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## EC144 Report of the 1939 Cooperative Sorghum Variety Trials

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144

REPORT OF THE 1939 COOPERATIVE SORGHUM VARIETY TRIALS 1/

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Inasmuch as all sorghum varieties are not equally well adapted to all parts of Nebraska, the state is divided into 4 regions for varietal testing (see Figure 1). The regions represent in a general way groups of counties with somewhat similar growing conditions.

Region I, in the southeast, is characterized by a fairly long growing season and relatively favorable rainfall. Region II, in the south-central part of the state, frequently experiences high summer temperatures accompanied by winds which, with periods of low rainfall, often cause severe damage to growing crops. It is in this section of the state that sorghums can most successfully compete with corn and where the greatest interest in sorghums has been shown. Region III, in the north-western part of the state, includes the high-plains area where the growing season is short, temperatures relatively low, and rainfall limited. The northeastern counties are designated as Region IV. Here, adverse climatic conditions are less frequent. Corn production has generally been successful and it is doubtful if grain sorghums will become of importance. Sorgo for silage and roughage, however, may become an accepted crop because of the regional importance of the livestock industry.

Ten varieties were included in the tests for each region. There was considerable duplication of varieties among the various regions, but in no two of them were all the varieties the same. Not all varieties grown commercially in a region were included in the tests for that region. An attempt was made, however, to use those which are most commonly grown and others which are rather new but promising. Where a particular variety was not used, some idea of its value in a given area may be ascertained by studying the performance of a similar type which was grown. For example, the value of Red Amber in western Nebraska can be estimated by studying the results with Black Amber, which is very similar.

Varieties included in the various regions were as follows:

| Region I<br>(Southeastern) | Region II<br>(Southwestern) | Region III<br>(Northwestern) | Region IV<br>(Northeastern) |
|----------------------------|-----------------------------|------------------------------|-----------------------------|
| Atlas                      | Atlas                       | Black Amber                  | Atlas                       |
| Leoti                      | Leoti                       | Leoti                        | Leoti                       |
| Hegari                     | Early Sumac                 | Highland                     | Early Sumac                 |
| Club                       | Highland                    | Improved Coes                | Hegari                      |
| Kalo                       | Cheyenne                    | Cheyenne                     | Club                        |
| Early Kalo                 | Kalo                        | Early Kalo                   | Kalo                        |
| Sooner                     | Early Kalo                  | Sooner                       | Early Kalo                  |
| Day                        | Sooner                      | Day                          | Sooner                      |
| Colby                      | Day                         | Colby                        | Day                         |
| Pink Kafir                 | Colby                       | A. C. 1                      | Colby                       |

1/ Acknowledgment is made for the assistance given by the farmers and agricultural agents who participated in the conduct of these tests.





