TEXAS AGRICULTURAL EXPERIMENT STATION
AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS
W. B. BIZZELL, President

BULLETIN NO. 275 FEBRUARY, 1921

DIVISION OF AGRONOMY

SPUR FETERITA

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†As of February 15, 1921.
*In cooperation with the School of Veterinary Medicine, A. & M. College of Texas.
**In cooperation with the United States Department of Agriculture.

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BULLETIN NO. 275. FEBRUARY, 1921.

SPUR FETERITA

BY

A. B. CONNER AND R. E. DICKSON

Spur feterita is a new and distinct variety of feterita with superior grain producing qualities developed by plant breeding work at the Texas Agricultural Experiment Station at Spur. Its performance since its development has been such that a supply of seed has been increased and distributed to farmers throughout the grain sorghum belt.* Accurate information as to the origin, description, and performance of Spur feterita will be helpful at this time.

HISTORY AND REQUIREMENTS OF UNIMPROVED FETERITA

In order that the reader may readily appreciate Spur feterita, it is thought desirable here to give a brief statement of the introduction and the requirements of unimproved feterita, the crop from which Spur feterita was derived. Feterita was first introduced from the Sudan region in Africa into the United States in 1909 by the Office of Forage Crops, United States Department of Agrculture, and it was tested out for the first time at the forage crop testing station at Chillicothe, Texas, operated jointly by the Office of Forage Crops, United States Department of Agriculture, and the Texas Agricultural Experiment Station. The introduction of feterita marked the entry of an altogether new type of grain sorghum. It proved to be somewhat earlier in maturing than even dwarf milo, and to be a crop especially well adapted wherever the supply of moisture is limited. The feterita as introduced normally grows to a height of from 5½ to 6½ feet, and, therefore, seemed comparable to what is known as standard milo. The stems of unimproved feterita are somewhat more slender than those of milo, and lodge or fall down more readily, especially if left in the field for a time after the crop is thoroughly ripe. The fodder or forage is of good quality, being considered superior to that of milo. The seed head is elipsoidal in shape, being rather pointed at the tip and not well filled with seed at the base. The grain is somewhat larger than milo grain and chalk white in color on account of which the crop has a very attractive appearance in the field. From the initial introduction, feterita soon found its way into the hands of the farmers and came to be recognized by many as a valuable addition to our grain sorghums throughout the region where they are grown. The yields of grain secured have in most cases been equal to those of milo and, in some cases, greater, notwith-

*In 1919 a distribution of 12,000 pounds of Spur Feterita seed was made to farmers by the Office of Dryland Seed Distribution, United States Department of Agriculture, Washington, D. C., this seed having been increased under the direction of the Texas Agricul tural Experiment Station.

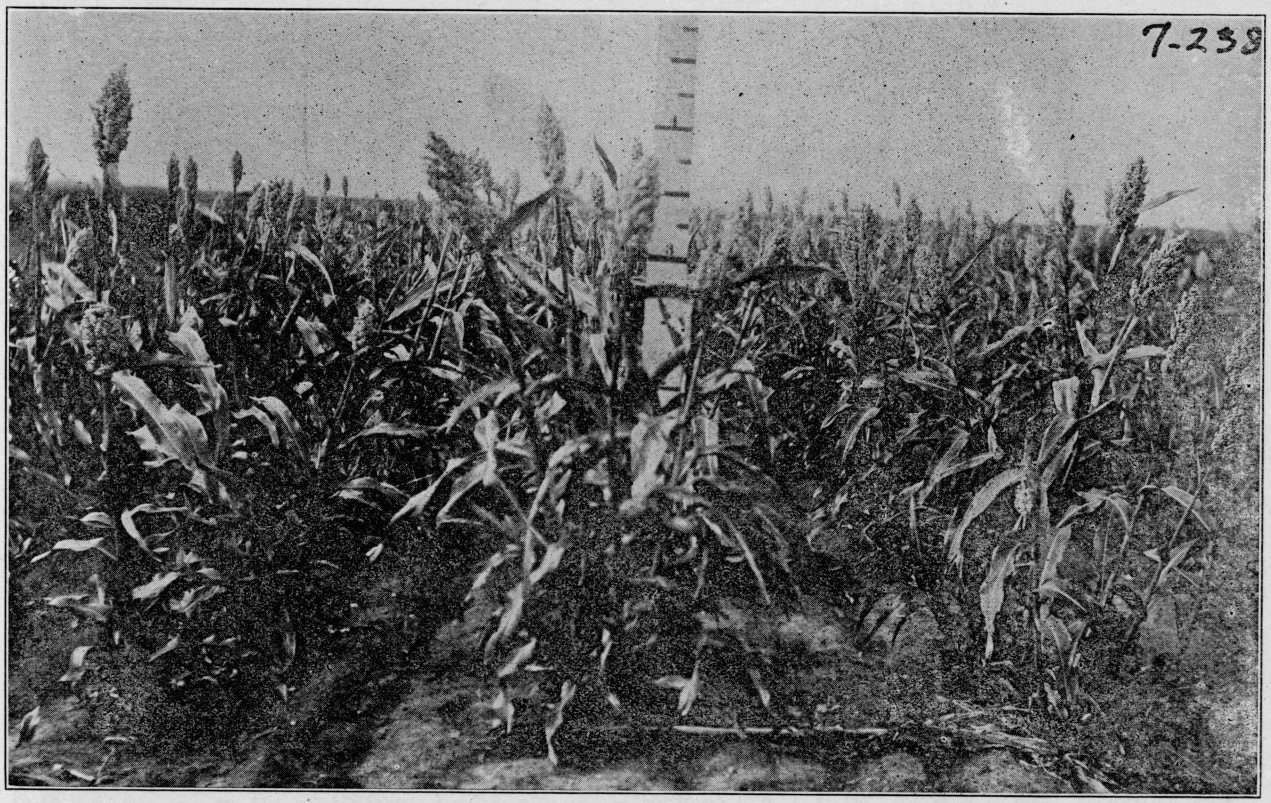

Figure 1. Unimproved Feterita typically developed in the dry season of 1917, Substation No. 7, Spur. The diversity of type and irregularity of height is very marked.

standing the fact that feterita as introduced lacked the improvement that is found in our best varieties of milo.

Feterita is adapted to all sections of Texas where grain sorghum may be grown. It is especially well suited as a crop under conditions of limited moisture, being somewhat earlier in maturity than dwarf milo, and, therefore, more evasive to drouth. It responds well in production to favorable growing conditions, being one of the best grain sorghums for silage purposes for use in the humid regions of the State. It makes a large forage growth under humid conditions and very frequently sets good crops of seed, probably on account of earliness and consequent ability to evade the midge.

Feterita may be planted three or four weeks later than Indian corn. The seed coat, unlike that of kafir and milo, is checked and seems to absorb water more readily, making the seed more susceptible to decay before germination when planted in cold soils. Early planting should be thicker than seedings made after the soil is thoroughly warm. Feterita is commonly planted with a lister planter in the same manner as kafir and milo. Four to six pounds of seed is a sufficient amount to plant one acre, and under favorable conditions a good stand may be had by planting from one to one and one-half pounds to the acre.

The preparation of the land for feterita should be done early for the purpose of storing moisture. Listing and relisting the land is a good practice, which provides for the storage of water, promotes the availability of plant food, and tends to prevent soil movement by winds. Soils that cannot be held by listing should receive no preparation until late in the spring.

The cultivation of feterita is much the same as that of Indian corn, of kafir, and of milo. It may be given two or three harrowings when the plants are small and later given a fairly deep and thorough cultivation. Subsequent cultivations should be shallower to avoid breaking the surface roots. Clean tillage is most important. Experiments have shown that clean tillage is the outstanding factor in obtaining large grain yields.

