with corn. If a period unfavorable to the growth of the sorghum crop is encountered in the course of its development, the plants have the ability to go into a more or less inactive state until suitable growing conditions again prevail. This particular property of the sorghums together with their ability to absorb more moisture from the soil than corn makes them a safer crop to grow. The hazards involved in the production of the sorghums are less than those encountered in the production of any other spring sown grain or forage crop that can be grown in the drier western and central portions of Oklahoma.

The above statements are emphasized by the facts brought out in Figures 1, 2 and 3, showing the relative distribution of grain and sweet sorghums and corn. It will be noticed that the production of the grain sorghums, Figure 1, especially is centered in the western part of the state with a considerable acreage in the north central counties. The production of grain sorghums is of little or no importance in the eastern, central-eastern and southeastern portions of the state or in those sections where corn production reaches its highest development, Figure 3. In other words, corn production is of greater importance than sorghum production in those portions of the state better supplied with moisture, and where climatic conditions are not too variable. The distribution of sorghums cut for silage, hay or fodder, Figure 2, is somewhat more general than that of the grain sorghums. This group includes some grain sorghums but is in the main made up of the sorgos. Since the sorgos are grown primarily for feed, one would expect a greater range in their distribution than with the grain sorghums.

## VARIETIES OF GRAIN SORGHUMS

Table 1 gives the yields of varieties included in the variety tests at the Oklahoma Agricultural Experiment Station, Stillwater, from 1915 to 1927 inclusive. Table 2 gives the grain yields of those varieties expressed on a percentage basis of the yield of Blackhull kafir. The yield of Blackhull for the respective years is put at 100 per cent.

When the varieties are compared for the longest period of years, Darso, of the four varieties grown over the period of thirteen years, gave the highest returns followed closely by Blackhull kafir. The yields of Common feterita and Hegari were much inferior to those of the first two varieties named.

Darso was again highest for the eight year period of the eight varieties grown. Again the yield of Blackhull kafir was second to Darso. Schrock kafir, Early kafir and Dawn kafir were other high yielding varieties.

For the four year period, Pearl kafir gave the highest yield of the fourteen varieties compared. Blackhull kafir and Darso again stood near the top of the list for this shorter period. Other high yielding varieties for the four year period were Common feterita, Schrock kafir, Dawn kafir, Bishop's kafir and Reed's kafir.

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**Table 1. Yields of grain sorghums in bushels per acre, 1915 to 1927 (inclusive).**

VARIETY	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	13 Yr. Av. 1915-1927	4 Yr. Av. "Av." 1920-1927	26 Yr. Av. 1920-1927
1. Darso .....	14.4	24.2	14.7	12.6	13.5	52.7	61.6	42.9	12.3	21.4	25.0	21.0	25.5	26.3	32.8	24.2
2. Blackhull kafir .....	14.4	16.4	21.1	6.5	5.5	45.5	53.2	42.5	10.0	27.4	17.9	22.8	31.5	24.2	31.4	24.9
3. Common feterita .....	12.4	21.4	3.6	4.4	9.6	20.0	23.3	13.6	8.1	28.9	17.9	20.0	39.9	17.2	21.5	26.6
4. Hegari .....	15.4	7.7	22.9	4.7	3.5	28.1	6.2	3.1	4.4	16.8	5.7	18.8	29.3	12.8	14.1	17.7
5. Schrock kafir .....			15.2	9.0	22.8	46.1	35.3	25.2	9.0	25.9	25.7	21.0	30.1		27.3	25.7
6. Early kafir .....			12.4		9.3	38.0	41.5	33.1	8.2	22.8	15.7	23.8	24.0		25.9	21.6
7. Dawn kafir .....						32.3	29.5	25.7	8.7	19.8	14.2	19.6	38.6		23.6	23.1
8. Spur feterita .....					12.6	25.1	39.4	16.6	10.0	25.9	17.9	19.2	24.5		22.4	21.9
9. Pearl kafir .....										21.4	28.6	21.3	36.9			27.1
10. Bishop's kafir .....								34.4	6.5	24.4	17.0	14.9	27.8			22.0
11. Reed's kafir .....								36.8	6.0	21.4	21.0	19.9	24.7			21.8
12. Pink kafir .....										13.7	14.6	23.5	31.8			20.9
13. Straight Neck maize .....									4.3	27.5	.0	19.6	24.7			18.0
14. Dwarf feterita .....									5.6	16.8	7.1	18.8	21.5			16.1
15. White milo .....	10.5	6.6	1.0	0.5	4.2	5.3	2.1	4.3			.0	4.2	3.8			3.9*
16. Yellow milo .....	2.7		2.1		6.1	2.6	25.3	6.7			.0	7.1	5.6			6.5*
17. Shallu .....						31.5	41.5	17.2	3.9	19.8	7.1					20.2*
18. Kaoliang .....		9.8				18.4		11.6	4.8	22.8	14.2	16.4				14.0*
19. Red kafir .....												23.8	24.7			24.3*

\*Average for the years the variety was grown.

Table 2. Yields of grain sorghums from 1915 to 1927 (inclusive) expressed on a percentage basis of the yield of Blackhull White kafir.

VARIETY	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	13-Yr. Av., 1915-1927	8-Yr. Av., 1920-1927	4-Yr. Av., 1924-1927
1. Darso .....	100.0	147.6	69.7	193.8	245.4	115.8	115.8	100.9	123.0	78.1	139.7	92.1	81.0	108.7	104.5	97.2
2. Blackhull kafir .....	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
3. Common feterita .....	86.1	130.5	17.1	67.7	174.5	44.0	43.8	32.0	81.0	105.5	100.0	87.7	126.7	71.0	68.5	106.8
4. Hegari .....	106.9	47.0	108.5	72.3	63.6	61.8	11.7	7.3	44.0	61.3	31.8	82.5	93.0	52.9	44.9	71.1
5. Schrock kafir .....			72.0	138.5	414.5	101.4	66.4	59.3	90.0	94.5	143.6	92.1	95.6		86.9	103.2
6. Early kafir .....			58.8		169.1	83.5	78.0	72.9	82.0	83.2	87.7	104.3	76.2		82.5	86.7
7. Dawn kafir .....						71.0	55.5	60.5	87.0	72.3	79.3	86.0	122.5		75.2	92.8
8. Spur feterita .....					229.1	55.0	74.1	39.1	100.0	94.5	100.0	84.2	77.8		71.3	88.0
9. Pearl kafir .....										78.1	159.8	93.4	117.1			108.8
10. Bishop's kafir .....								80.9	65.0	89.1	95.0	65.4	88.3			88.4
11. Reed's kafir .....								86.6	60.0	78.1	117.3	87.3	78.4			87.6
12. Pink kafir .....										50.0	81.6	103.1	100.9			83.9
13. Straight Neck maize .....									43.0	100.4	0.0	86.0	78.4			72.2
14. Dwarf feterita .....									56.0	61.3	39.7	82.5	68.3			64.7
15. White milo .....	72.9	40.2	4.7	7.7	76.4	11.6	3.9	10.1			0.0	18.4	12.1			
16. Yellow milo .....	18.7		10.0		111.0	5.7	47.6	15.8			0.0	31.1	17.8			
17. Kaoliang .....		59.8				40.4		27.3	48.0	83.2	79.3	71.9				
18. Red kafir .....												104.3	78.4			

Since data obtained from a longer period of years are more reliable, the high comparative yields of Darso and Blackhull kafir in the three sets of averages deserve special attention.