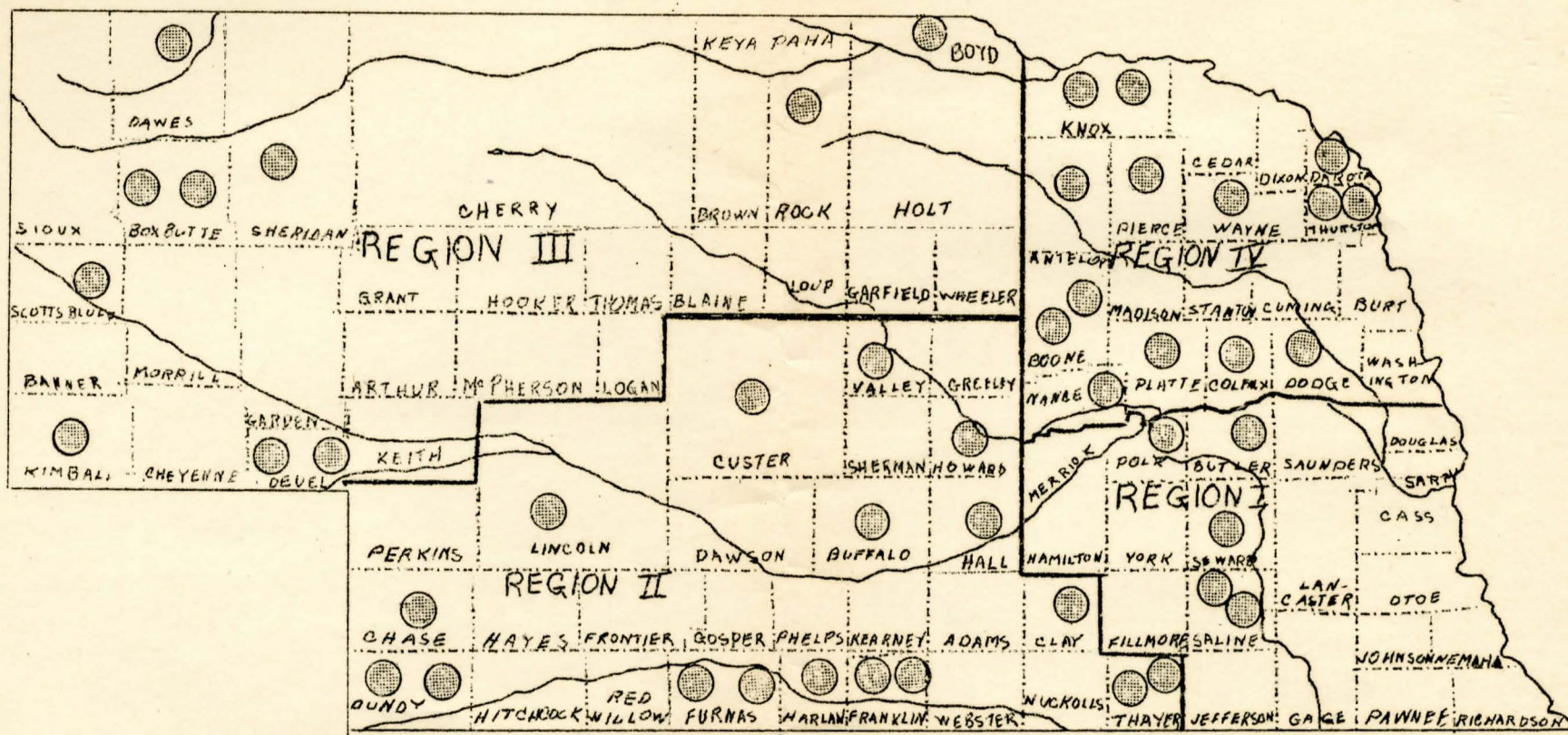


Figure 1

Distribution of the 1939 Nebraska cooperative Sorghum variety tests. Lines indicate the boundaries of regions by which the data is summarized.



## DESCRIPTIONS OF VARIETIES

The following brief descriptions of the varieties tested may be helpful in interpreting the results of the tests and in choosing a variety of sorghum to grow.

Kalo originated as a selection from a natural cross between Pink kafir and Dwarf Yellow milo at the Ft. Hays Experiment Station in Hays, Kansas. The plants grow to a medium height and produce cylindrical heads 9 to 12 inches in length. Kalo seeds resemble those of Pink kafir in size and shape but are pale yellow in color. The stalks are only slightly juicy and do not make good fodder. The variety is susceptible to chinch bug injury and is likely to lodge if left standing after full maturity. Kalo matures about 110 days after planting and has given high yields under favorable conditions. It is best adapted to the south central part of the state.

Early Kalo was selected from Kalo at the Ft. Hays Experiment Station. It closely resembles Kalo except that it matures 10 to 15 days earlier and is about a foot shorter. Despite its comparative dwarfness, Early Kalo usually lodges too badly after maturity to be suitable for combine harvesting and is best harvested by binding or heading. While it does not yield as much under favorable conditions as Kalo, Early Kalo has given excellent yields under conditions of severe drouth. It is moderately susceptible to chinch bug injury. Of all the varieties tested by the Nebraska Experiment Station, Early Kalo seems to be unsurpassed for grain production on dry land in most parts of the state. The first large distribution of Early Kalo seed was made in 1937 by the North Platte Substation. At the present time it is one of the most widely grown grain sorghums in Nebraska.

Sooner milo is an early variety developed at the Southern Great Plains Field Station, Woodward, Oklahoma. It matures in about 90 days after planting and is adapted to the same general regions as Early Kalo. Like the other milos, Sooner adjusts itself rather readily to variations in stand and responds to more favorable moisture conditions.

Sooner grows from 3 to 3½ feet tall, has few leaves, and slender, dry stalks. The heads are oval-shaped, compact of medium size, and have a tendency to "gooseneck" when the stand is thin or when there is abundant moisture. The seeds are large, oval and yellow. Sooner is susceptible to chinch bugs, and lodges too badly when left standing after maturity to be satisfactory for combining.

Day milo has the same parentage as Sooner and is similar to it except that it is shorter, has erect heads, and is about ten days later in maturity. It is sufficiently lodge resistant to permit combining and at the present time is the best adapted combine type for Nebraska conditions.

Colby milo was selected from the same cross as Sooner and Day but was developed at the Colby, Kansas, Branch Experiment Station. It is a dwarf, combine-type, has an oval, semi-compact head, yellow grain, and is very similar in appearance to Day. Colby has been distributed in Kansas but has been tested for only two years in Nebraska. It is susceptible to chinch bugs.