For use as forage, the crop should be harvested in the late dough stage, in which case it may be cut with a corn harvester and cured in shocks of from twenty to thirty bundles each. After the cutting, from thirty to forty days will be required for the bundles to cure sufficiently to be put into the stack. These bundles of forage, including the grain, make a most excellent feed for horses and cattle, and, if shredded, little or no waste will be had. For use as a grain crop, harvesting may be done by cutting the heads and throwing them into a wagon, in which case the stalks are left in the field and utilized for pasture, or they may be allowed to mature a sucker head crop and then be harvested as bundled feed. In any event, harvesting should be done promptly, as feterita deteriorates rapidly after ripening. Feterita, however, may be left in the field for a time after ripening without serious loss from shattering.

ORIGIN OF SPUR FETERITA

Spur feterita was originated by the Texas Experiment Station at Substation No. 7, Spur, Texas, as a result of selection and head-row planting of more than one hundred feterita plants. These selections

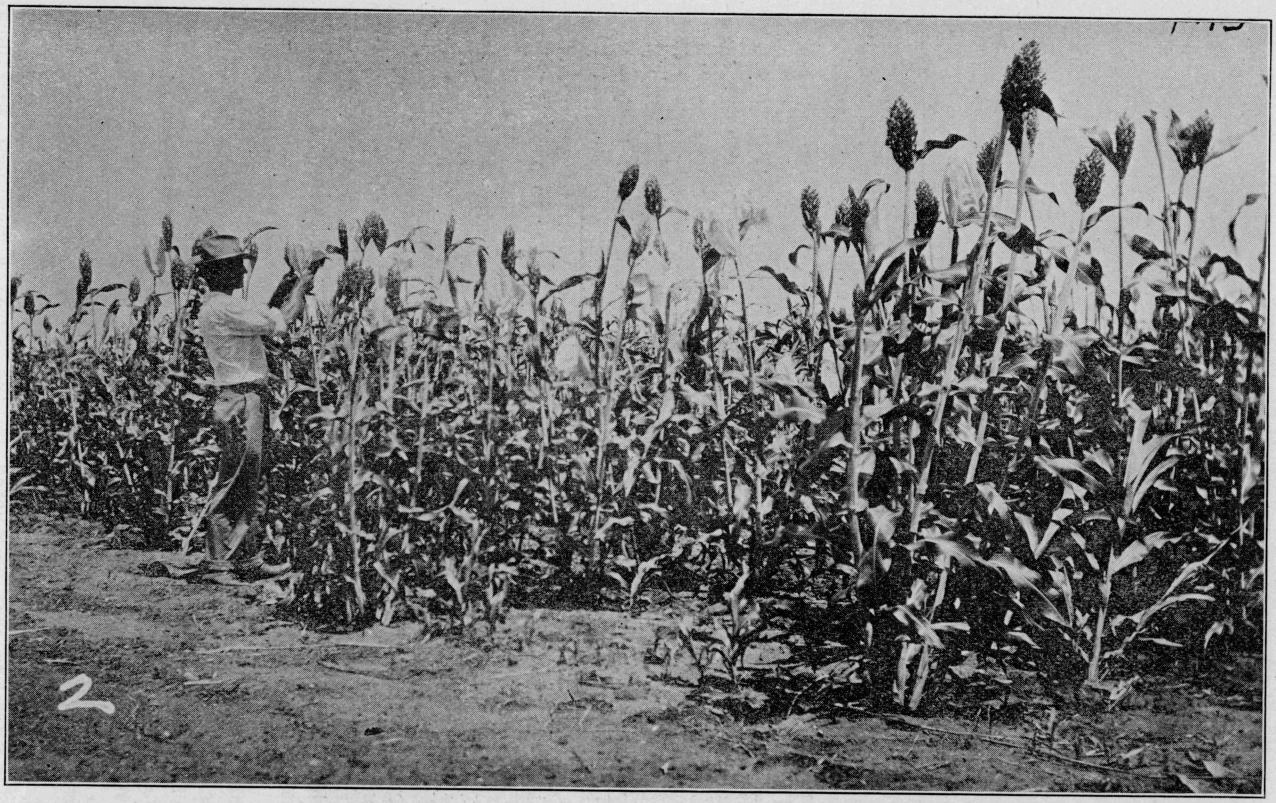

Figure 2. The first work done at Substation No. 7, Spur, in securing pure strains of Feterita by bagging heads of selected plants before they bloomed. Substation No. 7, Spur, 1914.

were made by the junior author in 1914 from a feterita grown by the Texas station under Texas Station No. 40, original seed of which was secured from the Office of Forage Crops, United States Department of Agriculture, Washington, D. C., which carried it under Seed and Plant Introduction No. 19517. The seed from the selected heads was planted in the spring of 1915, but during that growing season no appreciable variation was observed. Individual selections were made from different rows, however, and these were planted in head-row plats in 1916 for further observation, when variations occurred in stature, earliness, type of head, size of stem, and, in fact, a number of other characters. Two selections were made, one carried under Pedigree No. 40-3 and the other carried under Pedigree No. 40-92, which were especially promising. From each of these, further selections were made. At the close

Figure 3. A field of Spur Feterita grown from the seed distributed in 1919.

of the season of 1916, selection No. 40-3-6-15 was considered sufficiently outstanding to warrant its increase, and so it was assigned Texas Station No. 3232 and increased as rapidly as possible for distribution to farmers. Twelve thousand pounds of seed were grown under contract during the season of 1918 and purchased by the Office of Dry Land Seed Distribution, United States Department of Agriculture, Washington, D. C., for distribution. This seed was sent to farmers in Texas, in Oklahoma, in Kansas, and in other states. More than eight thousand pounds were distributed in Texas. The distribution of seed in 1919 resulted in a considerable supply of seed being available for the crop of 1920 and at the present time Spur feterita is perhaps more commonly grown in Texas than the unimproved kind.

