

# SORGHUMS

for  
Grain  
and  
Forage

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EXTENSION DIVISION  
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Oklahoma A & M College  
Stillwater, Oklahoma

**SORGHUMS**  
**for**  
**GRAIN and FORAGE**

**WESLEY CHAFFIN**  
Extension Agronomist

**INTRODUCTION**

The sorghums may properly be described as the "corn of the prairies," since they are to the drier sections of the United States what corn is to the Corn Belt. The sorghums are grown throughout Oklahoma and are the most important feed crop in the western half of the state. The ability of sorghums to remain dormant during periods of severe drought and resume growth when rain comes make them dependable sources of grain and forage in those areas which are normally too dry for corn. The sorghums are also more dependable than corn on many of the upland soils in the central and eastern sections of the state, particularly in dry seasons.

**Feeding Value**

The sorghums provide much of the feed grain and forage required for livestock on farms and ranches throughout the state. They may be fed as cured forage, silage, threshed grain, or in the head. The grain has a feeding value similar to that of corn. Sorghum grain should be coarsely ground or rolled for all kinds of livestock except sheep and poultry.

**Soil Requirements**

Sorghums may be grown on almost any type of soil, but deep, fertile, well drained, sandy loam soils are most desirable. The heavy clay soils produce good crops in seasons of normal rainfall, but severe drought injury may result during dry seasons. In the western part of the state it is a common practice to plant sorghum on the sandy soils and winter small grains on the medium and fine-textured soils. The sandy uplands in the eastern section are better adapted to sorghums than to oats. The sorghums are fairly tolerant of alkali in the soil.

## Fertilizers For Sorghums

Sorghums should be grown in rotation with a legume to maintain a good supply of active organic matter in the soil. Fertilizers will be needed on many soils to obtain a good growth of the legume. When sorghum follows sweet clover, alfalfa, or vetch, fertilizers are not likely to be needed for this crop.

Better response will be obtained from fertilizing sorghums in areas of abundant rainfall than in areas of limited rainfall.

For sorghums, and all other crops, the soil should be tested and fertilizer treatments determined on the basis of the test. General recommendations for fertilizing grain and forage sorghums when grown on soils of varying fertility levels in central and eastern Oklahoma are as follows:

### 1. Soils low to very low in organic matter, low to very low in phosphorus, and low to high in potassium.

- (a) Sorghums for grain. Applying a fertilizer which will supply 10 to 15 pounds of nitrogen and 20 to 30 pounds of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) per acre at planting time.
- (b) Sorghums for forage. The fertilizer to be applied should supply 10 to 15 pounds of nitrogen, 20 to 30 pounds of phosphoric acid (P<sub>2</sub>O<sub>5</sub>), and 10 to 20 pounds of available potash per acre at planting time.

For higher forage yields, a sidedressing of 20 to 30 pounds of nitrogen per acre at the second cultivation would be beneficial in seasons when moisture conditions are favorable for plant growth.

### 2. Soils low to very low in organic matter, low to very low in phosphorus, and very low in potassium.

- (a) Sorghums for grain. Using fertilizer which will supply 10 to 15 pounds of nitrogen, 20 to 30 pounds of phosphoric acid (P<sub>2</sub>O<sub>5</sub>) and 20 to 30 pounds of available potash per acre.
- (b) Sorghums for forage. The fertilizer should supply 10 to 15 pounds of nitrogen, 20 to 30 pounds of phosphoric acid (P<sub>2</sub>O<sub>5</sub>), and 30 pounds of potash per acre.

For higher forage yields, sidedress with nitrogen at the second cultivation as indicated in 1-b above.

## Western Oklahoma

In western Oklahoma sorghums are usually fertilized only when grown on sandy to sandy loam soils of low fertility. The suggested rates of application for this area are somewhat lower than those recommended for the central and eastern sections of the state.

