University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Historical Materials from University of Nebraska-Lincoln Extension

Extension

1-1954

EC199 Sorghums in Nebraska

O. J. Webster

J. D. Furrer

Follow this and additional works at: http://digitalcommons.unl.edu/extensionhist

Webster, O. J. and Furrer, J. D., "EC199 Sorghums in Nebraska" (1954). *Historical Materials from University of Nebraska-Lincoln Extension*. 4319.
http://digitalcommons.unl.edu/extensionhist/4319

This Article is brought to you for free and open access by the Extension at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Historical Materials from University of Nebraska-Lincoln Extension by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Jan. 1954 E.C. 199

AGRI
S
85
E7
#199

Sorghums in Nebraska

UNIVERSITY OF
NEBRASKA
AGRICULTURAL LIBRARY
APR 29 1954
RECEIVED
DEC 9 1970
COLLEGE OF AGRICULTURE
LIBRARY

UNIVERSITY OF NEBRASKA-LINCOLN
R02378 93347

UNIVERSITY OF NEBRASKA COLLEGE OF AGRICULTURE
AND U. S. DEPARTMENT OF AGRICULTURE
COOPERATING
W. V. LAMBERT, DIRECTOR

CONTENTS

	Page
Seed Selection	2
Seed Treatment	3
Seedbed Preparation	3
Planting	3
Date of Planting	4
Rate of Planting	4
Depth of Planting	5
Cultivation	5
Chemical Weed Control	5
Irrigation	6
Fertilization	6
Harvesting for Grain	7
Storing Grain Sorghum	7
Harvesting for Roughage	8
Rotations	8
Utilization	9
Livestock Poisoning	9
Cropping Districts	10
Varietal Recommendations	
Grain	10
Forage	14
Varietal Descriptions	
Grain	11
Forage	14

SORGHUMS IN NEBRASKA

O. J. Webster and J. D. Furrer 1/

Sorghums are adapted to a wide variety of soils found in the Great Plains. However, they do best on land that is fertile, friable, well drained, and level to gently rolling. Sorghum is a hot weather crop and may do quite poorly in cool seasons, especially when frosts are early.

In Nebraska grain sorghums are most popular in the territory south of the Platte River. In seasons of normal temperature or above they can be expected to yield as much as or more than corn. Like corn, they respond well to irrigation on fertile soils. Yields of over 100 bushels per acre can be obtained.

The sorgos (forage sorghums) are commonly used for silage or fodder. They can be grown successfully throughout the state. The selection of varieties which will mature before frost is important. Under favorable conditions and when planted in rows and cultivated, some sorgos may produce 20 tons or more of silage per acre.

SEED SELECTION

Sorghum seed should be kept as free from mixtures as possible. A crop planted from impure seed is variable in height, maturity, head shape, and seed color, thus making harvesting more difficult and lowering the quality. All sorghums hybridize freely with each other, making it difficult to maintain purity when two or more kinds are grown close together. Seed fields should be isolated at least 40 rods from other sorghum. The seed producer will find it to his advantage to hand select for his seed well-filled, mature, typical heads from healthy plants of uniform height. Removal of hybrid or off-type plants from the fields before blooming is essential for the production of pure seed.

Seed certification requirements provide adequate isolation, field inspection, and laboratory analysis to safeguard the genetic purity of the seed. The use of certified seed assures purity and uniformity.

---

1. Agronomist, Agricultural Research Service, USDA, and Assistant Extension Agronomist, respectively.

SEED TREATMENT

All sorghum seed should be treated for control of kernel smut and for other organisms that cause rotting of the planted seed. Several commercial compounds such as Ceresan M, Panogen, Agrox, Arasan, Spergon, Orthocide, and Setrete can be used for this purpose. The first two compounds named are the only ones of the group recommended for treating Leoti, Black Amber, or other varieties with persistent glumes. Seed should be treated according to instructions for each specific compound. Treating with some compounds at rates more than the recommended rate will cause serious injury to the seed. Most materials used for treating are poisonous to man and farm animals.