#### FORAGE YIELDS OF SORGO VARIETIES

The air dry forage yields of fifteen varieties of sweet sorghums in the variety test from 1918 to 1927, inclusive, are given in Table 3.

Of the varieties grown for the ten year period, Sumac and Orange were outstanding yielders. The yield of Dwarf Ashburn was considerably less than that of the first two varieties, yet it was appreciably higher than the yields of such varieties as Black Amber, Red Amber or Clubhead.

Over the five year period, Sumac was again the highest yielder followed closely by Orange and Kansas Orange. African Millet and Dwarf Ashburn were again among the higher yielding varieties.

Table 3. Forage yields of sorgos, 1918 to 1927 (inclusive) in tons per acre.

VARIETY	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	10-Yr. Av.
1. Sumac	3.38	1.32	14.40	3.42	2.74	4.39	4.56	3.70	3.33	7.07	4.83
2. Orange	3.70	1.96	12.40	3.22	2.93	3.98	4.40	2.95	3.16	6.71	4.54
3. Dwarf Ashburn	3.68	1.39	9.30	.70	2.27	2.39	2.66	2.00	2.73	5.57	3.27
4. Black Amber	1.44	1.16	8.40	2.85	1.78	1.78	2.53	1.35	1.34	2.72	2.54
5. Red Amber	1.76	1.33	7.70	2.14	1.63	1.57	2.86	1.18	1.79	2.83	2.48
6. Clubhead	1.28	1.49	7.30	2.43	1.56	2.04	2.04	1.35	2.00	2.77	2.43
7. Kansas Orange						4.91	4.40	3.05	2.58	7.22	
8. African Millet				3.51	2.40	3.93	3.55	4.48	3.25	4.30	
9. Coleman						1.53	4.18	.35	1.74	4.21	
10. Honey						1.25	2.54	1.78	2.01	3.68	
11. Folger						0.00	3.37	1.85	1.89	3.90	
12. Early Rose						1.02	2.86	1.35	2.02	3.40	
13. Collier						2.19	2.31	.90	1.75	2.55	
14. McClain's								2.15	1.97	5.32	
15. Seeded Ribbon								3.25	2.40	1.02	

\*Three-year average only.

#### GRAIN YIELDS OF SORGOS

The amount of seed produced by a variety gives a good index of the quality of the forage obtained. Table 4 gives the grain yields in bushels per acre of the fifteen varieties included in the sorgo variety test. It will be noticed from Table 4 that the high yielding forage varieties, Sumac, Orange, Dwarf Ashburn and African Millet, were also among the high grain yielding varieties. This shows that these varieties produce not only a relatively high tonnage of forage but also a forage of high quality.

Table 4. Grain yields of sorgos in bushels per acre.

VARIETY	1920	1921	1922	1923	1924	1925	1926	1927	8-Yr. Av.	3-Yr. Av.
1. Sumac	41.0	22.9	15.2	12.8	25.9	17.9	10.7	31.8	22.3	20.1
2. Orange	33.4	18.3	14.0	9.9	21.4	10.7	13.9	30.6	19.0	18.4
3. Dwarf Ashburn	31.2	6.9	14.2	5.7	16.4	10.7	19.2	27.3	16.5	19.1
4. Black Amber	40.0	26.4	13.4	11.4	27.5	17.9	8.2	30.3	29.9	18.8
5. Red Amber	25.5	14.9	13.4	3.4	24.5	11.1	15.6	27.5	19.0	18.1
6. Clubhead	22.3	18.3	13.0	11.4	21.2	17.0	14.0	25.3	17.8	18.8
7. Kansas Orange				5.2	21.4	15.3	10.3	35.9		20.5
8. African Millet		23.1	16.6	5.2	26.7	17.9	20.6	28.0		22.2
9. Coleman						00.0	14.2	27.3		13.8
10. Honey				0.6	17.1	14.3	15.6	27.0		19.0
11. Folgers						16.1	14.2	23.7		18.0
12. Early Rose						14.3	8.5	18.9		13.9
13. Collier						10.7	23.1	26.3		20.0
14. McClain's						15.0	21.7	33.3		23.3
15. Seeded Ribbon							6.0	.3		

## DATE OF PLANTING OF GRAIN SORGHUMS

Varieties of grain sorghums were planted at four different dates: the middle of April, first part of May, middle of May, and early in June. Tables 5, 6, 7, 8 and 9 give the grain and forage yields of the several varieties included in the test for the respective dates of planting for the years 1922, 1924, 1925, 1926 and 1927. Due to unfavorable climatic conditions, no yields were obtained for 1923.

The yields of all varieties at the respective dates of planting are summarized in Table 10. It will be noticed that the highest average yields were obtained with the early plantings, that is from the fifteenth to the twentieth of April. The highest average yield of 1925, Table 7, was secured with the second date of planting. The date of the first planting was earlier in 1925 than in any other year. Since the second date was more comparable to the first date of planting in the other years considered, it was used as such in the summary, Table 10.

In the backward seasons such as 1927, it is well to delay planting from the dates indicated above. The best date of planting for all seasons cannot definitely be set. Variations in seasonal conditions must be taken into consideration. Results here reported show that it is best to plant as early as is consistent with seasonal conditions. In normal seasons, the highest yields may be expected from the middle of April plantings. In backward seasons planting should be delayed till early in May.

At the United States Department of Agriculture field station at Woodward, best returns are reported from the planting of kafir from May 15 to June 1. The season in the northwestern portion of the state is fully two weeks later than at Stillwater; consequently, the later date of planting. The more severe dry period in the extreme western part of the state also reflects on the best date of planting. When the crop is planted too early in that section, the dry, hot weather encountered during the middle of the summer is more detrimental to early than late plantings.