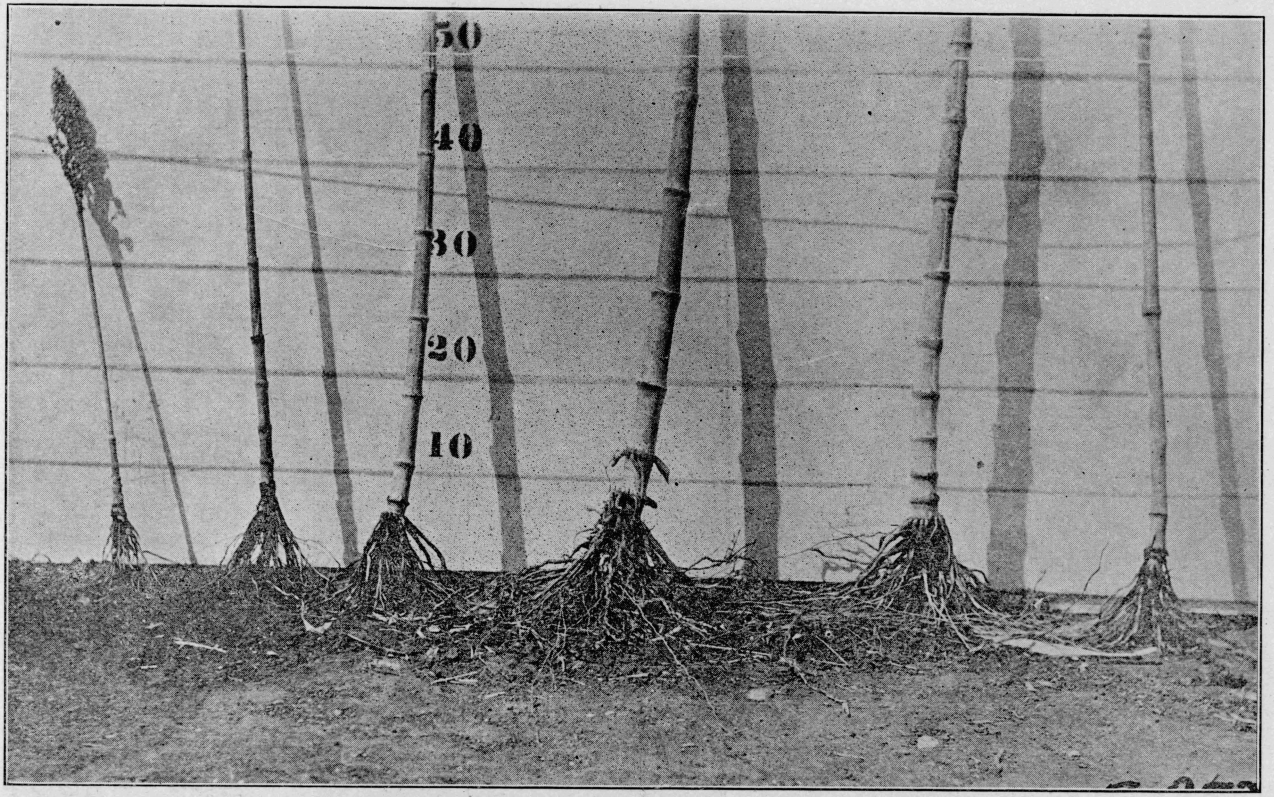

Figure 4. Type of stalk and nodes or joints in No. 40 Feterita at Substation No. 7, Spur, 1917.

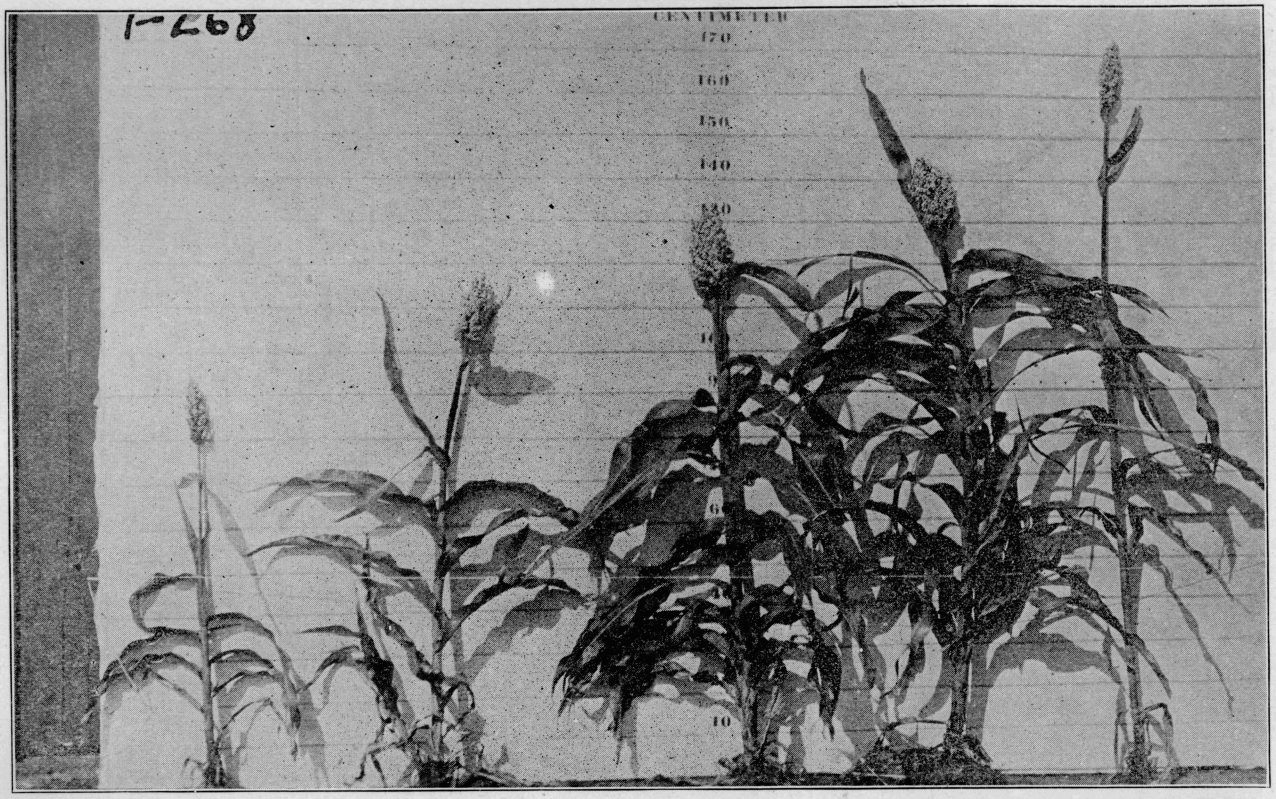

Figure 5. Plant types found in the original strain of No. 40 Feterita from which Spur Feterita was selected. Substation No. 7, Spur, 1917.

HAS THICK STRONG STALK

Spur feterita is a stocky plant, the stem averaging 27 per cent. larger in diameter than that of unimproved feterita. This stockiness seems to be of value in that the plant does not lodge or fall down so readily as the unimproved feterita. The size of the stem as compared to that of milo, of kafir, and of feterita is shown in the following table where successive dates of planting have been made throughout the season, subjecting the crop to varying seasonal conditions. Ten consecutive plants in each plat were measured and the measurements averaged.

Table 1.—Diameter of plant in centimeters—1919

T. S. No.	Variety Name	April 15	May 3	May 15	June 2	June 16	July 2	July 15	Aug. 1	Average
3232	Spur Feterita....	1.9	2.1	1.9	2.2	1.9	1.8	1.9	1.4	1.88
1652	Unimproved Feterita.....	1.4	1.7	1.5	1.5	1.5	1.4	1.5	1.2	1.47
670	Milo.....	1.5	1.8	1.8	1.1	1.9	1.5	1.6	.....	1.60*
673	Kafir.....	1.6	1.6	1.9	2.1	2.1	1.8	.....	.....	1.85**

Note: *Average of seven. **Average of six.

The average diameter of the stem of the Spur feterita is 1.88 centimeters as compared to 1.47 centimeters in unimproved feterita, or 27 per cent. greater. It is seen that the stem of Spur feterita is larger than that of milo and approximately the same as that of kafir, and hence is less susceptible to lodging or falling down if left in the field until overripe. Spur feterita stands well in the field, even after ripening.

NOT SO TALL AS UNIMPROVED FETERITA

The stalk of Spur feterita is about twelve inches less in height than that of unimproved feterita, yet it is not what would be termed a "dwarf feterita," as it is not comparable with dwarf milo. The height of Spur feterita as compared to that of the unimproved feterita, milo, and kafir is shown in the following date of planting test from which measurements of ten consecutive plants from each plat were averaged:

Table 2.—Height of plant in centimeters—1919

T. S. No.	Variety Name	April 15	May 3	May 15	June 2	June 16	July 2	July 15	Aug. 1	Average
3232	Spur Feterita....	175	142	125	195	162	136	151	163	156
1652	Unimproved Feterita.....	218	175	170	208	196	184	176	181	188
670	Milo.....	130	101	100	114	106	102	108	.....	108*
673	Kafir.....	118	106	107	116	112	108	.....	.....	111**

Note: *Average of seven. **Average of six.

It is seen that the very early and the very late plantings have grown tallest. On averaging the dates of plantings, however, for each of the four grain sorghums, it is seen that Spur feterita is 32 centimeters, or approximately one foot lower in stature than unimproved feterita. It is somewhat taller than milo or even kafir.