SEEDBED PREPARATION

The principal objectives of seedbed preparation for sorghums are to kill weeds, conserve moisture, and to pulverize and warm soil. Warming is particularly important because sorghum seed germinates poorly when the soil is cold. Weed control is also important because sorghum plants grow slowly during the early stages of their development. It is much easier to kill weeds before seeding than after the small plants have emerged. Any practical procedure of preparing the seedbed that accomplishes these objectives is satisfactory.

PLANTING

Sorghum is a small-seeded crop. Surface planting with a corn planter or with a grain drill with certain spouts stopped to give the desired row spacing is recommended. Furrow openers should be used if the surface soil is dry to a depth of three inches or more. Listers are not recommended unless the furrows are shallow and have a broad base. Planting in deep furrows in cold soil, as is done with corn, may result in the seed's rotting before germination or in slow seedling growth. Rains falling on listed fields may wash soil into the furrows and cover the seed too deeply for emergence.

DATE OF PLANTING

Sorghum is a hot-weather crop. For this reason, planting should be delayed until the soil is warm enough to insure good seed germination and rapid emergence of the plants.

As a general rule, it should be planted about 10 days to two weeks later than the normal time for planting corn. In most parts of Nebraska this will be in late May and early June. In areas where chinch-bug infestations are likely to occur, damage from these pests may be reduced by planting somewhat earlier than is ordinarily recommended.

RATE OF PLANTING

Only seed of high germination should be planted. No sorghum should be used for seed that has not been tested for germination, and in general seed that germinates less than 80 per cent is unsatisfactory. It has been established that the field germination of sorghum seed with good viability will usually average from 30 to 50 per cent less than the laboratory germination. This suggests that under average field conditions only about half of the viable kernels planted will produce plants. Thus if it is desired to obtain a field stand of two plants per foot of row, it is usually necessary to drop four to five seeds per foot.

As a result of plant adjustments in tillering and head size there may be considerable variation in plant spacing without an appreciable effect on grain yield. Most of the varieties suitable for combine harvest now being grown are non-tillering, and are often planted at rates as high as ten pounds per acre. A normal crop can be expected from thick planting provided there is adequate soil moisture to bring the plants into head. Thick planting results in smaller heads which are more easily threshed with some combines.

Sorgos usually yield more and give higher quality forage from closer spacings either when grown in rows or when drilled.

The following general suggestions may be made regarding distance between plants in 40- or 42-inch rows:

eastern Nebraska--for grain 4 to 6 inches, for forage 2 to 4 inches; central and western Nebraska--for grain 6 to 8 inches, for forage 4 to 6 inches. When drilled for hay, about 100 pounds of seed should be sown per acre in eastern Nebraska and 75 pounds per acre further west in the state.

DEPTH OF PLANTING

Sorghum seed should generally be covered with 1 to 1 1/2 inches of soil. If the seed is planted shallower than this the surface soil may dry out before it germinates and if planted deeper the seedlings may fail to merge. In light soils the seed may be placed somewhat deeper than in heavy soils.

It is important that the soil be firmly packed, since this retards drying of the soil immediately surrounding the seed.

CULTIVATION

Sorghum planted in rows is cultivated the same as corn, the amount necessary depending on growth of weeds. For surface-planted sorghum a light harrowing or use of a rotary hoe before mergence and after the crop is two to three inches in height will eliminate most of the problem of weed control. These operations followed by two or three cultivations with a shovel cultivator should be adequate. If the crop is listed, cultivation is the same as for corn.

CHEMICAL WEED CONTROL

The use of 2, 4-D to control broadleaf weeds such as pigweed, cocklebur, sunflower, and ragweed in growing sorghum should be only a supplement to mechanical cultivation. In years when timely cultivation is impossible because of wet fields, chemicals may have to be used for weed control. There is no time in the growth of the plant when some injury might not occur. The most critical periods are (1) flowering time when spraying is likely to cause considerable head sterility and (2) when the plants are less than 4 or 6 inches, at which time spraying is likely to inhibit root development.

Recommended rates of 2, 4-D per acre are 1/2 to 1 pound of the amine salt or 1/4 to 1/2 pound of the ester formulations. (See E. C. 198 for more complete information on chemical weed control in crops.)