#### Placement of Fertilizer

When fertilizers are applied in direct contact with sorghum seeds, injury to germination may result. The best placement of fertilizer for sorghums is in a band along the row 2 inches to the side and 1 to 2 inches below the level of the seed. The next best placement is 2 to 3 inches directly below the seed.



Fertilizer increased the yield of sorghum forage from 1900 pounds to 9900 pounds per acre (Field weight).

#### SORGHUM VARIETY RECOMMENDATIONS

Much progress has been made in sorghum breeding in recent years, and varieties are now available to meet the particular needs of farmers in every section of Oklahoma. The recommended varieties of grain and forage sorghums for different areas of the state are as follows:

Section of State	Grain Sorghums	Forage Sorghums
Northeast	Redlan, Darset, Darso Hegari*	Sugar Drip, Sumac 1712, Atlas
North Central	Dwarf Kafir 44-14, Redlan, Darset, Darso, Hegari*, Sharon, Ok- lahoma Blackhull	Sumac 1712, Atlas, Sugar Drip

Northwest (Except Pan- handle)	Westland, Martin, Redlan, Dwarf Kafir 44-14, Wheatland	Atlas, African Millet
Panhandle	Westland, Martin	Atlas, African Millet
Southwest	Dwarf Kafir 44-14, Redlan, Wheatland, Plainsman, Martin, Hegari*	Sumac 1712, Sugar Drip African Millet
South Central	Dwarf Kafir 44-14, Redlan, Darset, Darso	Sumac 1712, Sugar Drip, African Millet
Southeast	Darset, Redlan, Mar- tin, Darso	Sumac 1712, Sugar Drip

#### GRAIN SORGHUM VARIETIES

The principal groups of grain sorghums are the milos and the kafirs. The milos are very drought resistant and are adapted in regions of low rainfall. They are highly susceptible to chinch bug injury and cannot be successfully grown in areas where these insects are prevalent in large numbers. When milos are grown in humid areas, weather damage to the grain is likely to occur, and the stalks tend to lodge if the crop is not harvested soon after it matures. Milos planted in the section of the state west of a line drawn from Alva through Clinton to Frederick will generally be most successful.

The kafirs have juicy stalks and slender cylindrical heads. The grain is white, pink or red, depending upon the variety. The kafirs are adapted throughout the state and are grown primarily for grain. Some varieties such as Hegari and Darso, are occasionally utilized as forage.

##### (a) Combine Varieties

The dwarf and double-dwarf varieties have short stalks and are suitable for harvesting with combines. The recommended combine varieties include Redlan, Dwarf Kafir 44-14, Darset, Westland, Wheatland, Plainsman and Martin.

**Redlan:** Redlan, a combine-type of grain sorghum, was developed by the Oklahoma Experiment Station for use in the central and eastern parts of the state. The stalks are juicy and average 42 inches in height. The seeds are large in size, bright red in color and thresh easily from the glumes. The upper part of the stalk, the center stem of the head, and the seed branches become dry as the grain ripens. This is important when the crop is to be harvested

\*Hegari is an intermediate type of sorghum and may be grown either for grain or forage.

early, since the moisture content of the grain will be lower. Redlan is a late maturing variety, requiring 115 to 120 days to complete its growth.

In the Experiment Station yield tests, Redlan has ranked first at Stillwater and second at Woodward. It has more resistance to chinch bug injury than kafir, and the grain is not readily eaten by birds.

Redlan is adapted in all of Oklahoma except the panhandle. It is recommended especially in the central and eastern sections of the state.

**Dwarf Kafir 44-14:** Dwarf Kafir 44-14 was developed in Oklahoma to meet the need for a variety of kafir which can be harvested with combines. The variety is earlier than Standard kafir and matures in about the same time as Sharon. It is very uniform in appearance and has produced high yields at both Stillwater and Woodward. Dwarf kafir 44-14 is resistant to milo disease and has more resistance to chinch bug injury than the combine milos. It also has a wider range of adaptation than the combine milos and is recommended throughout the main sorghum-producing section of the state.