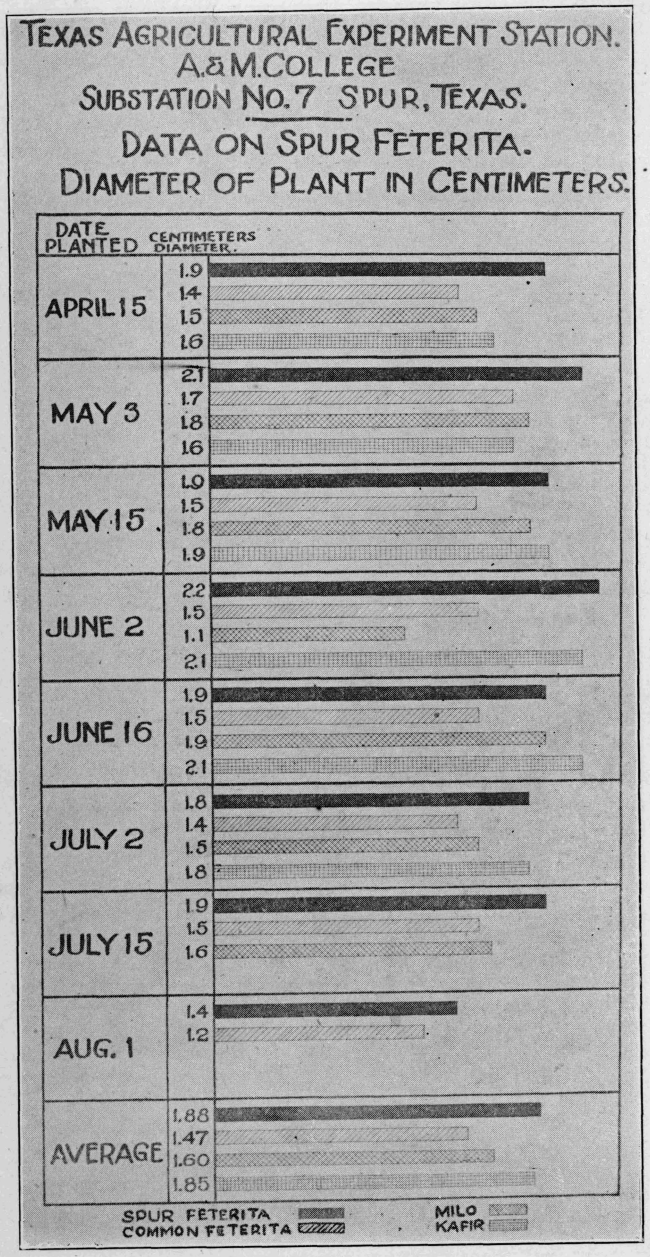
TEXAS AGRICULTURAL EXPERIMENT STATION.
A.& M. COLLEGE
SUBSTATION NO. 7 SPUR, TEXAS.
DATA ON SPUR FETERITA.
DIAMETER OF PLANT IN CENTIMETERS.
DATE PLANTED
CENTIMETERS DIAMETER.
APRIL 15
1.9
1.4
1.5
1.6
MAY 3
2.1
1.7
1.8
1.6
MAY 15
1.9
1.5
1.8
1.9
JUNE 2
2.2
1.5
1.1
2.1
JUNE 16
1.9
1.5
1.9
2.1
JULY 2
1.8
1.4
1.5
1.8
JULY 15
1.9
1.5
1.6
AUG. 1
1.4
1.2
AVERAGE
1.88
1.47
1.60
1.85
SPUR FETERITA
COMMON FETERITA
MILO
KAFIR

Figure 6.

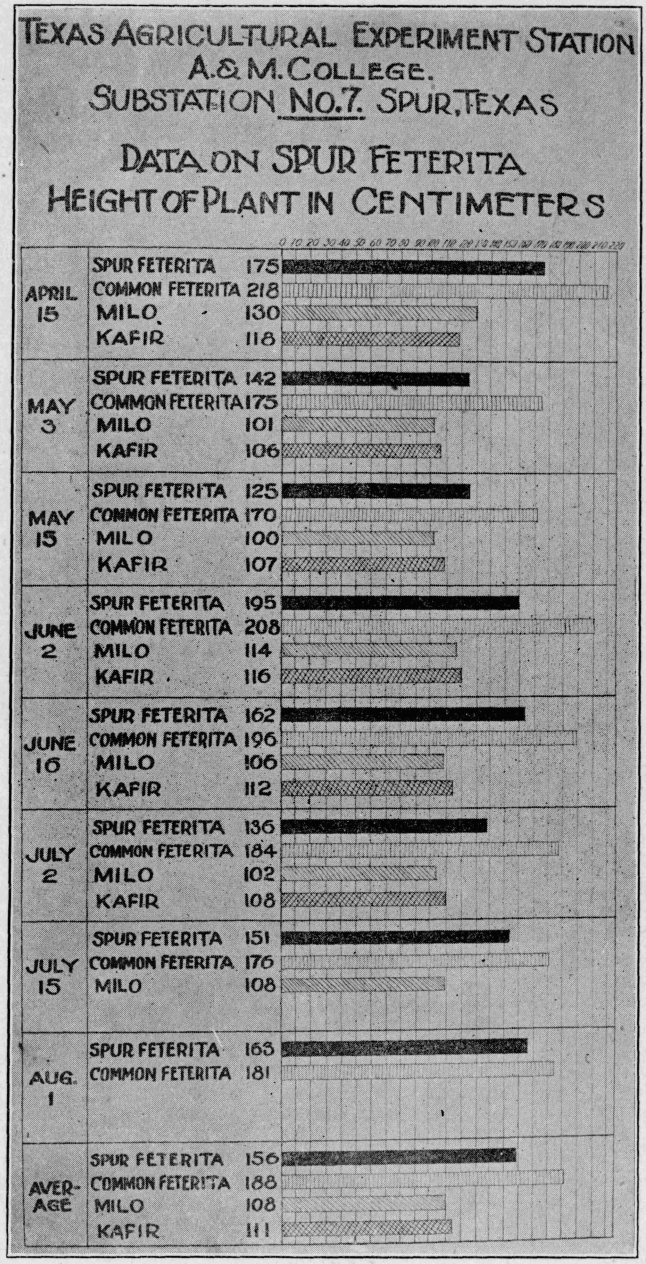
TEXAS AGRICULTURAL EXPERIMENT STATION
A.& M. COLLEGE.
SUBSTATION NO.7. SPUR, TEXAS
DATA ON SPUR FETERITA
HEIGHT OF PLANT IN CENTIMETERS
0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220
APRIL 15
SPUR FETERITA 175
COMMON FETERITA 218
MILO 130
KAFIR 118
MAY 3
SPUR FETERITA 142
COMMON FETERITA 175
MILO 101
KAFIR 106
MAY 15
SPUR FETERITA 125
COMMON FETERITA 170
MILO 100
KAFIR 107
JUNE 2
SPUR FETERITA 195
COMMON FETERITA 208
MILO 114
KAFIR 116
JUNE 16
SPUR FETERITA 162
COMMON FETERITA 196
MILO 106
KAFIR 112
JULY 2
SPUR FETERITA 136
COMMON FETERITA 184
MILO 102
KAFIR 108
JULY 15
SPUR FETERITA 151
COMMON FETERITA 176
MILO 108
AUG. 1
SPUR FETERITA 163
COMMON FETERITA 181
AVERAGE
SPUR FETERITA 156
COMMON FETERITA 188
MILO 108
KAFIR 111

Figure 7.