IRRIGATION

Sorghum may be grown successfully under irrigations and usually produces high yields of grain or forage. The rate of planting should be increased under irrigation and row width narrowed, otherwise cultural practices are similar. Later-maturing varieties may be grown under irrigation than on dry land at the same location, because the more favorable water supply hastens plant development.

Sorghums appear to have particular merit where abundant water for irrigation is available only in the fall and spring. If the subsoil can be thoroughly filled with moisture, sorghums can usually produce a satisfactory crop without additional summer irrigation.

FERTILIZATION

No blanket recommendations can be made on the use of commercial fertilizers on sorghums. If beneficial responses are derived from the use of fertilizers on other crops on the farm, it is reasonable to expect that sorghums will give a like response.

Fertilizer trials were conducted at Lincoln for two years without any increased yield. The land on which these tests were conducted had been in cultivation for more than 50 years without legumes in the rotation or without the addition of barnyard manure or commercial fertilizers. These soils were, however, still very productive since 80- to 100-bushel sorghum crops were harvested. Reports from farms in eastern Nebraska and as far west as Hastings have shown a good response from 30 pounds of nitrogen per acre applied to grain sorghum at the second cultivation the last of June.

If fertilizers are used, it is suggested that 30 to 40 pounds of nitrogen be applied to grain sorghums about the

third week of June and at planting time for forage varieties. On irrigated land higher rates may prove more profitable.

Phosphate fertilizers such as superphosphate and mixed fertilizers containing phosphate should be used on limy bottom lands and eroded slopes or on fields testing very low in phosphate. Phosphate fertilizers should be applied before or at the time of planting. If phosphate fertilizers are used at planting time, care should be taken to place the fertilizer close to the seed but not in contact with it. On fields where the sorghum is listed the phosphate fertilizer should be placed in a band near the seed. Broadcasting the phosphate fertilizer ahead of the lister is usually much less effective. Twenty to forty pounds of available phosphate per acre is suggested where the fertilizer is banded in the row, and higher rates if broadcast before planting.

Where fertilizers are used it is desirable to leave at least four rows unfertilized in the middle of the field to measure the value of the fertilizers.

HARVESTING FOR GRAIN

Practically all grain sorghum is now harvested with combines. The crop should be left standing in the field until the grain is thoroughly dry unless artificial drying facilities are available. During good drying weather the crop is generally ready for combining 10 days to two weeks after a good killing frost.

The combine reel should be equipped with wide slats and set so that they just clear the sickle bar. The cylinder speed should be reduced to one-half or two-thirds the normal speed used for threshing small grain. The operator's manual provided by the manufacturer gives recommendations for correct speed and other necessary combine adjustments.

STORING GRAIN SORGHUM

Difficulties with heating and spoilage of sorghum grain in storage are quite common. Such problems are generally due to excess moisture in the grain at the time of harvesting. Modern drying facilities will help eliminate this problem and should be considered. When mechanical drying facilities are used the grain can be combined with a moisture content of about 20% with considerable saving

in field loss in those years when the crop may lodge. Drying to a moisture content of 13% or less is necessary for safe storage.

Cracked kernels and pieces of stems and stalks in combined grain may increase danger of heating and spoilage. Removal of such inert materials before the grain is binned may reduce moisture content of the grain 1/2 to 1 1/2%.

HARVESTING FOR ROUGHAGE

Definite rules cannot be given regarding the time of harvesting forage sorghums.

In general when sorgos are utilized as hay, cured fodder, or silage, the seed should be permitted to reach the hard dough stage before the crop is harvested. At this time the sugar content has reached a maximum.

When the soil moisture becomes exhausted in September and the lower leaves begin to fire, the crop should be harvested although the heads are not matured. If this drouth condition occurs in August it would be advisable under most conditions to delay harvesting. If there are early fall rains the plants will revive and a good growth of forage may be produced before frost. It is fairly well established that sorghum will make good feed even if cut prematurely.

Silage made from immature sorghum may become too acid in the fermentation process. However, if drouth injures the crop before maturity, it can be safely ensiled.