Date of planting tests have been conducted at Granite for only two years. In 1926 the highest yield was obtained with the May 10 planting while the highest yield in 1927 was obtained with the June 1 planting. While these experiments have not been under way long enough to warrant the drawing of definite conclusions, indications are that it is best not to plant too early in the southwestern part of the state. The middle of April plantings are, due to their greater development at the dry part of the summer, damaged to a greater extent than later plantings.

The behavior of the individual varieties included in the date of planting tests will be discussed under a separate heading.

Table 5. Yields of grain sorghums at different dates of planting in 1922.

VARIETY	DATES OF PLANTING									
	April 18		May 4		May 17		June 1		Av. Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre	Forage Yields in Tons Per Acre
1. Blackhull kafir	42.5	2.00	10.0	1.40	2.2	.30	13.2	.90	17.0	1.15
2. Darso	42.9	1.50	5.5	1.20	5.5	.60	7.7	.70	15.4	1.00
3. Schrock kafir	25.2	1.40	10.0	1.30	0.0	.40	13.2	.80	12.1	1.00
4. Early kafir	33.1	1.70	7.7	1.10	0.0*	.00*	.0*	.60	10.2	.90
5. Bishop's kafir	34.4	1.20	3.3	.80	1.0	.40	.0	.50	9.7	.70
6. Shallu	17.2	2.30	5.5	.80	1.0	.30	12.1	.70	9.0	1.03
7. Dawn kafir	25.7	1.40	7.7	1.00	.4	.10	1.3	.70	8.8	.80
8. Dwarf feterita	21.5	1.40	4.4	.60	1.8	.30	.0	.40	6.9	.70
9. Common feterita	13.6	1.60	4.8	.90	.0	.10	.8	.70	6.8	.80
10. Barchet kaoliang	11.6	.60	5.5	.80	1.0	.30	8.8	.80	6.7	.60
11. Spur feterita	16.6	1.00	.0*	.00*	.0*	.00*	.0*	.00*	4.2	.30
12. Hegari	3.1	1.10	8.8	1.30	2.2	.60	.0	.80	3.5	.90
13. White milo	4.3*	.40	8.8*	1.30	.0*	.00*	.0*	.00	3.3	.40
14. Yellow milo	6.7*	.30	5.5*	1.00	1.0	.20	.0	.00	3.3	.40
Average	21.3	1.28	6.3	.96	1.2	.30	4.6	.50		

\*Damaged by chinch bugs.

Table 6. Yields of grain sorghums at different dates of planting in 1924.

VARIETY	DATES OF PLANTING									
	April 18		May 3		May 16		May 30		Av. Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre	Forage Yields in Tons Per Acre
1. Common feterita	28.9	2.50	27.5	1.40	19.8	1.30	17.6	1.30	23.5	1.62
2. Blackhull kafir	27.4	2.20	22.9	1.80	18.7	1.10	22.0	1.30	22.8	1.60
3. Bishop's kafir	24.4	1.60	25.9	1.30	16.5	.80	23.1	1.10	22.5	1.20
4. Straight Neck maize	27.5	2.50	21.4	2.30	18.7	1.20	22.0	1.30	22.4	1.82
5. Schrock kafir	25.9	2.20	21.4	1.30	18.7	1.00	23.1	1.30	22.3	1.45
6. Darso	21.4	1.50	19.8	1.50	19.0	.90	26.4	1.20	21.4	1.28
7. Spur feterita	25.9	1.30	22.9	1.80	17.2	1.10	16.5	1.20	20.6	1.35
8. Early kafir	22.8	2.70	22.0	1.20	16.5	1.40	18.7	1.40	20.2	1.68
9. White yolo	16.8	1.00	21.4	1.50	18.0	.90	22.0	1.30	19.6	1.18
10. Pearl kafir			21.4	1.90	19.8	1.00	16.5	.90	19.2	1.27
11. Barchet kaoliang	22.8	1.60	21.4	1.60	15.4	.90	16.9	1.00	19.1	1.28
12. Hegari	16.8	2.00	21.4	2.20	17.6	1.50	17.6	1.70	18.4	1.85
13. Kafir sorgo	19.8	1.60	18.4	1.20	16.5	.80	16.5	1.00	17.8	1.15
14. Dwarf feterita	16.8	1.20	22.9	1.80	13.6	.80	16.5	1.10	17.5	1.12
15. Dawn kafir	19.8	1.80	18.4	1.70	11.0	1.00	18.7	1.10	17.0	1.40
16. African millet	18.4	2.50	16.8	2.60	15.8	1.50	16.5	1.60	16.9	2.05
17. Shallu	19.8	1.40	19.8	.90	12.3	.60	11.0	.60	15.8	.88
18. Pink kafir			13.7	1.40	13.6	.80	16.5	1.20	14.6	1.13
Average	22.2	1.85	21.1	1.63	16.5	1.03	18.8	1.20		



Table 7. Yields of grain sorghums at different dates of planting in 1925.

VARIETY	DATES OF PLANTING									
	April 13		April 20		May 1		May 11		Av. Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre	Forage Yields in Tons Per Acre
1. Pearl kafir	15.7	1.80	31.4	2.64	28.6	3.30	32.1	3.00	26.9	2.68
2. Darso	21.4	1.60	20.0	1.44	25.0	2.00	21.4	1.60	21.9	1.66
3. Reed's kafir			16.4	1.60	21.4	2.00	25.0	2.00	20.9	1.87
4. Schrock kafir	10.7	1.80	23.5	2.10	25.1	2.40	10.7	1.40	17.7	1.92
5. Pink kafir	17.9	1.54	20.0	2.00	14.6	2.20	17.9	2.00	17.6	2.08
6. Common feterita	8.6	1.60	18.6	2.00	17.9	2.00	21.4	2.00	16.6	1.90
7. Blackhull kafir	7.1	1.40	14.3	1.15	17.9	2.50	25.0	1.80	16.1	1.71
8. Bishop's kafir	8.6	1.60	14.3	1.60	17.0	2.20	17.9	1.80	15.2	1.80
9. Early kafir	8.6	1.90	17.9	2.20	15.7	2.50	17.9	2.60	15.0	2.30
10. Sunrise kafir	10.7	1.80	14.3	2.10	18.6	2.40	14.3	1.80	14.5	2.02
11. African millet	14.3	3.10	18.6	3.50	17.9	3.30	7.1	2.01	14.3	1.84
12. Kafir sorgo	14.3	1.56	15.0	1.60	7.1	2.00	21.4	2.20	14.3	2.38
13. White yolo	9.3	1.50	14.3	1.56	14.2	2.00	17.9	1.40	13.9	1.61
14. Spur feterita	8.6	1.30	11.4	1.64	17.9	2.01	15.7	1.90	13.4	1.71
15. Dawn kafir	5.0	1.50	14.3	1.90	14.2	2.00	15.7	2.00	12.3	1.85
16. Shallo	14.3	1.40	17.9	1.30	7.1	1.10	4.3	.80	10.9	1.15
17. Barchet kaoliang			10.7	1.50	14.2	1.40	7.1	.70	10.7	1.20
18. Dwarf feterita	3.6	.90	12.9	1.11	7.1	.80	10.7	1.06	8.6	.97
19. Premo					14.2	1.40	0.0	0.0	7.1	.35
20. Hegari kafir	3.6	1.50	11.4	2.40	5.7	.90	1.4	2.00	5.5	1.70
21. Straight Neck maize	10.7	1.40	0.0	0.00	0.0	0.00	0.0	0.00	2.7	.35
22. Yellow milo	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
23. White milo	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00	0.0	0.00
Average	9.8	1.47	14.4	1.61	14.0	1.76	13.2	1.50		