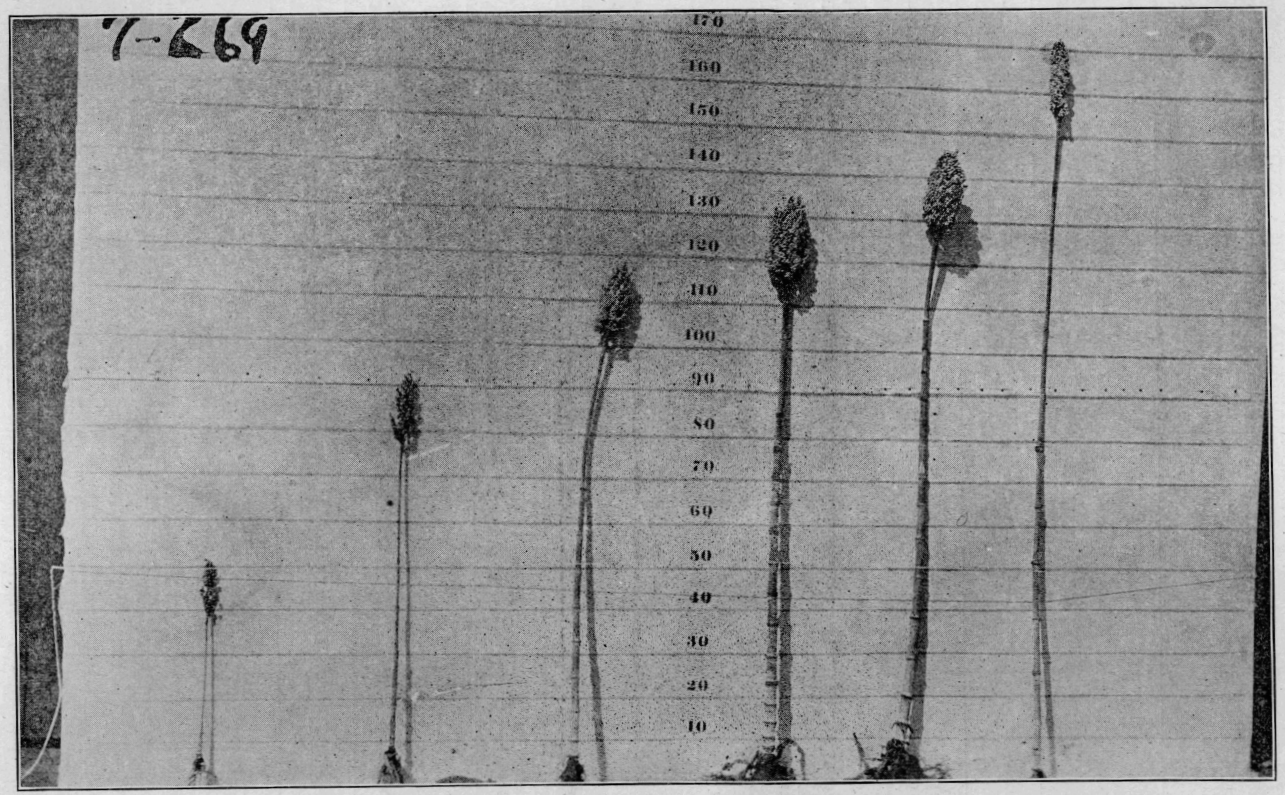

Figure 8. Six types of Feterita stalks as found No. 40 Feterita, 1917, Substation No. 7, Spur.

THRESHES HIGH PERCENTAGE OF GRAIN

Spur feterita has a rather compact seed head, well filled with seed at the base. The compactness of the head seems to be due to the better filled seed branches throughout the head. That the heads are well filled is shown by determination of the percentage of grain turnout from a series of date plantings throughout the season and by comparing these percentages with those obtained from a similar series planted to common feterita, milo, and kafir. The data are shown below, as obtained from the grain turnouts from the different plats and averaging:

Table 3.—Per cent. Grain to head—1919

T. S. No.	Variety Name	April 15	May 3	May 15	June 2	June 16	July 2	July 15	Aug. 1	Average
3232	Spur Feterita....	79.41	78.63	79.41	78.35	77.14	76.19	73.17	71.14	76.68
1652	Unimproved Feterita.....	71.76	75.81	73.14	74.16	76.17	71.12	70.71	68.14	72.62
670	Milo.....	79.82	76.41	78.84	77.65	76.64	74.14	71.19	.....	76.38*
673	Kafir.....	71.76	73.47	75.40	76.71	74.50	73.91	.....	.....	74.29**

Note: *Average of seven. **Average of six.

It is shown here that Spur feterita threshed approximately the same per cent. of grain as milo and a higher percentage of grain than either unimproved feterita or kafir. High threshing percentage is desirable as a better turnout of threshed grain is secured.

REQUIRES SLIGHTLY LONGER GROWING PERIOD THAN UNIMPROVED FETERITA

Earliness in maturity enables grain sorghum in periods of extreme shortage of water supply to frequently evade or to escape drouth, and even to produce a fair crop. A series of date plantings of Spur feterita, unimproved feterita, milo, and kafir shows the relative earliness of these crops as obtained by recording the date on which 50 per cent. of the seed were ripe on each plat and averaging.

Table 4. Length of growing period in days—1919

T. S. No.	Variety Name	April 15	May 3	May 15	June 2	June 16	July 2	July 15	Aug. 1	Average
3232	Spur Feterita....	113	106	109	95	91	87	87	89	97
1652	Unimproved Feterita.....	108	101	97	87	89	80	78	83	90
670	Milo.....	107	95	96	93	91	89	89	.....	94*
673	Kafir.....	118	123	123	115	107	105	.....	.....	115**

Note: *Average of seven. **Average of six.

It is seen that, while the growing season required varies with the time of planting, the average time required for Spur feterita is about a week more than that for unimproved feterita and three days more than that for milo. It would seem that in periods of extreme shortage of moisture its lateness might lessen its production. Its performance, however, under such conditions has not shown decreased grain production.

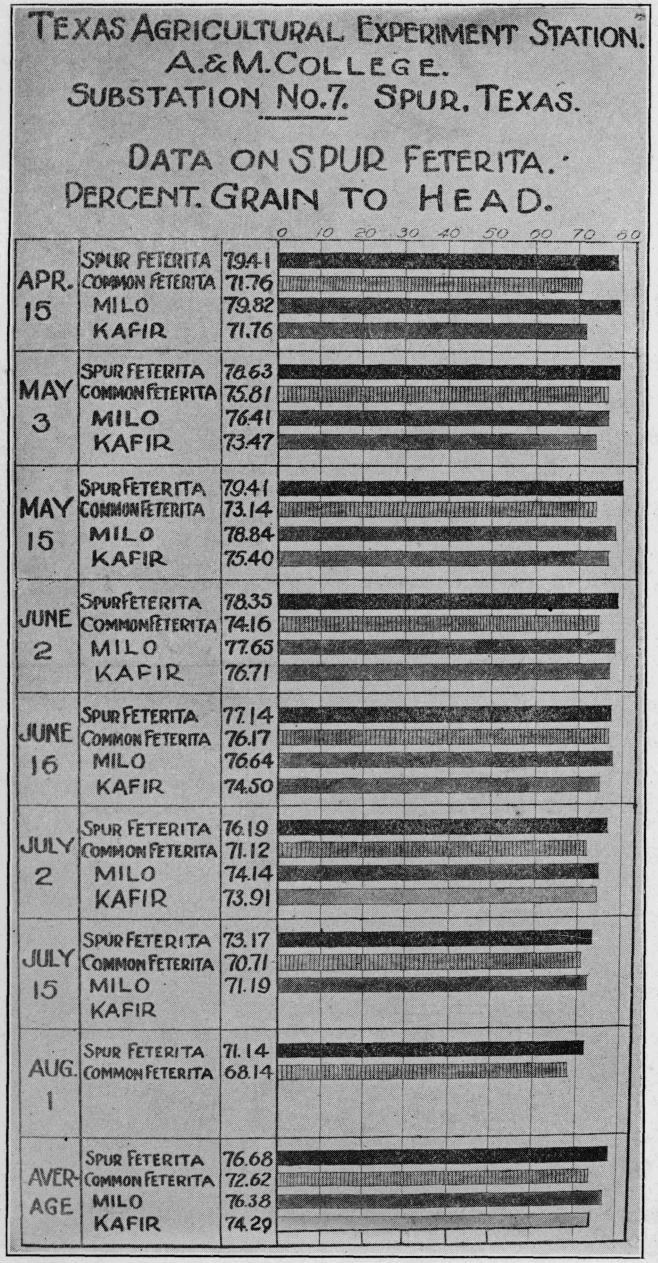
TEXAS AGRICULTURAL EXPERIMENT STATION.
A.&M.COLLEGE.
SUBSTATION NO.7. SPUR, TEXAS.
DATA ON SPUR FETERITA.
PERCENT. GRAIN TO HEAD.
0 10 20 30 40 50 60 70 80
APR. 15
SPUR FETERITA 79.41
COMMON FETERITA 71.76
MILO 79.82
KAFIR 71.76
MAY 3
SPUR FETERITA 78.63
COMMON FETERITA 75.81
MILO 76.41
KAFIR 73.47
MAY 15
SPUR FETERITA 79.41
COMMON FETERITA 73.14
MILO 78.84
KAFIR 75.40
JUNE 2
SPUR FETERITA 78.35
COMMON FETERITA 74.16
MILO 77.65
KAFIR 76.71
JUNE 16
SPUR FETERITA 77.14
COMMON FETERITA 76.17
MILO 76.64
KAFIR 74.50
JULY 2
SPUR FETERITA 76.19
COMMON FETERITA 71.12
MILO 74.14
KAFIR 73.91
JULY 15
SPUR FETERITA 73.17
COMMON FETERITA 70.71
MILO 71.19
KAFIR
AUG. 1
SPUR FETERITA 71.14
COMMON FETERITA 68.14
AVERAGE
SPUR FETERITA 76.68
COMMON FETERITA 72.62
MILO 76.38
KAFIR 74.29