When close drilled or broadcast, sorghum is commonly mowed and cured in the windrow. If the crop is not too tall and coarse, it may be cut with a grain binder and shocked in the field for curing. This method often facilitates handling and curing.

SORGHUM IN THE ROTATION

The expression is often heard that sorghum is "hard on the land." The principal reasons for this are the greater depletion of soil moisture and the temporary tie-up of available nitrates. The nitrate tie-up effect can be overcome

by adding nitrogen to the soil in the form of manure or commercial fertilizer and by using more legumes in the rotations.

Where summer fallow is practiced, a good rotation is fallow, wheat, and sorghum. In other areas corn and sorghum are better crops with which to follow sorghum than are small grains. One of the things to avoid in rotations is the sowing of winter wheat on land which has been in sorghum during the same year. Such a practice should be followed only if the soil has a good supply of moisture, and nitrogen fertilizers are applied at seedtime. Since winter wheat requires larger quantities of nitrates earlier in the season than any other crop, it suffers most from the shortage of nitrates.

UTILIZATION

Sorghums are utilized largely in the same manner as corn. The whole sorghum plant may be fed either cured or ensiled. The composition of sorghum grain is nearly the same as that of corn and it is generally considered that its feeding value is nearly equal to that of corn for most classes of livestock. Like corn, sorghum grain must be supplemented with other feeds to provide a balanced ration.

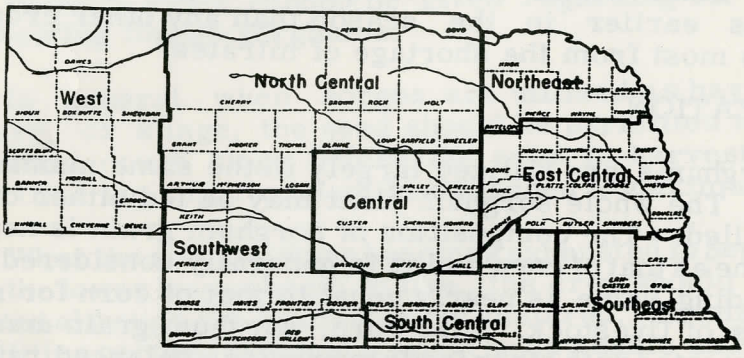
Because of the small size and hardness of the grain much of it is passed through the animals undigested. The grains should therefore be cracked for all classes of livestock, except hogs, sheep, and poultry when self-fed. The brown-seeded varieties are somewhat unpalatable because of their bitter taste, and are eaten less freely than those with white, yellow, or red seed.

LIVESTOCK POISONING

All sorghums are capable of producing enough prussic (hydrocyanic) acid to cause the death of livestock when pastured under certain conditions of growth. The leaves, particularly young leaves, contain most of the poison but young branches and suckers on large plants may be as dangerous as young plants. When the plants are stunted, wilted, or recently frosted, they may cause death when eaten by the animal. Cattle and sheep should not be pastured on sorghum when conditions are favorable for the development of prussic acid.

VARIETAL RECOMMENDATIONS

Varieties of sorghums suited for production in the various cropping districts in Nebraska are divided into two groups - Recommended and Acceptable. The recommended group includes those varieties that have proved superior for the cropping district where they are recommended. Those listed in the acceptable group are only slightly inferior and may be planted with reasonable satisfaction when seed of recommended varieties is not available.



Principal Cropping Districts in Nebraska

RECOMMENDED AND ACCEPTABLE GRAIN SORGHUM VARIETIES

District	Recommended	Acceptable
(Southeast)	Midland Redbine 60	Martin Combine 60 Early Kalo
(East Central)	Martin Midland Redbine 60	Early Kalo
(Northeast)	Martin Midland Norghum Redbine 60 Reliance	Early Kalo

Recommended and Acceptable Grain Sorghum Varieties (continued)

District	Recommended	Acceptable
(South Central, Central, and Southwest)	Martin Midland Coes (for SW Dist.) Redbine 60 Reliance (for SW Dist.)	Early Kalo Westland
(North Central)	Coes Norghum Reliance	Martin Midland Redbine 60
(West)	Coes Norghum Reliance	

DESCRIPTION OF RECOMMENDED GRAIN SORGHUM VARIETIES

MIDLAND

Midland is a selection from Kalo that matures in a little over 100 days. It is a combine type with an average height of 3 1/2 feet. It is quite lodge resistant, combines easily, and threshes free from the glumes. It has a short semi-compact head with reddish-brown, kalo-type seed. Yields of over 100 bushels have been reported on farms in Nebraska.