Table 8. Yields of grain sorghums at different dates of planting in 1926.

VARIETY	DATES OF PLANTING									
	April 15		May 1		May 15		June 7		Average Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre*	Forage Yields in Tons Per Acre
1. Early kafir	20.6	2.14	23.8	2.09	19.6	1.55		2.05	21.3	1.96
2. Pearl kafir	20.6	1.74	21.3	1.75	21.7	1.73		2.21	21.2	1.86
3. Schrock kafir	21.3	1.73	21.0	1.61				2.03	21.1	1.79
4. Red kafir	19.9	1.64	23.8	1.62	19.2	1.33		1.84	21.0	1.61
5. Darso	18.5	1.31	21.0	1.37	19.6	1.32	26.0	1.88	19.7	1.47
6. Blackhull kafir	21.7	2.03	22.8	1.68	13.2	1.41		2.05	19.4	1.79
7. Dwarf feterita			18.8	1.32	20.6	1.07	8.9	.93	19.7	1.11
8. Reed's kafir	18.8	1.52	19.9	1.44	18.5	1.28		1.43	19.1	1.42
9. Hegari	17.4	1.61	18.8	1.61	20.3	1.34	6.8	2.09	18.8	1.66
10. Pink kafir	17.1	1.41	23.5	1.59	15.4	1.03		1.70	18.7	1.43
11. Dawn kafir	21.0	1.78	19.6	1.62	15.3	1.49	5.3	1.90	18.6	1.69
12. Spur feterita	18.5	1.62	19.2	1.55	17.8	1.26		1.66	18.5	1.52
13. Barchet kaoliang	14.2	1.59	16.4	1.49	18.8	1.31		2.00	16.5	1.59
14. Bishop's kafir	18.8	1.62	14.9	1.39	12.4	1.28		2.00	15.4	1.57
15. Sunrise kafir	18.5	1.93	13.2	1.83	12.4	1.47		1.74	14.7	1.74
Average	19.1	1.69	19.9	1.71	17.6	1.26		1.83		

\*Average for three dates of planting only.

Table 9. Yields of grain sorghums at different dates of planting in 1927

VARIETY	DATES OF PLANTING									
	April 20		May 1		May 14		June 1		Av. Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre	Forage Yields in Tons Per Acre
1. Common feterita	33.8	3.85	36.6	3.65	39.9	5.41	18.9	2.55	32.3	3.87
2. Dawn kafir	29.0	2.77	31.3	2.68	38.6	4.30	10.4	2.66	27.3	3.10
3. Darso	28.0	2.71	30.8	2.83	28.5	3.20	17.9	3.00	25.6	2.94
4. Sunrise kafir	22.7	3.11	33.3	3.11	25.3	3.00	19.2	1.90	25.4	2.78
5. Schrock kafir	30.3	3.28	29.8	3.71	30.1	2.23	10.1	3.85	25.1	3.27
6. Pink kafir	20.4	2.04	30.6	2.29	31.8	2.53	16.2	2.42	24.8	2.26
7. Early kafir	28.2	2.52	18.9	1.92	24.0	2.26	17.7	2.89	22.2	2.40
8. Blackhull kafir	23.2	2.25	23.4	2.45	31.5	3.18	6.1	2.81	21.1	2.67
9. Reed's kafir	25.3	2.43	24.2	2.38	24.7	2.15	5.6	.91	20.0	1.97
10. Pearl kafir	22.2	2.75	17.2	2.40	36.9	3.71	6.1	2.37	20.6	2.81
11. Red kafir	22.7	2.48	26.8	2.58	24.7	3.08	4.0	2.41	19.6	2.56
12. Spur feterita	6.8	1.33	20.5	3.23	24.5	3.68	21.7	3.85	18.4	3.02
13. Hegari	10.4	.74	19.7	1.56	29.3	2.55	9.6	3.42	17.3	2.07
14. Dwarf feterita	5.1	.70	19.4	1.89	21.5	2.03	22.2	2.09	17.1	1.68
15. Bishop's kafir	20.7	3.08	11.4	2.41	27.8	3.85	1.2	2.55	15.3	2.97
16. Straight Neck maize	17.4	1.90	16.4	1.44	24.7	2.91	0.0	0.00	14.6	1.56
17. Desert maize	12.4	1.64	4.8	.62	4.8	.59	0.0	0.00	5.5	.71
Average	21.1	2.31	23.2	2.36	27.4	3.04	11.0	2.32		

Table 10. Averages of yields of grain sorghum varieties planted at different dates from 1922 to 1927.

Year	DATES OF PLANTING							
	First		Second		Third		Fourth	
	Grain Yields in Bu.	Forage Yields in Tons	Grain Yields in Bu.	Forage Yields in Tons	Grain Yields in Bu.	Forage Yields in Tons	Grain Yields in Bu.	Forage Yields in Tons
1922	21.3	1.28	6.3	.96	1.2	.30	4.6	.50
1923				FAILURE				
1924	22.2	1.85	21.1	1.63	16.5	1.03	18.8	1.20
1925	14.4	1.61	14.0	1.76	13.2	1.50		
1926	19.1	1.69	19.9	1.71	17.6	1.26		1.83
1927	21.1	2.31	23.2	2.36	27.4	3.04	11.0	2.32
Average	21.0	1.75	16.9	1.68	15.2	1.43	11.5	1.71

## DATE OF PLANTING SORGOS

Tables 11 and 12 give the yields of sweet sorghums planted at different dates. The same conclusions stated under the optimum date of planting for the grain sorghums hold true with the sorgos. As with the grain sorghums, the highest yields in 1927 were obtained with the third date of planting. The reason for this is found in the fact that the spring of 1927 was exceptionally cold.