Figure 9.

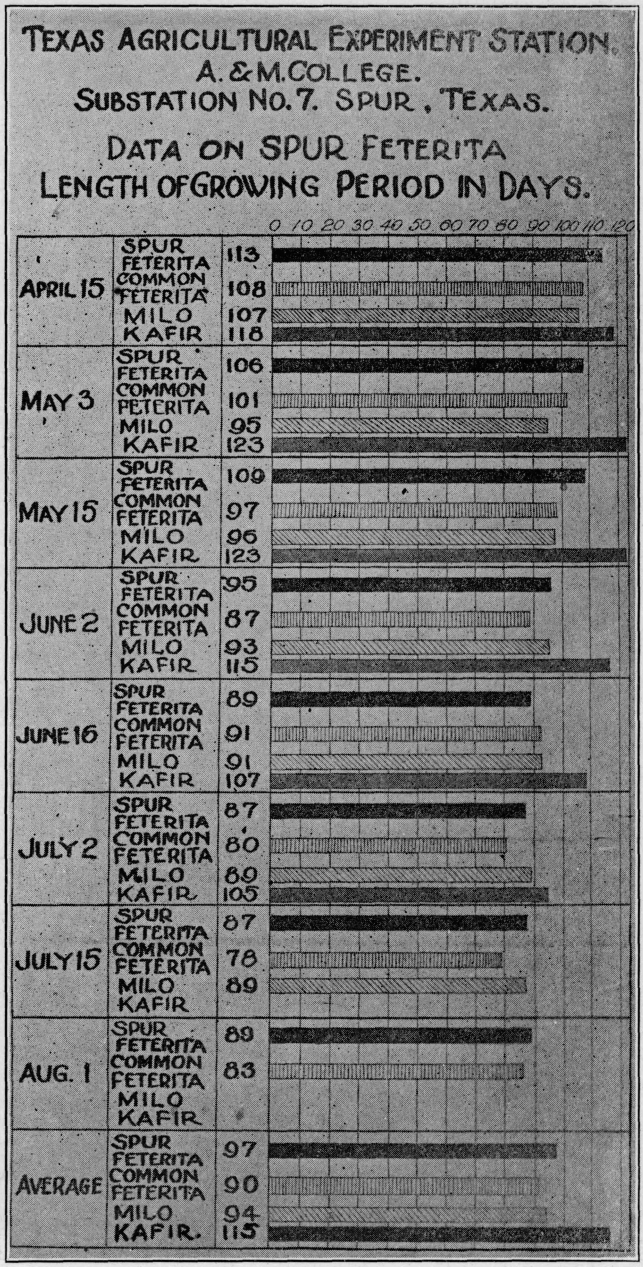
TEXAS AGRICULTURAL EXPERIMENT STATION.
A. & M. COLLEGE.
SUBSTATION NO. 7. SPUR, TEXAS.
DATA ON SPUR FETERITA
LENGTH OF GROWING PERIOD IN DAYS.
0 10 20 30 40 50 60 70 80 90 100 110 120
APRIL 15
SPUR FETERITA 113
COMMON FETERITA 108
MILO 107
KAFIR 118
MAY 3
SPUR FETERITA 106
COMMON FETERITA 101
MILO 95
KAFIR 123
MAY 15
SPUR FETERITA 109
COMMON FETERITA 97
MILO 96
KAFIR 123
JUNE 2
SPUR FETERITA 95
COMMON FETERITA 87
MILO 93
KAFIR 115
JUNE 16
SPUR FETERITA 89
COMMON FETERITA 91
MILO 91
KAFIR 107
JULY 2
SPUR FETERITA 87
COMMON FETERITA 80
MILO 89
KAFIR 105
JULY 15
SPUR FETERITA 87
COMMON FETERITA 78
MILO 89
KAFIR
AUG. 1
SPUR FETERITA 89
COMMON FETERITA 83
MILO
KAFIR
AVERAGE
SPUR FETERITA 97
COMMON FETERITA 90
MILO 94
KAFIR. 115

Figure 10.

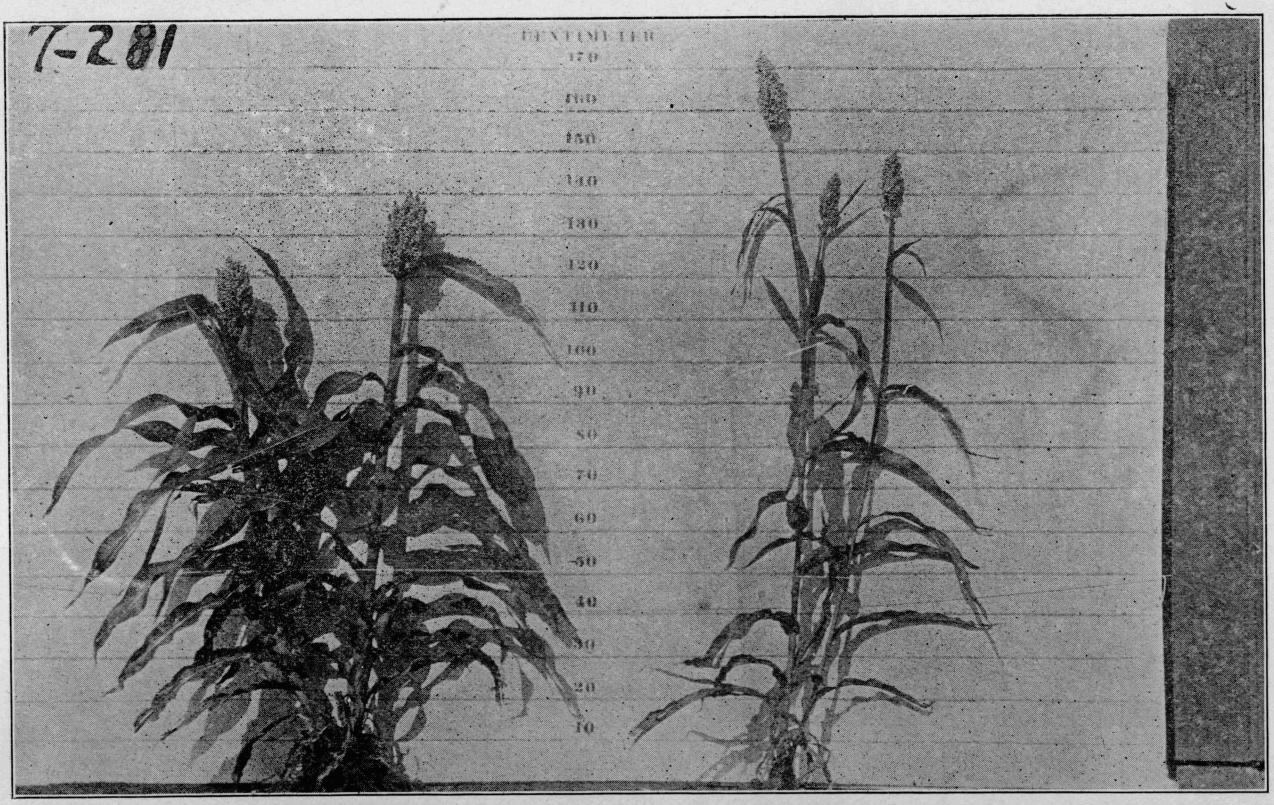

Figure 11. Left typical plant of Spur Feterita in 1917, right typical plant of Unimproved Feterita from which it was selected, Substation No. 7, Spur, Texas, 1917.