Club kafir was selected at the Ft. Hays, Kansas, Experiment Station. It grows to a medium height and the stalks are leafy white seeds slightly juicy. The heads are compact and club-shaped and have white seeds splashed at the tips with red. Because it is late maturing, Club is adapted only to the southern and southeastern parts of the state. It yields well, is relatively resistant to smut, and is apparently resistant to chinch bugs, but is not suited to combine methods of harvesting.



Pink kafir was selected at the Ft. Hays Experiment Station from material originally introduced from Africa. The stalks grow from 4 to 6 feet tall, are rather leafy, of medium size, and vary as to juiciness. The heads are 10 to 14 inches long, slender, cylindrical in shape, and bear seeds that are small and pinkish-white. Pink kafir has given good yields of both grain and forage at Lincoln when drouth was not severe. Because of its late maturity it is adapted only to the southeastern part of the state where it is of value because of its chinch bug resistance.

Hegari stalks grow to a height of 4 to 5 feet, are fairly juicy and slightly sweet. It has been one of the latest maturing varieties in the tests. The heads are compact, 7 to 9 inches long, cylindrical, and bear seeds that are similar to those of Atlas except for the presence of a red-brown subcoat. When grown on dry land, Hegari has given very erratic results. In seasons of plenteous rainfall it has given good grain yields, but when drouth is severe the grain rarely matures. Hegari yields well when grown under irrigation but probably should not be planted on dry land except when seed of better adapted varieties is not available.

Cheyenne (sometimes called Sweet Stalk) is a variety developed by Albert Weaver of Bird City, Kansas. It has a rather slender stalk with a limited amount of foliage, fairly loose heads and white seed. This variety frequently lodges badly soon after ripening. Some of the stalks are juicy while others are dry and it is doubtful if the forage is any more palatable than that of dry-stalked grain sorghums. Cheyenne is best adapted in the western third of the state where earliness is of considerable importance.

Highland was developed at the Akron, Colorado, Field Station from a selection in Dawn kafir. It is an early-maturing variety that produces slightly juicy stalks about 3 feet in height. The heads are rather large and open and bear white seed which is sometimes flecked with red-brown spots. Because of its early maturity, Highland shows some promise for the panhandle region of Nebraska.

A.C.1 is a new strain developed at the Akron, Colorado, Field Station. It is now undergoing preliminary tests and has not been released for commercial production. No seed is available for distribution.

Improved Coes also originated at the Akron Field Station as a selection from Modoc. It is very early, grows to a height of 40 inches, and produces long, semi-compact cylindrical heads. The grain is white. The stalks of Improved Coes are apparently of some value as forage but the yield is low.

Atlas Sorgo was selected at the Kansas Agricultural Experiment Station at Manhattan from material supplied by I. N. Farr of Stockton, Kansas, who had found a field cross between Sourless sorgo and Blackhull kafir. Atlas grows from 7 to 10 feet tall, has an abundance of leaves and stalks that are juicy, sweet, and very palatable. The heads are compact and cylindrical in shape although they taper somewhat toward the tip. Unlike most sorgos Atlas has white seeds that are similar to those of kafir in size and shape. It may truly be called a dual-purpose type since both the grain and forage are of excellent quality. Atlas requires about 125 days from planting to maturity and will consistently mature grain in the eastern part of the state only.

Leoti Sorgo is of unknown origin but was grown locally in Kansas for many years before being taken to the Ft. Hays Experiment Station for testing. The stalks are very sweet and juicy and quite leafy. The heads are open with long upper branches which give them a drooping appearance. The seed is medium-sized and red-brown in color. Leoti matures enough earlier than Atlas to make it well suited to forage production in the central, southwestern, and western parts of the state.



Black Amber Sorgho is the "old stand-by" among the sorghum varieties in this state. It grows fairly tall with rather slender, juicy and sweet stalks, relatively few leaves, and loose, sprangly heads. Seeds are inclosed in heavy, black glumes. Stands are more easily secured than with most other sorghum varieties. In general, Black Amber is fairly productive but may now be replaced with superior varieties except where extreme earliness is needed. It may lodge considerably where the growth is heavy.

Early Sumac Sorgho was selected from Standard Sumac at the Ft. Hays Experiment Station. It grows from 6 to 7 feet tall, has juicy, sweet moderately slender stalks, and matures in about 105 days. Early Sumac heads are small, cylindrical, with a flattened tip, and bear very small, dark red seeds. It tends to lodge and is susceptible to head and kernel smut. Early Sumac is adapted to the same general regions as Leoti.

#### LOCATION OF TESTS

One hundred and five sets of seed were distributed to county agricultural agents in 73 counties. Since the seed was furnished in 2-pound samples of each variety, most of these samples were further divided by the agents and the seed furnished to the co-operating farmers in quantities of one-half pound to one pound of each variety. Planting, care after planting, and harvesting for yield determinations of most of these tests were supervised by the county agricultural agents.