Table 11. Yields of sorghos at different dates of planting in 1926

VARIETY	DATES OF PLANTING									
	April 16		May 1		May 15		June 8		Av. Yields	
	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels Per Acre	Forage Yields in Tons Per Acre
1. Sumac	3.50	11.0	3.33	10.7	3.07	12.1	2.75	11.7	3.16	11.4
2. Orange	3.11	12.2	3.16	13.9	2.77	15.3	2.92	10.7	2.99	13.0
3. African millet	3.46	21.3	3.25	20.6	2.92	19.9	1.83	8.5	2.86	17.6
4. Gooseneck	4.70	3.6	3.15	2.0	2.17	2.8	1.08	.0	2.77	2.1
5. Dwarf Ashburn	2.99	23.8	2.73	19.2	2.44	18.1	2.78	8.2	2.73	17.4
6. McClain's	2.30	25.2	1.97	21.7	2.09	22.8	2.59	12.4	2.23	20.5
7. Seeded Ribbon	2.58	5.7	2.40	6.0	1.78	5.0	1.98	.0	2.19	4.2
8. Kansas Orange	2.81	8.2	2.57	10.3			2.41	3.6	2.59	7.4
9. Schrock kafir			2.26	27.6	1.74	24.0	2.11	16.4	2.03	22.7
10. Honey	2.26	17.1	2.02	15.6	1.78	16.7	1.10	13.5	1.79	15.7
11. Red Amber	2.12	18.5	1.79	15.6	1.73	18.1	1.00	12.8	1.66	16.3
12. Colenian's	2.10	21.0	1.74	14.2	1.32	13.5	1.44	14.2	1.65	15.7
13. Folger	1.97	21.0	1.89	14.2	1.48	13.5	1.24	9.2	1.65	14.5
14. Black Amber	2.18	23.1	1.34	8.2	1.41	7.5	1.28	16.7	1.53	13.9
15. Blackhull kafir (check)	1.93	25.6	1.66	18.8	1.12	13.4	1.49	8.2	1.55	16.5
16. Collier	1.48	20.3	1.76	23.1	1.22	14.9	1.06	11.4	1.38	17.4
Average	2.63	17.2	2.31	15.4	1.93	14.2	1.82	9.8		

Table 12. Yields of sorghos at different dates of planting in 1927

VARIETY	DATES OF PLANTING									
	April 20		May 1		May 14		June 1		Av. Yields	
	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons	Grain Yields in Bushels	Forage Yields in Tons Per Acre	Grain Yields in Bushels Per Acre
1. Sumac	5.66	20.5	5.94	27.3	7.07	31.8	4.81	10.1	5.87	22.4
2. Orange	5.18	25.0	5.23	32.6	6.71	30.6	4.27	3.5	5.35	22.9
3. Kansas Orange	6.54	29.5	6.06	33.3	7.22	35.9	1.36	2.3	5.30	25.3
4. African millet	4.72	30.6	5.01	26.0	4.30	28.0	3.34	11.0	4.34	23.9
5. McClain's	4.30	20.2	5.23	33.8	5.32	33.3	2.07	7.6	4.23	23.7
6. White African	3.25	11.8	4.91	23.7	5.04	20.7	3.60	0.8	4.20	14.3
7. Dwarf Ashburn	4.16	24.5	4.05	31.8	5.57	27.3	2.09	2.8	3.97	21.6
8. Honey	2.63	21.0	2.26	13.9	3.68	27.0	3.48	15.2	3.01	19.3
9. Early Rose	2.35	15.4	2.69	16.7	3.40	18.9	2.55	5.8	2.75	14.2
10. Sugar Drip	3.23	21.5	2.61	22.5	3.51	37.4	1.64	8.3	2.75	22.4
11. Coleman	2.40	17.9	2.71	22.5	4.21	27.3	1.21	7.6	2.63	18.8
12. Gooseneck	1.90	3.8	3.11	6.3	2.57	10.6	2.84	2.0	2.61	5.7
13. Folger	2.69	13.6	3.25	25.0	3.90	23.7	0.59	0.3	2.61	15.7
14. Early Sumac	2.29	14.4	2.83	21.2	4.10	32.3	0.42	2.3	2.41	17.6
15. Clubhead	2.23	21.5	1.81	13.1	2.77	25.3	2.26	17.7	2.27	19.4
16. Red Amber	2.46	18.4	3.17	29.5	2.83	27.5	0.28	0.3	2.19	18.9
17. Black Amber	2.18	23.5	2.86	31.3	2.72	30.3	0.37	2.0	2.03	21.8
18. Collier	2.12	19.2	2.55	25.0	2.55	26.3	0.76	5.1	2.00	18.9
19. Seeded Ribbon	1.70	1.5	2.26	0.8	1.02	0.3	0.00	0.0	1.25	.7
Average	3.26	18.6	3.61	23.0	4.12	26.0	2.00	5.5	3.25	18.3

## CHARACTERISTICS OF VARIETIES

Varieties of grain and sweet sorghums grown at the Oklahoma Agricultural Experiment Station from time to time are below grouped into several classes. Due to the ease with which cross-pollination takes place in sorghums, new and intermediate types are easily produced. The development of such types having characteristics common to more than one group makes definite classification difficult.

## I. Grain Sorghums

- A. Kafir
  1. Blackhull kafir
  2. Dawn kafir
  3. Sunrise kafir
  4. Early kafir
  5. Reed's kafir
  6. Pearl kafir
  7. Pink kafir
  8. Red kafir
- B. Milo
  1. White milo
  2. Yellow milo
  3. Straight Neck maize
- C. Feterita
  1. Common feterita
  2. Spur feterita
  3. Dwarf feterita
- D. Durra
  1. White durra
  2. Brown durra
- E. Kaoliang
- F. Shallu
- G. Intermediate varieties
  1. Darso
  2. Schrock kafir
  3. Hegari
  4. Bishop's kafir

## II. Sweet Sorghums

- A. Early maturing varieties
  1. Red Amber
  2. Black Amber
  3. Honey
  4. Collier
  5. Clubhead
  6. Folger
  7. Coleman
  8. Sugar Drip
  9. Early Rose
- B. Medium maturing varieties
  1. Sumac
  2. Orange
  3. Kansas Orange
  4. African Millet
  5. Dwarf Ashburn
  6. McClain's
  7. Early Sumac
- C. Late maturing varieties
  1. Seeded Ribbon
  2. Gooseneck
  3. White African

## I. The Grain Sorghums

## A. The Kafirs

In the variety tests reported Blackhull kafir has been the outstanding variety. In seasons with less than normal rainfall, Darso outyielded Blackhull. In normal or super-normal seasons and when planted at the proper date, Blackhull outyielded Darso.