MARTIN

Martin is a selection from Wheatland that matures in slightly over 100 days. It is a combine-type that grows about 3 1/2 feet tall. It is quite lodge resistant. It is susceptible to chinch bugs and should not be grown in southeastern Nebraska. Martin is a good yielder. It has long, semi-compact heads with fairly large, orange-brown colored seeds. The seed of Martin is of a harder texture than Midland and stands are more easily obtained. It also has a dry head stem which permits the crop to be combined before frost.

COES

Coes matures in slightly less than 100 days. It grows about 4 1/2 feet tall. It is fairly lodge resistant and yields well. Its earliness makes it a good variety for the panhandle region and southwestern Nebraska. The grain is small and white, sometimes with pink spots. The heads are long, erect, and semi-compact to open. Coes is often harvested with a grain binder and used as bundle feed.

NORGHUM

Norghum is an early-maturing grain sorghum developed and released by the South Dakota Agricultural Experiment Station. At Alliance it matures approximately two weeks earlier than Martin. It is a combine-type growing approximately four feet tall. Norghum is adapted in the west district and the northern section of the north central district. In the remainder of the state it is a suitable variety for late planting. It should be seeded at approximately one-third heavier rate than other grain sorghums. Norghum tends to lodge quite badly if left standing long after maturity.

RELIANCE

Reliance is an early maturing grain sorghum released by the South Dakota Experiment Station in 1952. It is about ten days earlier than Martin and Midland and about three days later than Norghum. It grows about 38 inches tall and stands well late in the fall. In seed size and color it is similar to Midland. Yields compare favorably with other recommended varieties.

REDBINE 60

Redbine 60 is a red-seeded, double-dwarf combine variety recently distributed by the Texas Agricultural Experiment Station. It is a variety which will compete with Martin. It is a day or two earlier in heading, and has a larger and softer seed which may be better as a livestock feed. Yields have been comparable to those of Martin and Midland. Its earlier maturity is desirable for the central part of the state.

DESCRIPTION OF ACCEPTABLE GRAIN SORGHUM VARIETIES

EARLY KALO

Early Kalo is a selection from Kalo that matures in about 100 days at Lincoln. The plants average 3 1/2 feet tall, and are fairly uniform in height. Susceptibility to lodging following maturity makes it difficult to harvest. It is somewhat resistant to chinch bug injury and can be grown with considerable success in southeastern Nebraska except when there is a heavy infestation. Early Kalo gives a good yield of grain, which is reddish-brown, often with dark spots. The heads are medium-long to long, erect, and semi-compact.

WESTLAND

Westland is very similar to Martin. It is a selection from Wheatland that matures in 105 to 110 days. It is a combine type growing approximately 3 feet tall. Under Nebraska conditions it has yielded considerably less than Martin. The head and grain resemble Martin.

COMBINE 60

Combine 60 is a white-seeded combine kafir. It is three to four days later than Martin or Midland and should be grown only in the southeastern part of the state when the growing season is the longest. It has good chinch bug resistance and is very productive when grown under favorable conditions.