Only 46 of the tests were harvested for yield determinations. Many of the plantings were made for demonstrational purposes only. In addition, other tests could not be considered for yield determinations because of uneven stands, plots being too narrow to eliminate the effects of varietal competition, and adverse growing conditions. The location of the 46 tests which were harvested is shown in Figure 1.

#### TESTING PROCEDURE

Seed - All seed was treated with copper carbonate for the control of smut.

Planting - No uniform method of seedbed preparation and planting was followed for the various tests although the varieties were treated alike within any one test. Most of them were planted by listing into soil that had had no tillage. The next most common method was to surface plant in soil that had been plowed and harrowed. A few tests were planted in plowed soil with a surface planter equipped with disk furrow-openers.

In some cases, no adjustment in rate of planting was made to compensate for the different seed sizes of the various varieties. Since only eight of these tests were thinned after planting, stands in some tests were not uniform. It is recognized that there may be considerable variation in the spacing of plants without greatly affecting yields.

Cultivation - Practically all of the test plots were parts of larger fields of sorghum or corn and were given the same cultivation as the remainder of the field.

Harvest and yield determination - The stalks from four random, one-rod rows were cut from the interior of each plot and were immediately weighed. The heads were then removed from the stalks, bagged, and shipped to the Experiment Station at Lincoln where they were threshed and the grain was cleaned, weighed, and the moisture content determined.



The yields of green silage per acre for most tests were calculated directly from the field weights. It is obvious that these yields may be subject to considerable error because no correction could be made for varying moisture content.

Grain yields were calculated in bushels per acre, on the basis of 56 pounds per bushel.

## RESULTS

The yield data from the individual tests are reported primarily for the interest of those directly connected with the cooperative tests. Results from a single, unreplicated test should not be considered highly reliable and valid conclusions regarding varietal performances can be made only from tests over a period of years or from a number of tests in a given area.

The regional averages presented in this report are obtained from a sufficient number of tests to give a reasonably accurate representation of the yielding abilities of the varieties tested. Therefore, the averages should be given more consideration than the yields in the individual tests.

In all regions, the average yield of each variety is compared to the average yield of a standard variety that appeared in the same tests. This relationship is expressed in per cent. Early Kalo was used as the basis for comparison of grain yields and Leoti for forage yields since yields were taken on these two varieties in all tests.

Forage yields are reported only for those varieties that have special value as forage. Data from tests in previous years have shown that the forage yields of grain sorghum varieties like Sooner and Early Kalo are much lower than the yields of Atlas and other forage sorghums. Furthermore, it is well known that the forage from the grain sorghums is less palatable than that from the sweet-stalked sorgos.

Region I The grain yields from five tests in this region are given in Table 1 and the silage yields in Table 2.

Kalo and Early Kalo gave definitely higher grain yields than the other varieties included in the tests in this region. The unusually high yields reported from Polk County are explained by the fact that the test in this County was located on the Platte River bottom lands where moisture conditions were very favorable. Chinch bugs damaged Sooner, Day and Colby in one of the Saline County tests so severely that they produced no grain. This accounts, in part, for the low average yields of these varieties in Region I.

The average forage yield of Atlas was 21 per cent greater than that of Leoti in Region I. Average yields of Club, Hegari, and Pink kafir were 95, 84 and 67 per cent of the average yield of Leoti. In addition to yielding more, the quality of forage produced by Atlas and Leoti is usually superior to that of the other three varieties.

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Table 1. — Comparative grain yields of 10 sorghum varieties in five cooperative tests in four counties in Region I. 1939.

| Location         | Variety  |         |         |           |           |          |           |           |          |          |
|------------------|----------|---------|---------|-----------|-----------|----------|-----------|-----------|----------|----------|
|                  | : Early: | : Club: | : Day:  | : Sooner: | : Colby:  | : Pink:  | : Hegari: | : Leoti:  | : Atlas: |          |
|                  | : Kalo:  | : Kalo: | : Club: | : Day:    | : Sooner: | : Colby: | : Kafir:  | : Hegari: | : Leoti: | : Atlas: |
|                  | : Bu.:   | : Bu.:  | : Bu.:  | : Bu.:    | : Bu.:    | : Bu.:   | : Bu.:    | : Bu.:    | : Bu.:   | : Bu.:   |
| Butler           | 40.0     | 38.2    | 34.3    | 36.1      | 26.9      | 24.4     | 33.3      | 25.5      | 12.7     | 19.8     |
| Polk             | 98.3     | 77.8    | 84.5    | 68.4      | 45.8      | 69.0     | 42.1      | 42.1      | 44.4     | 30.0     |
| Saline (Aksamit) | 18.5     | 24.9    | 18.9    | 0         | 0         | 0        | 12.8      | 15.2      | 13.8     | 17.2     |
| Saline (Eurich)  | 36.1     | 43.9    | 22.6    | 34.0      | 44.6      | 20.5     | 21.2      | 20.9      | 12.4     | 0        |
| Seward           | 29.0     | 27.6    | 22.2    | 17.8      | 17.8      | 19.5     | 16.2      | 9.8       | 15.2     | 4.7      |
| Average (Bu.)... | 44.4     | 42.5    | 36.5    | 31.3      | 27.0      | 26.7     | 25.1      | 22.7      | 19.7     | 14.3     |
| Relative (P.ct.) | 104      | 100     | 86      | 74        | 64        | 63       | 59        | 53        | 46       | 34       |