Results from the date of planting experiments show that Blackhull kafir must be planted early in the season. The yields become decidedly lower if planting is delayed after the early part of May.

None of the other kafirs listed have been grown for as long a period of time as Blackhull. None of the other kafirs have been such consistent yielders. Dawn kafir has given fair yields yet was outyielded by a considerable margin by Blackhull. Early kafir in some seasons outyielded Blackhull. The average grain yield over a period of years is, however, much lower. The yields of Reed's kafir did not compare favorably with Blackhull. Pearl kafir has not been grown long enough so that its comparative value can be stated. For the short period of comparison, its performance has

been promising. Sunrise, Pink and Red kafirs have not been grown long enough so that their actual values may be determined.

B. Milo

Milos and any milo hybrids have met with decided failure at Stillwater. Complete failures resulting from chinch bug damage have been the rule. Straight Neck maize is able to endure chinch bug invasions somewhat better than White and Yellow milo or Desert maize but even with it, complete failures have been frequent. The milos are of great importance in the western and northwestern portions of Oklahoma. They will produce more under drier conditions than Blackhull kafir.

C. Feterita

The yields of Common, Spur and Dwarf feterita do not compare favorably with the yields of Blackhull kafir. Of the three types, the Common feterita has given best results. The data from the date of planting tests give evidence of the fact that especially Common feterita may be used for planting later in the season but for this use Darso has given better returns. The feteritas are of far greater importance to the western than to the central portion of the state.

D. Durra

This group is grown to but a limited extent in the grain sorghum producing area. Representatives of this group have given no indications of promise at Stillwater.

E. Kaoliang

White, Brown and Barchet kaoliang have from time to time been grown on the Experiment Station without material success when compared with Blackhull kafir. The kaoliangs are known for their drought resisting abilities. Where climatic conditions are such as in the central part of Oklahoma that Blackhull kafir can be grown, it offers the more profitable crop.

F. Shallu

Shallu, also known under the name of Egyptian wheat, was included in the variety test of grain sorghums but was subsequently dropped due to low yields.

G. Intermediate varieties

Darso has given most excellent results. The date of planting tests show that this variety is especially fitted for planting late in the season. If for any reason the planting of kafir has been delayed Darso can be used as a good substitute. Tables 1 and 2 show that the yields of Darso surpassed those of Blackhull kafir for the two longer periods of comparison.

Schrock kafir, a variety lately advertised under the name of Sagraim, has many characteristics in common with Darso. It is quite well adapted to late planting. The color of the seed as that of Darso is dark brown to red. The seed is for that reason not as palatable to livestock as white seeded types. The yields of Schrock kafir have not been as uniformly high as those of Darso.

Hegari is quite similar to feterita with regard to general appearance as well as habits of growth. The yields of Hegari were decidedly inferior to the yields of Blackhull kafir.

Bishop's kafir, recently sold under the name of Algeria, has for the short period of comparison been outyielded by Blackhull kafir. Bishop's kafir may, due to its lateness, be expected to give better returns in the southern than in the northern part of Oklahoma. This variety is from all appearances the result of a kafir and milo cross.

## II. Sorghos

## A. Early maturing varieties

The yields of early maturing varieties are considerably below those of the medium maturing varieties. Still in instances as in a soiling system there is need of early maturing varieties. Of this group best results were obtained from Black and Red Amber. Clubhead and Honey have also given good returns. Collier, Folger, Early Rose and Sugar Drip gave relatively low yields.

## B. Medium maturing varieties

This group has given the greatest yields. Varieties of it are best for general production. Sumac, Orange and Kansas Orange were the outstanding varieties. Sumac also known as Redtop cane has the advantage over Orange in that it produces a sturdier stalk and for that reason does not lodge as readily. Sumac, due to its leafiness and good seed producing habits, produces an excellent quality of forage. African Millet has given good returns both from the standpoint of grain and forage production. It is well suited for silage purposes. Dwarf Ashburn yielded considerably less than the varieties above indicated. McClain's sorgho and Early Sumac have not been grown long enough so that their comparative values may be determined.

## C. Late maturing varieties.

Seeded Ribbon, Gooseneck and White African have been grown long enough to show that they are too late for northern and north-central Oklahoma conditions. Due to the small amount of seed produced by these varieties, the forage produced by them is of low quality.

## RATE OF PLANTING KAFIR

Each year the plots used for this experiment were planted at a rather thick rate in rows forty-two inches apart. After the kafir was up about four or five inches, the various plots were thinned to the stand desired. The thinning was done with a hoe and according to measurements and counts, the various spacings were approximately as indicated in the tables below.

As sorghums in the western part of the state are often grown in wide rows or with wide spacing in the row, best results were expected here with the thinner plantings especially in dry years while the medium rates were expected to do better under more favorable conditions. This would seem to be the case more likely with the grain yields than with the forage yields. The following table shows the results of grain and forage yields for five years.

Table 13. Rate of planting kafir, grain and forage yields.

Spacing in Inches	1922		1924		1925		1926		1927		Five-Yr. Av.	
	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons
Not Thinned	30.1	1.43	44.1	3.50	17.4	3.30	*	*	47.4	4.70	34.7**	3.20**
6	28.9	1.95	42.5	3.40	20.1	2.60	18.0	3.30	35.7	3.20	29.0	2.90
10	28.1	1.40	41.2	3.30	21.4	2.40	15.6	2.60	28.0	2.30	26.8	2.40
16	22.5	1.12	33.0	2.30	20.5	2.20	14.8	2.00	25.0	2.10	23.1	1.90
24	22.8	1.41	33.5	2.50	20.5	1.90	16.3	1.90	21.7	1.70	22.9	1.90
30	20.4	1.23	30.0	2.30	17.0	1.50	14.4	1.60	20.0	1.70	20.4	1.70

No results for 1923, due to dry weather. Data not reliable.

\*Plot accidentally thinned to six inches.

\*\*Four-year average only.

From this data it will be seen that in every instance the thicker rates of planting gave a higher tonnage of forage than the thinner or wider spacings. This is true even in the drier years as well as in the years of a higher rainfall.

With the grain yields the results are similar to the forage except for the year 1925 when the heaviest rate of planting as well as the lightest rate gave lower yields than the intermediate rates.

As these tests were conducted on medium upland of good fertility, it is not likely that the heavier rates would compare as well to the lighter rates on thin uplands of low fertility. The results obtained at the Outfield Experimental plots at Granite,\* Oklahoma, are here given but for three years as the work in that part of the state was begun in 1925.

\*In charge of R. W. Ellithorp.