RECOMMENDED AND ACCEPTABLE SORGOS

District	Recommended	Acceptable
(Southeast)	Atlas Axtell Rox Norkan	Leoti Kan. Orange Early Sumac
(East central)	Atlas Axtell Rox Norkan	Leoti Early Sumac

Recommended and Acceptable Sorgos (Continued)

District	Recommended	Acceptable
(Northeast)	Axtell Norkan Rox Leoti	Atlas Black Amber Early Sumac Ellis
(South central, central, and southwest	Axtell Norkan Rox Leoti	Atlas Black Amber Early Sumac Ellis
(North central)	Leoti Rox Norkan Fremont	Rancher Early Sumac Ellis Black Amber
(West)	Leoti Fremont	Rancher Black Amber

DESCRIPTION OF RECOMMENDED SORGO VARIETIES

ATLAS

Atlas is a full-season variety that requires over 120 days to mature. It grows over 7 feet tall and produces the highest forage yields of any of the recommended forage sorghums grown in southeastern Nebraska or under irrigation farther west. It also produces a grain yield comparable to the better grain sorghums. Atlas is superior to other forage sorghum varieties in resistance to lodging. It is highly resistant to damage by chinch bugs. Heads of Atlas are medium in length, erect, and compact. The kernels are medium-sized and are white with reddish-brown to black spots.

AXTELL

Axtell is an early selection from Atlas. It matures about a week earlier and the plant is slightly shorter. At Lincoln it yields an average of about a half ton less forage per acre than Atlas, but it exceeds Atlas in grain yield by about seven bushels. The heads and kernels are similar to those of Atlas.

NORKAN

Norkan matures a few days earlier than Axtell and grows over 6 feet tall. It is best described as an early

Atlas, but it is not as lodge resistant. At Lincoln Norkan has yielded a little less than Axtell in both grain and forage, but at North Platte it has yielded about the same amount of grain as Axtell. Heads are medium in length, erect, and compact. Kernels are medium-sized and are white with reddish-brown to black spots.

LEOTI

Leoti matures in 105 to 110 days and grows over 6 feet tall. The forage is of excellent quality. Leoti yields about the same as Norkan and Rox Orange, but less than Atlas and Axtell. It lodges severely under certain conditions. The heads are medium in length, erect, and semi-compact with the upper branches of the head drooping. Much of the threshed grain is enclosed in the shiny, orange-brown glumes. The seed is light brown. Its grain yield is somewhat below that of Atlas, Axtell and Norkan, but is equal to that of Black Amber and Rox Orange.

ROX ORANGE

Rox Orange matures is 105 to 110 days and grows over 6 feet tall. It yields slightly more forage and grain than Black Amber and Leoti. The forage is of a very high quality. Rox Orange is especially suited for farm production of syrup and molasses. The heads are quite compact and erect. The kernels are orange-brown in color.

FREMONT

Fremont matures in 95 to 100 days and grows about 6 1/2 feet tall. It is best described as an early maturing Early Sumac, and at North Platte it has given yields about equal to those of Early Sumac. The heads are compact and the kernels are light reddish-brown in color.

DESCRIPTION OF ACCEPTABLE SORGO VARIETIES

BLACK AMBER

Black Amber matures in 95 to 100 days and grows over 7 feet tall. Severe lodging may result when growth is heavy. Black Amber yields about the same amount of forage

as Leoti and Norkan. Its grain yield is also comparable to that of Leoti although it is below that of Norkan. The quality of forage is less desirable than that of Leoti. The heads are of medium length, erect, and open. The seeds are enclosed in heavy, shiny, black glumes and are medium in size and buff or reddish-brown in color.

EARLY SUMAC

Early Sumac matures in 105 to 114 days and grows about 6 feet tall. It tillers profusely and has a tendency to lodge. The heads are short, erect, and compact. The kernels are very small and are reddish-brown in color.

KANSAS ORANGE

Kansas Orange requires over 120 days to reach full maturity. It grows over 7 feet tall. It has given high forage yields superior to those of Atlas. In some years it lodges severely. It is susceptible to chinch bugs. The heads are of medium length, erect, and semi-compact. The kernels are of medium size and are orange-brown in color.

RANCHER

Rancher is a very early Black Amber type. It was selected primarily for its low prussic acid content. This variety is not productive enough to be grown in any counties except those bordering on South Dakota and Wyoming. The heads and kernels are similar to those of Black Amber Sorgo.

ELLIS

Ellis is very similar to Leoti in all characteristics except that it has a white seed which has a "waxy" type of endosperm starch. It has yielded a little less forage than Leoti in Nebraska tests.