Table 2. — Comparative silage yields of 5 sorghum varieties in 5 tests in Region I. 1939.

| Location          | Variety |       |      |        |            |
|-------------------|---------|-------|------|--------|------------|
|                   | Atlas   | Leoti | Club | Hegari | Pink Kafir |
|                   | Tons    | Tons  | Tons | Tons   | Tons       |
| Butler            | 12.2    | 8.5   | 7.3  | 8.3    | 6.2        |
| Polk              | 19.0    | 15.5  | 18.0 | 9.9    | 10.7       |
| Saline (Aksamit)  | 9.4     | 7.2   | 6.0  | 7.7    | 3.8        |
| Saline (Eurich)   | ....    | 3.8   | 3.2  | 4.1    | 2.0        |
| Seward            | 7.8     | 8.6   | 7.0  | 6.3    | 6.4        |
| Relative yield 1/ | 121     | 100   | 95   | 84     | 67         |

1/ Based on the average yield of Leoti for the same tests as the variety named.



Table 3. -- Comparative grain yields of 10 sorghum varieties in 17 cooperative tests in 13 counties in Region II. 1939.

| Location          | Variety   |          |          |          |         |         |          |          |          |           |
|-------------------|-----------|----------|----------|----------|---------|---------|----------|----------|----------|-----------|
|                   | : Early:  | : Chey-: | : Early: | : High-  |         |         |          |          |          |           |
|                   | : Sooner: | : Kalo:  | : Day:   | : Colby: | : enne: | : Kalo: | : Sumac: | : Leoti: | : Atlas: | : land 1/ |
|                   | : Bu.     | : Bu.    | : Bu.    | : Bu.    | : Bu.   | : Bu.   | : Bu.    | : Bu.    | : Bu.    | : Bu.     |
| Buffalo           | 25.5      | 25.5     | 27.6     | 23.4     | 16.8    | 24.4    | 8.2      | 11.0     | 8.1      | ....      |
| Chase             | 11.8      | 10.1     | 11.1     | 6.1      | 9.8     | 0       | 9.1      | 4.4      | 0        | ....      |
| Clay              | 34.0      | 37.0     | 29.6     | 27.3     | 20.9    | 21.6    | 0        | 0        | 0        | 20.9      |
| Custer            | 11.1      | 5.7      | 8.4      | 8.4      | 14.1    | 0       | 0        | 0        | 0        | 8.1       |
| Dundy (Stamm)     | 14.1      | 12.1     | 10.8     | 9.4      | 6.1     | 7.7     | 6.1      | 6.4      | 0        | ....      |
| Dundy (Woods)     | 17.8      | 17.2     | 14.2     | 13.5     | 10.4    | 0       | 0        | 7.4      | 0        | 13.5      |
| Franklin (Akers)  | 7.4       | 6.4      | 11.1     | 8.1      | 5.7     | 0       | 0        | 6.1      | 0        | 12.1      |
| Franklin (Fuerst) | 15.5      | 17.8     | 7.4      | 8.4      | 12.8    | 6.7     | 0.4      | 2.4      | 3.7      | 14.8      |
| Furnas (Kleckner) | 9.4       | 8.2      | 4.0      | 3.4      | 6.4     | 0       | 0        | 0        | 0        | 8.8       |
| Furnas (Smith)    | 16.8      | 11.8     | 11.8     | 9.1      | 0       | 0       | 0        | 0        | 0        | ....      |
| Hall              | 18.0      | 15.6     | 12.0     | 6.7      | 6.4     | 15.3    | 7.4      | 0        | 0        | 14.9      |
| Harlan            | 5.1       | 6.1      | 6.4      | 5.4      | 3.4     | 0       | 0        | 0        | 0        | 5.4       |
| Howard            | 18.2      | 15.2     | 16.8     | 12.5     | 9.8     | 11.8    | 15.2     | 9.4      | 12.8     | ....      |
| Lincoln           | 30.3      | 22.2     | 29.0     | 22.2     | 24.2    | 11.0    | 15.5     | 16.8     | 0        | 22.2      |
| Thayer (Kreuger)  | 5.4       | 18.9     | 16.8     | 7.1      | 15.5    | 15.2    | 9.8      | 13.5     | 16.8     | 8.8       |
| Thayer (Sinn)     | 19.2      | 18.2     | 18.2     | 16.2     | 13.8    | 12.1    | 21.6     | 11.4     | 0        | 19.2      |
| Valley            | 17.2      | 16.8     | 10.8     | 12.5     | 14.1    | 0       | 0        | 0        | 0        | ....      |
| Average (Bu.).... | 16.3      | 15.6     | 14.5     | 11.7     | 11.2    | 7.4     | 5.5      | 5.2      | 2.4      | ....      |
| Relative (P.ct.). | 104       | 100      | 93       | 75       | 72      | 47      | 35       | 33       | 15       | ....      |