Table 14. Rate of planting kafir at Granite, grain and forage per acre

Spacing in Inches	1925		1926		1927		Three-Yr. Av.	
	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons	Grain Yield in Bushels	Forage Yield in Tons
Not Thinned	26.4	2.90	7.1	1.20	32.3	2.40	21.9	2.10
6	22.7	2.80	7.3	1.10	31.9	1.80	20.6	2.60
9	20.7	2.80	9.0	.90	34.9	1.80	21.5	1.80
12	18.4	2.80	9.3	1.00	33.0	1.70	20.2	1.90
15	*	*	9.6	1.00	32.4	1.80	20.5	1.40
18	17.1	2.60	10.4	1.00	30.1	1.70	19.2	1.80
24	16.5	2.60	10.2	1.10	29.0	1.50	21.9	1.70
30	13.9	2.20	9.9	1.00	25.5	1.50	16.4	1.60
36	**	**	9.0	.90	21.5	1.50	15.2	1.20

\*No fifteen inch spacing in 1925.

\*\*No thirty-six inch spacing in 1925.

The differences in yields for the various rates of planting are not so marked except for 1925 when the yield of grain for the thicker rate was almost double that of the lightest rate. There is a gradual decrease in the yield of forage for the three year average. For the grain, there is not much difference in the yields of the rates of planting up to and including the 24 inch rate. Two of the three years show that the higher rates of seeding gave greater yields of grain while for 1926 better yields of grain were obtained from the lighter rates of planting.

#### RESULTS OF VARIETY TESTS OF GRAIN SORGHUMS AT OUTFIELD STATIONS

For the past few years, five grain sorghum varieties have been grown at seven different places over the state as given in Table 15. This work was under the supervision of H. C. Potts, Assistant Agronomist, in charge of outfield experiments. In the places where the several varieties were grown, the results correspond with those reported in Tables 1 and 2 at Stillwater. Darso and Blackhull kafir were the outstanding varieties.

Table 15. Yields of grain sorghums in bushels per acre at outfield stations

Variety	Eufaula 3-Yr. Av.	Nowata 3-Yr. Av.	Sapulpa 3-Yr. Av.	Purcell 2-Yr. Av.	Durant 2-Yr. Av.	Okmulgee 2-Yr. Av.	Carrier 1-Yr. Av.
Darso	33.9	27.1	34.1	52.6	36.6	16.8	34.3
Blackhull kafir	**	26.4	**	50.0	39.7	16.3	25.4
Reed's kafir	**	23.3	**	42.3	27.8*	14.3	**
Hegari kafir	**	27.5*	**	44.2	47.2*	14.5	**
Sunrise kafir	**	25.0	**	44.3	23.9	11.3	**

\*One year.

\*\*Destroyed by birds.

RESULTS OF VARIETY TESTS OF SWEET SORGHUMS  
AT OUTFIELD STATIONS

Table 16 gives the yields of sorgo varieties grown at the places indicated. Seeded Ribbon was the highest yielder in nearly all places. This is a late maturing variety producing a forage of inferior quality. The stems of this variety are coarse and as may be seen from Table 4, the grain yields are exceedingly low. Sumac, Orange and African Millet gave, as in the variety test at Stillwater, good yields.

Table 16. Yields of sorgos in tons per acre at outfield stations.

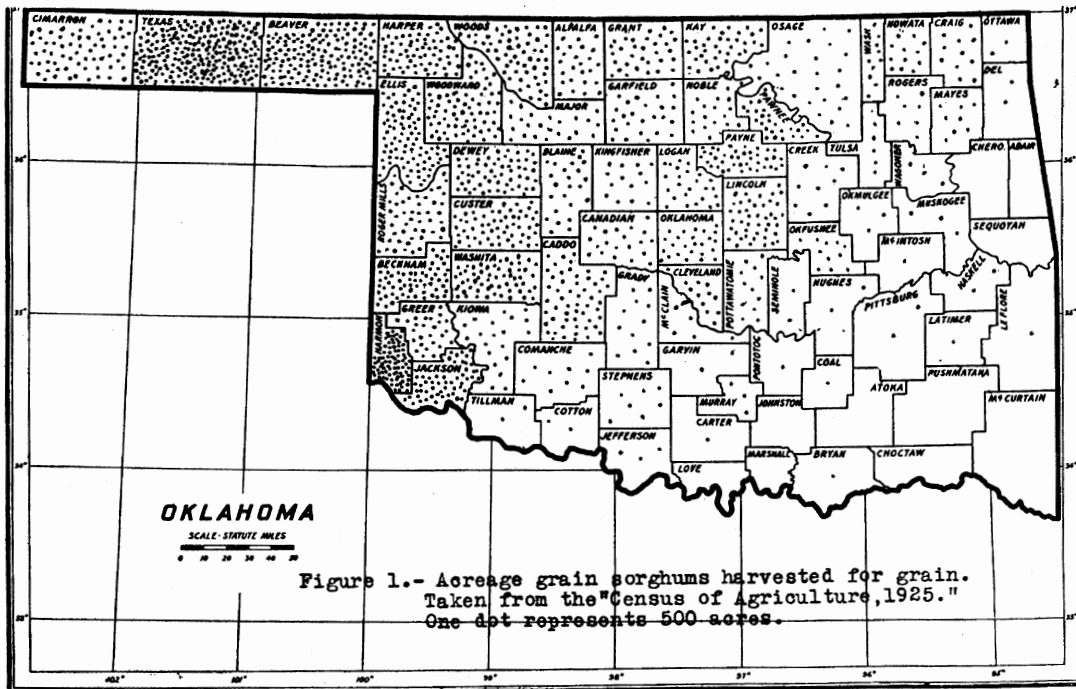
Variety	Eufaula 3-Yr. Av.	Nowata 3-Yr. Av.	Sapulpa 3-Yr. Av.	Purcell 3-Yr. Av.	Durant 2-Yr. Av.	Okmulgee 2-Yr. Av.	Carrier 1-Yr. Av.
Sumac	4.72	5.06	3.70	5.31	5.55	7.85	3.75
Orange	4.81	5.21	3.50	5.83	6.87	6.75	6.45
African millet	4.36	5.84	3.94	5.48	6.55	5.62	3.85
Red Amber	3.27	5.07	2.41	5.14	4.17	4.09	2.90
Seeded Ribbon	7.44	5.56	5.14	8.48	12.90	7.30	7.25