GRAIN PRODUCTION LARGE

A series of plantings of Spur feterita, unimproved feterita, milo, and kafir were made for the purpose of determining the relative grain yield of these four crops. The results from each of eight different plantings, together with the average results in grain yield, are shown in the following table:

Table 5.—Yield of threshed grain in bushels to the acre—1919

T. S. No.	Variety Name	April 15	May 3	May 15	June 2	June 16	July 2	July 15	Aug. 1	Average
3232	Spur Feterita....	66.44	63.94	68.00	71.72	49.39	44.59	22.13	14.93	50.14
1652	Unimproved Feterita.....	60.48	57.18	61.77	58.85	56.85	39.95	21.10	8.29	45.55
670	Milo.....	55.18	49.23	40.26	37.82	33.11	25.33	23.48	0.00	33.05
673	Kafir.....	51.02	45.60	37.02	35.26	33.95	31.06	00.00	0.00	29.23

It is seen in this test that where each crop was subjected to varying seasonal conditions throughout the planting period, Spur feterita showed superiority in grain yield in every case but one and averaged five bushels to the acre more grain than the unimproved feterita, seventeen bushels more than milo, and twenty-one bushels more than kafir.

SHOWS GOOD PERFORMANCE IN GENERAL TESTS

Spur feterita has been grown in a comparative way with unimproved feterita for five years at Substation No. 7, Spur, Texas. The results are shown in the following table:

Table 6.—Yield in bushels to the acre, general tests at Spur.

	1916	1917	*1918	1919	1920	Average
Spur feterita.....	31.52	22.39	0	50.14	49.29	30.67
Unimproved feterita.....	22.84	14.32	0	45.55	31.18	22.78

*Crop failure on account of extreme drought.

It is seen that Spur feterita has constantly given better yields than unimproved feterita, and that it shows an average yield for the five-year period of 7.89 bushels more than unimproved feterita.

Spur feterita has been grown in comparison with unimproved feterita for three years by Mr. R. E. Karper, Superintendent Substation No. 8, Lubbock, with results as shown below:

Table 7.—Yield in bushels to the acre, general tests at Lubbock.

	1918	1919	1920	Average
3232 Spur feterita.....	23.56	58.68	35.84	39.36
1652 Unimproved feterita.....	15.48	68.25	26.27	36.66

It is noticeable here that Spur feterita yielded more grain than unimproved feterita two years out of the three tested, giving an average of 2.70 bushels of grain more per acre.

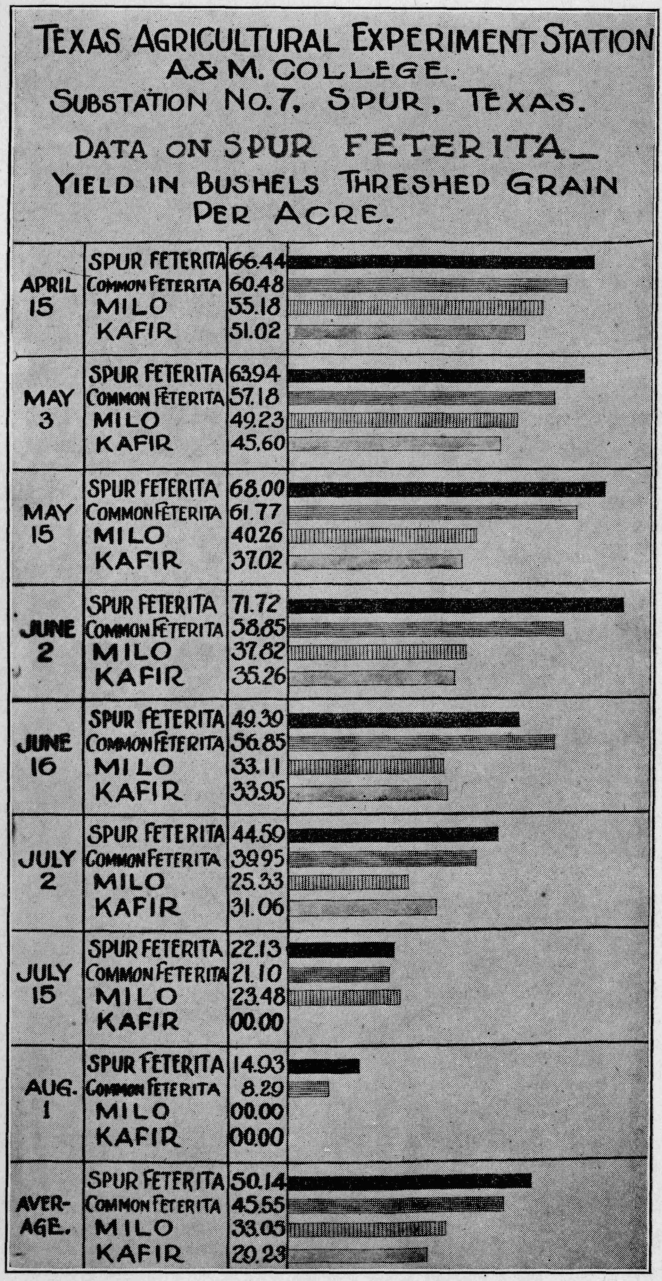
TEXAS AGRICULTURAL EXPERIMENT STATION
A.& M. COLLEGE.
SUBSTATION NO.7, SPUR, TEXAS.
DATA ON SPUR FETERITA
YIELD IN BUSHELS THRESHED GRAIN PER ACRE.
APRIL 15
SPUR FETERITA 66.44
COMMON FETERITA 60.48
MILO 55.18
KAFIR 51.02
MAY 3
SPUR FETERITA 63.94
COMMON FETERITA 57.18
MILO 49.23
KAFIR 45.60
MAY 15
SPUR FETERITA 68.00
COMMON FETERITA 61.77
MILO 40.26
KAFIR 37.02
JUNE 2
SPUR FETERITA 71.72
COMMON FETERITA 58.85
MILO 37.82
KAFIR 35.26
JUNE 16
SPUR FETERITA 49.39
COMMON FETERITA 56.85
MILO 33.11
KAFIR 33.95
JULY 2
SPUR FETERITA 44.59
COMMON FETERITA 39.95
MILO 25.33
KAFIR 31.06
JULY 15
SPUR FETERITA 22.13
COMMON FETERITA 21.10
MILO 23.48
KAFIR 00.00
AUG. 1
SPUR FETERITA 14.93
COMMON FETERITA 8.29
MILO 00.00
KAFIR 00.00
AVER-AGE.
SPUR FETERITA 50.14
COMMON FETERITA 45.55
MILO 33.05
KAFIR 29.23

Figure 12.