1/ No yields are reported for Highland in certain tests because of failure to obtain stands. In the 11 tests in which the two varieties can be compared, the average yield of Highland was 85 per cent of the average yield of Early Kalo.

Table 4. -- Comparative silage yields of 4 sorghum varieties in 12 tests. Region II. 1939.

| Location          | Variety |       |             |          |
|-------------------|---------|-------|-------------|----------|
|                   | Atlas   | Leoti | Early Sumac | Cheyenne |
|                   | Tons    | Tons  | Tons        | Tons     |
| Buffalo           | 2.1     | 1.4   | ....        | ....     |
| Chase             | 5.9     | 7.3   | 5.6         | 3.1      |
| Custer            | 11.4    | 8.8   | 10.9        | 5.9      |
| Dundy (Stamm)     | 5.7     | 5.7   | 5.7         | 2.8      |
| Dundy (Woods)     | ....    | 4.2   | 3.1         | 2.6      |
| Franklin (Akers)  | 2.3     | 2.3   | 1.7         | 1.5      |
| Franklin (Fuerst) | 6.2     | 4.3   | 3.8         | 3.0      |
| Hall              | 4.9     | 5.2   | 5.4         | 3.5      |
| Howard            | 5.7     | 4.7   | 4.7         | 1.5      |
| Lincoln           | ....    | 9.6   | 7.2         | 5.7      |
| Thayer (Sinn)     | 6.5     | 5.2   | 7.4         | 2.9      |
| Valley            | 3.9     | 3.9   | 3.2         | 2.7      |
| Relative yield 1/ | 100     | 112   | 95          | 57       |

1/ Based on the average yields of Leoti for the same tests as the variety named.



Region II Grain yields from 17 tests in this region are shown in Table 3 and forage yields from 12 tests are given in Table 4.

In agreement with results from tests in previous years, Sooner milo and Early Kalo gave the highest average grain yields. There has been very little difference in the yields from these two varieties and they are about equally acceptable for grain production in Region II. Some farmers have expressed a preference for Early Kalo because the erect heads are somewhat easier to handle at harvest. In those parts of the area where chinch bugs may be troublesome it would be safer to use Early Kalo than Sooner, since it shows considerably more chinch bug resistance. Of the two "combine" varieties, Day yielded 93 per cent as much grain as Early Kalo while Colby yielded only 75 per cent as much. Comparing the two varieties directly, Day yielded 19 per cent more grain than Colby. Highland was planted in all tests in this region but failed to give stands in six of them. However, in the 11 tests in which the two varieties can be directly compared, Highland yielded 85 per cent as much grain as Early Kalo. There was no real difference in the yields of Early Sumac and Leoti, but Atlas yielded less than half as much grain as these varieties and only 15 per cent as much as Early Kalo.

Atlas sorgo gave the highest average yield of forage, yielding 12 per cent more than Leoti. The average forage yields of Early Sumac and Cheyenne were 95 and 57 per cent, respectively, of the average yield of Leoti.

Region III Grain yields in this region are given in Table 5 and forage yields in Table 6.

The average grain yields of Sooner and A.C. 1 were the same, both varieties yielding 24 per cent more than Early Kalo. Improved Coes yielded slightly more than Early Kalo but Highland, Day, Colby, Cheyenne, Black Amber, and Leoti all yielded less than Early Kalo. The only varieties that consistently matured grain were Sooner, A.C.1, Improved Coes, and Highland. Because of the short season the other varieties failed to mature in many of the tests. A.C.1, Improved Coes, and Highland, all early-maturing, appear to have promise as grain sorghum varieties for this region.