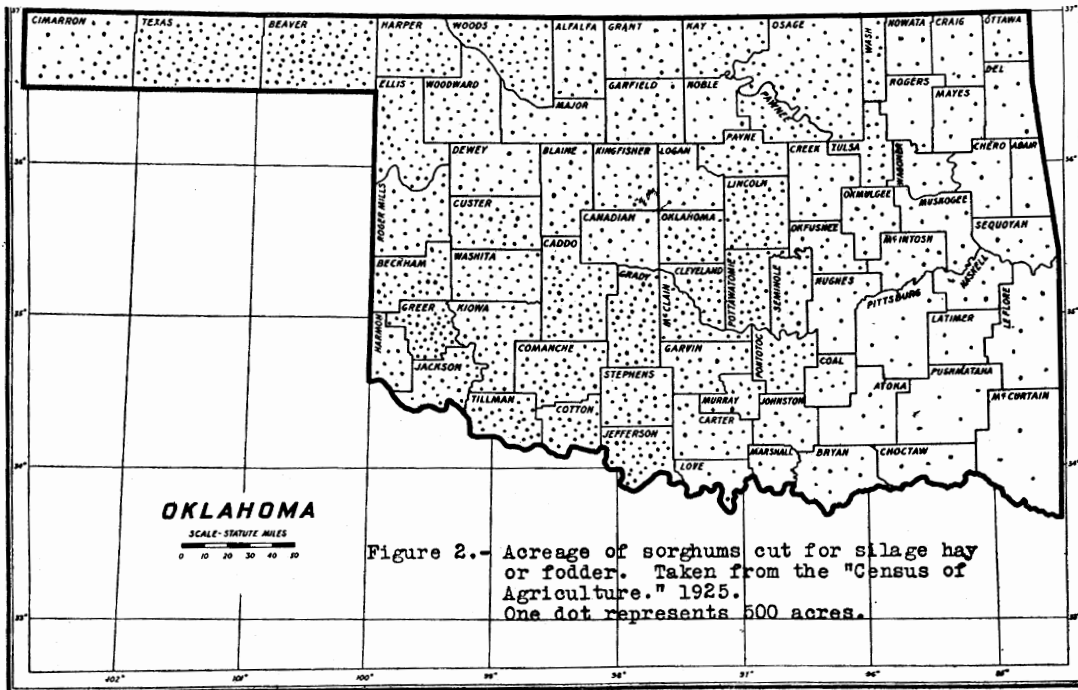
As Seeded Ribbon cane is a late maturing variety, it is not dependable. It produces good yields during favorable seasons. In average or adverse seasons, it is not as desirable as either Orange or Sumac. Since the results recorded in Table 16 are based on the performance of the respective varieties for but one to three seasons only and since these seasons have been more favorable than the average, too much emphasis should not be attached to the high yields of Seeded Ribbon cane.

### SUMMARY

1. Blackhull kafir and Darso have in variety tests shown themselves the highest and most consistent grain yielders.
2. Sumac and Orange gave the highest yields of forage in comparative variety tests. These two varieties produce a forage of high quality. Other good forage producing sorgos were African Millet and Dwarf Ashburn.
3. The highest yields of grain and sweet sorghums were obtained with the middle to the end of April plantings. The best date of planting is greatly influenced by seasonal conditions. Results here reported show that it is best to plant as early as is consistent with seasonal conditions. Results of tests conducted in the western and southwestern parts of Oklahoma show that it is best to plant later in the season than at Stillwater. The explanation for differences in the best dates of planting for those respective parts of the state is found in the differences in climatic conditions.
4. The date of planting tests show that varieties such as Darso and Common feterita may be planted later in the season than Blackhull kafir. If for any reason the planting of kafir in the north central part of the state is delayed after the first part of May, it is good practice to substitute Darso for Blackhull kafir.
5. At Stillwater heavier rates of planting kafir have given higher yields of both grain and forage than lighter rates. At Granite in the southwestern part of the state where the rainfall is less than at Stillwater, one year (1926) of the three during which this test was conducted showed that rates ranging from 15 to 30 inches gave larger yields of grain than heavier or lighter rates.
6. Blackhull kafir and Darso are the higher yielding varieties of grain sorghums in the tests conducted at the various outfield stations.
7. In the outfield tests, Orange, Sumac and African Millet gave, as at Stillwater, consistent yields and are considered as the most dependable varieties of sorgos to be recommended for Oklahoma conditions.







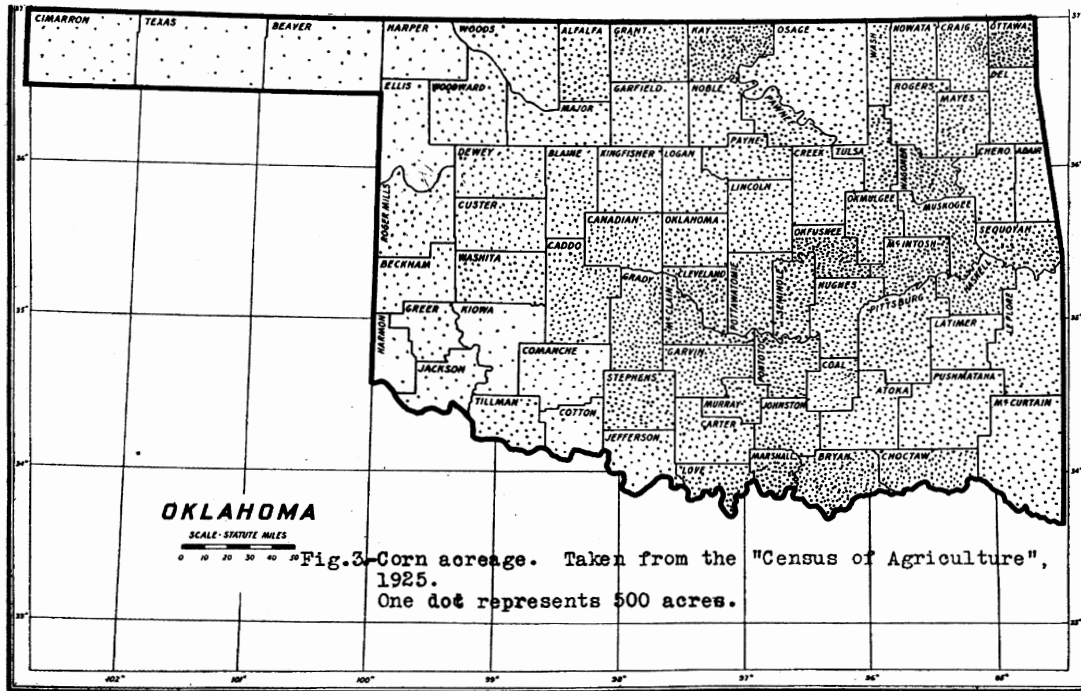


Fig. 3. Corn acreage. Taken from the "Census of Agriculture", 1925.  
One dot represents 500 acres.