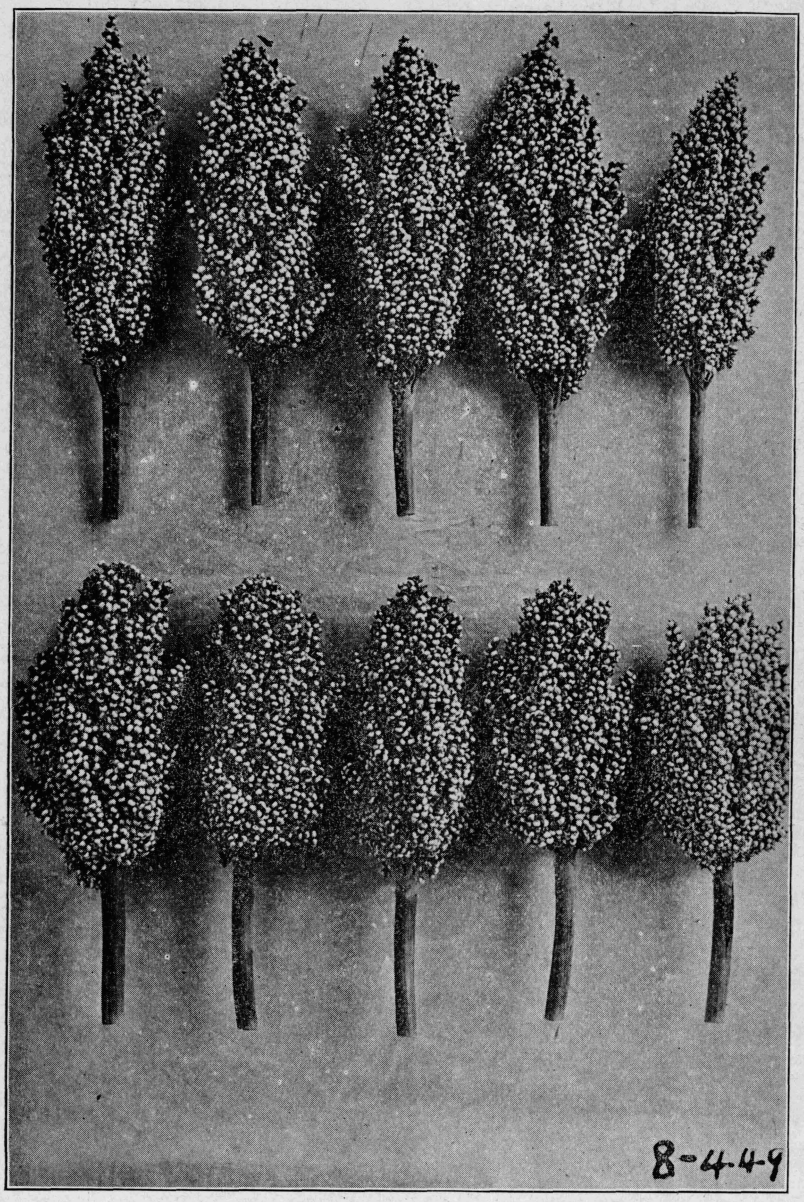

Figure 13. Above typical well filled heads of Unimproved Feterita. Below typical well filled heads of Spur Feterita, Substation No. 8, Lubbock, 1920.

Spur feterita has been tested two years by Mr. D. T. Killough, Superintendent Substation No. 5, Temple, Texas, in comparison with unimproved feterita, giving results as follows:

Table 8.—Yield in bushels to the acre, general tests at Temple

	1919	1920	Average
Spur feterita	14.25	10.25	12.25
Unimproved feterita	12.43	9.50	10.96

It is seen that Spur feterita at Temple has marked superiority for grain production over the unimproved variety.

SUMMARY

Spur feterita is the name of a new and distinct variety of grain sorghum developed by plant breeding work by the Texas Agricultural Experiment Station at Substation No. 7, Spur, Texas.

Spur feterita is the first highly improved named variety of feterita which has been developed and widely distributed in the United States.

Feterita was first introduced into the United States in 1909 and first grown at Chillicothe, Texas. Feterita is widely adapted in Texas and the United States; its cultural requirements and the general farm operations necessary to produce the crop are similar to those of the other grain sorghums.

The unimproved feterita commonly grown possesses certain defects, and its improvement is highly desirable. In view of the performance and of the characters of Spur feterita the work of the Texas Agricultural Experiment Station in improving feterita has been fully justified.

Spur feterita has a thicker stalk than kafir, milo, or unimproved feterita. It stands up better in storms or at maturity than the unimproved feterita. It does not grow so tall as the unimproved feterita. Spur feterita has a compact, well-filled seed head, and it produces a high percentage of grain in the head. Spur feterita matures in a shorter growing period than that required for kafir, but itself requires a longer growing period than milo or unimproved feterita. It produces heavy yields of grain and is well adapted not only to planting in season, but also to very late planting. Its yields have exceeded yields of unimproved feterita by approximately eight bushels to the acre at Substation No. 7, Spur, and approximately two and three-fourths bushels at Substation No. 8, Lubbock, and by approximately one and one-fourth bushels at Substation No. 5, Temple.

APPENDIX

The following tables show the monthly distribution of rainfall for the crop years referred to in this bulletin, at Spur, Lubbock, and Temple.

Figure 14. Harvesting Spur Feterita on the Rotation Experiment Plats, 1920, Substation No. 8, Lubbock.

Table 9.—Precipitation by months—Substation No. 7—Spur.

Month	1916	1917	1918	1919	1920
January	T	.22	T	.28	1.31
February	T	.51	.64	.21	T
March	.43	T	.30	3.56	.16
April	2.35	1.27	.62	3.78	.99
May	1.31	1.71	2.44	4.37	6.91
June	2.36	.14	1.97	2.03	3.36
July	.56	2.17	.44	2.60	.75
August	4.01	1.58	1.42	2.44	8.34
September	1.12	4.12	.92	4.26	2.20
October	2.63	.12	2.60	7.48	2.49
November	.82	.07	.20	.80	1.11
December	.00	.00	1.37	T	.38
Total	15.59	11.91	12.92	31.81	28.00

Table 10.—Precipitation by months—Substation No. 8—Lubbock.

Month	1918	1919	1920
January	.84	.12	.90
February	.58	.25	.11
March	.05	3.39	.24
April	.72	3.53	.15
May	1.69	2.10	2.91
June	2.95	3.52	3.66
July	.53	2.28	2.19
August	.79	2.83	2.64
September	.79	5.70	1.63
October	.51	7.34	1.43
November	.69	.36	2.21
December	2.03	.19	.09
Total	12.17	31.61	18.16

Table 11.—Precipitation by months—Substation No. 5—Temple.

Month	1919	1920
January	3.51	4.81
February	3.36	.79
March	4.95	1.98
April	1.77	.52
May	3.20	4.80
June	7.87	3.06
July	.92	3.66
August	5.10	10.41
September	4.09	5.76
October	7.08	2.37
November	3.44	5.40
December	2.16	1.17
Total	47.45	44.73

Table 9, showing the rainfall at Spur, brings out that the seasons of 1916, 1917, and 1918 were all seasons of low rainfall. Nineteen sixteen, however, was a fair crop season, inasmuch as it followed 1915, a season of plentiful rainfall. Nineteen seventeen, although a year of low annual rainfall, had favorable distribution during the growing period of the crop, and, therefore, favored fair crop production. No appreciable amount of rainfall occurred, however, from September, 1917, to May, 1918, hence the year 1918, with slightly over seven inches of

rainfall from January to August, was a disastrous crop year and resulted in crop failure. Nineteen nineteen and 1920 were favorable crop seasons.

Table 10, showing the rainfall at Lubbock, brings out the fact that May and June of 1918 had a plentiful supply of rainfall for a good season, which assured a fair crop. Nineteen nineteen and 1920 were seasons of plentiful rainfall for satisfactory crop production.

Table 11, showing the rainfall at Temple, sets forth well distributed rainfall for the seasons of 1919 and 1920, amounting to 47 and 44 inches, respectively.