Table 5. -- Comparative grain yields of 10 sorghum varieties in 10 cooperative tests in eight counties in Region III. 1939.

| Location            | Variety |       |                       |               |      |       |               |                |       |                             |
|---------------------|---------|-------|-----------------------|---------------|------|-------|---------------|----------------|-------|-----------------------------|
|                     | Sooner  | A.C.1 | Im-<br>proved<br>Coes | Early<br>Kalo | Day  | Colby | Chey-<br>enne | Black<br>Amber | Leoti | High-<br>land <sup>1/</sup> |
|                     | Bu.     | Bu.   | Bu.                   | Bu.           | Bu.  | Bu.   | Bu.           | Bu.            | Bu.   | Bu.                         |
| Boyd                | 39.7    | 27.9  | 49.8                  | 46.1          | 25.9 | 31.3  | 25.3          | 13.5           | 10.8  | 25.3                        |
| Box Butte (Johnson) | 11.8    | 11.2  | 8.8                   | 10.6          | 12.4 | 8.8   | 4.1           | 15.9           | 0     | 11.8                        |
| Box Butte (Oldt)    | 8.5     | 8.1   | 3.9                   | 0             | 3.2  | 2.5   | 6.0           | 1.8            | 0     | 3.5                         |
| Dawes               | 9.8     | 3.4   | 1.3                   | 1.7           | 2.0  | 2.4   | 2.4           | 0              | 0     | 2.7                         |
| Deuel (Armstrong)   | 5.5     | 10.6  | 3.9                   | 0             | 3.5  | 5.9   | 5.5           | 0              | 0     | 9.0                         |
| Deuel (Smith)       | 8.1     | 10.4  | 10.1                  | 10.1          | 7.4  | 7.4   | 4.4           | 0              | 0     | .... <sup>1/</sup>          |
| Kimball             | 19.5    | 20.3  | 17.5                  | 14.8          | 19.5 | 12.4  | 9.1           | 9.1            | 6.1   | ....                        |
| Rock                | 17.2    | 25.3  | 11.1                  | 19.5          | 10.4 | 11.8  | 12.8          | 5.1            | 3.0   | ....                        |
| Scottsbluff         | 5.1     | 9.4   | 5.1                   | 2.0           | 5.5  | 5.9   | 7.5           | 0              | 0     | ....                        |
| Sheridan            | 10.1    | 5.7   | 5.4                   | 3.7           | 3.4  | 2.7   | 6.4           | 0              | 0     | 4.7                         |
| Average (Bu.)....   | 12.3    | 12.3  | 10.6                  | 9.9           | 8.6  | 8.3   | 7.6           | 4.1            | 1.8   | ....                        |
| Relative (P.ct.)..  | 124     | 124   | 107                   | 100           | 87   | 84    | 77            | 41             | 18    | ....                        |

<sup>1/</sup> No yields are reported for Highland in certain tests because of failure to obtain stands. In the six tests in which the two varieties can be compared, the average yield of Highland was 91 per cent of the average yield of Early Kalo.



Table 6. — Comparative silage yields of 4 sorghum varieties in 9 tests.  
Region III. 1939.

| Location            | Variety                |               |                  |                          |
|---------------------|------------------------|---------------|------------------|--------------------------|
|                     | Black<br>Amber<br>Tons | Leoti<br>Tons | Cheyenne<br>Tons | Improved<br>Coes<br>Tons |
| Boyd                | 9.0                    | 12.2          | 6.3              | ....                     |
| Box Butte (Johnson) | 18.0                   | 10.6          | 7.1              | 7.6                      |
| Box Butte (Oldt)    | 1.9                    | 2.4           | 2.0              | 1.6                      |
| Deuel (Armstrong)   | 1.3                    | 1.7           | 1.9              | 1.3                      |
| Deuel (Smith)       | 2.0                    | 1.3           | 2.1              | 2.0                      |
| Kimball             | 8.9                    | 9.6           | 5.1              | 5.5                      |
| Rock                | 6.5                    | 7.7           | 5.3              | 4.4                      |
| Scotts Bluff        | 2.6                    | 3.3           | 1.8              | ....                     |
| Sheridan            | 11.3                   | 8.6           | 5.6              | 3.8                      |
| Relative yield 1/   | 108                    | 100           | 64               | 62                       |

1/ Based on the average yield of Leoti for the same tests as the variety named.

Black Amber produced a slightly higher yield of forage than Leoti and both of these varieties yielded appreciably more than Cheyenne and Improved Coes.

Region IV Table 7 presents grain yields from 14 tests and Table 8 shows forage yields from 10 tests in this region.

Grain yields were generally higher than in the other regions, which is a direct result of more favorable rainfall. Even though weather conditions were comparatively favorable, Early Kalo and Sooner made the highest grain yields. They were followed, in order, by Kalo, Day, Colby, Club, Hegari, Leoti, Atlas and Early Sumac.

Atlas sorgo produced the highest average yield of forage, with a yield 18 per cent greater than that of Leoti. Early Sumac yielded 6 per cent more and Hegari 12 per cent less than Leoti.

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Table 7. -- Comparative grain yields of 10 sorghum varieties in 14 cooperative tests in 11 counties in Region IV. 1939.

| Location            | Variety |        |      |      |       |      |        |       |       |       |
|---------------------|---------|--------|------|------|-------|------|--------|-------|-------|-------|
|                     | Early:  | :      | :    | :    | :     | :    | :      | :     | :     | Early |
|                     | Kalo    | Sooner | Kalo | Day  | Colby | Club | Hegari | Leoti | Atlas | Sumac |
|                     | Bu.     | Bu.    | Bu.  | Bu.  | Bu.   | Bu.  | Bu.    | Bu.   | Bu.   | Bu.   |
| Antelope            | 20.2    | 23.2   | 18.5 | 19.2 | 14.1  | 16.5 | 6.4    | 4.0   | 0     | 0     |
| Boone (Ives)        | 24.8    | 24.8   | 18.8 | 25.8 | 22.6  | 19.8 | 3.9    | 7.8   | 2.8   | 1.1   |
| Boone (Pofahl)      | 38.2    | 33.6   | 32.2 | 30.4 | 26.2  | 25.5 | 34.0   | 16.3  | 17.0  | 25.5  |
| Colfax              | 29.6    | 32.7   | 25.3 | 37.4 | 38.4  | 12.5 | 7.7    | 11.4  | 9.4   | 16.5  |
| Dakota              | 43.5    | 32.9   | 48.8 | 37.5 | 35.4  | 36.5 | 18.8   | 24.1  | 26.9  | 15.6  |
| Dodge               | 38.1    | 33.3   | 45.5 | 35.4 | 38.7  | 40.7 | 23.9   | 21.2  | 20.2  | 0     |
| Knox (Hansing)      | 19.9    | 12.5   | 15.8 | 17.2 | 21.6  | 15.5 | 14.5   | 11.4  | 0     | 9.1   |
| Knox (Knudson)      | 34.0    | 50.5   | 38.4 | 23.6 | 24.9  | 27.6 | 26.9   | 15.2  | 10.4  | 2.0   |
| Pierce              | 52.2    | 53.2   | 32.0 | 45.5 | 39.4  | 29.6 | 25.0   | 12.5  | 18.9  | 11.3  |
| Platte              | 33.7    | 26.9   | 33.7 | 37.0 | 35.0  | 23.6 | 27.6   | 17.5  | 17.3  | 23.6  |
| Thurston            |         |        |      |      |       |      |        |       |       |       |
| (Indian Agency)     | 56.9    | 48.8   | 60.9 | 36.0 | 32.7  | 41.8 | 38.4   | 12.5  | 25.9  | 33.0  |
| Thurston (Malmberg) | 29.3    | 30.6   | 16.8 | 26.6 | 21.6  | 14.8 | 7.1    | 16.5  | 6.4   | 15.2  |
| Nance               | 15.5    | 16.8   | 14.5 | 17.8 | 12.8  | 16.5 | 19.5   | 6.1   | 6.0   | 5.6   |
| Wayne               | 30.6    | 24.6   | 23.6 | 20.5 | 16.2  | 18.7 | 20.2   | 7.7   | 6.7   | 7.0   |
| Average (Bu.)....   | 33.3    | 31.7   | 30.3 | 29.3 | 27.1  | 24.3 | 19.6   | 13.2  | 12.0  | 11.8  |
| Relative (P.ct.).   | 100     | 95     | 91   | 88   | 81    | 73   | 59     | 40    | 36    | 35    |

Table 8. -- Comparative silage yields of 4 sorghum varieties in 10 tests. Region IV. 1939.

| Location                     | Variety |       |       |        |
|------------------------------|---------|-------|-------|--------|
|                              | Atlas   | Early | Leoti | Hegari |
|                              | Tons    | Tons  | Tons  | Tons   |
| Boone (Ives)                 | 5.3     | 4.9   | 5.2   | 4.3    |
| Boone (Pofahl)               | 8.5     | 9.2   | 11.1  | 6.8    |
| Colfax                       | 13.0    | 11.2  | 7.5   | 8.4    |
| Dakota                       | 11.5    | 7.8   | 9.5   | 5.6    |
| Dodge                        | 9.4     | 7.4   | 8.7   | 8.7    |
| Knox (Hansing)               | ....    | 6.4   | 6.2   | 5.7    |
| Knox (Knudson)               | 10.6    | 10.4  | 7.9   | 7.8    |
| Platte                       | ....    | 8.4   | 7.3   | 9.4    |
| Thurston (Indian Agency)     | 11.0    | 10.3  | 9.1   | 8.7    |
| Thurston (Malmberg)          | 13.3    | 11.9  | 10.7  | 7.1    |
| Relative yield <sup>1/</sup> | 118     | 106   | 100   | 88     |

<sup>1/</sup> Based on the average yield of tests for the same tests as the variety named.