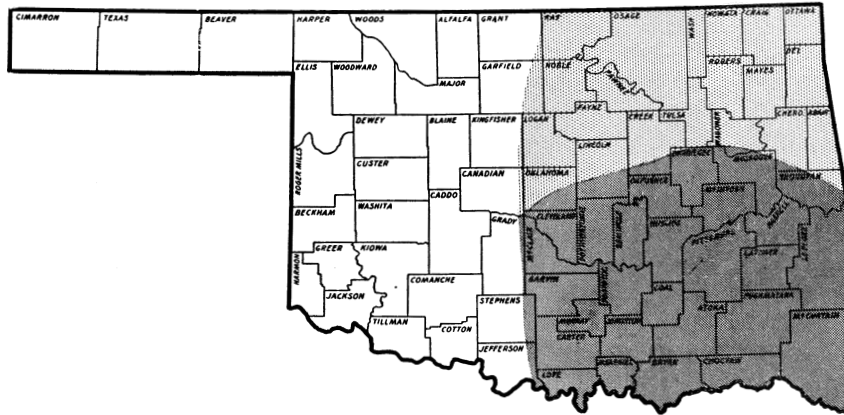


**Dwarf Kafir 44-14—A high yielding variety suitable for combine harvesting.**

**Darset:** Darset is a new combine-type Darso, developed by the Oklahoma Experiment Station. It is similar to Oklahoma No. 1 Darso, except that the stalks are about one-third shorter, and the heads are smaller. Darset is 7 to 10 days earlier than Darso No. 1. It is resistant to Periconia stalk rot, or milo disease, and will remain standing under conditions that produce lodging of common Darso.

Darset has the same resistance to chinch bug injury as kafir, and is less readily eaten by birds than white seeded varieties.

Darset yields as well, or better, than the popular combine milos. It is believed that Darset will rapidly replace Darso, particularly on farms where a combine-type is desired. It is adapted throughout Oklahoma, and is especially recommended in the eastern and southeastern sections of the state.



Map showing areas in which Darset is best adapted.

**Westland:** Westland, a selection of Wheatland made at the Garden City (Kansas) Experiment Station, is resistant to milo disease. It matures in about 105 days and produces high yields of grain. Westland is recommended in the northwest part of the state.



Westland—An early maturing, disease-resistant combine milo.

**Wheatland (Resistant):** Resistant Wheatland is a selection of Wheatland made at the Garden City Station. In plant characteristics, it is similar to Westland, and is resistant to milo disease. The variety is slightly later than Westland, and under average conditions, it produces higher yields of grain. It is recommended in the west-central and southwest parts of the state.



**Wheatland—A disease-resistant combine milo.**

**Plainsman:** Plainsman was developed by the Texas Experiment Station. The heads are long and cylindrical, resembling kafir. Plainsman matures in about 110 days and is approximately one week later than Westland. The variety is resistant to milo disease. Plainsman is recommended in the southwest part of the state.

**Plainsman—A resistant milo grown extensively in southwest Oklahoma.**





**Martin:** Martin Milo was developed in Texas and is resistant to milo disease. It matures in about 100 days. Martin does not yield as much as the later combine varieties under favorable conditions, but it is more likely to produce grain consistently under less favorable conditions.



**Martin milo—Southern Great Plains Station, Woodward.**

Table I. Grain yields of combine varieties.  
Oklahoma Experiment Station, Stillwater and Woodward\*

<i>Variety</i>	<i>Grain Yield, Bu. Per Acre (7-year Average)</i>	
	<i>Stillwater</i>	<i>Woodward</i>
Redlan	26.2	29.5
Dwarf Kafir 44-14	25.0	29.8
Westland		24.8
Wheatland (Res.)		26.8
Plainsman		27.3
Martin		23.0

\*New Varieties of Sorghums, (Mimeograph) by Frank Davies, Associate Professor of Agronomy, Oklahoma Agriculture Experiment Station, January, 1952.

## (b) Standard Varieties

The Standard varieties of grain sorghums have medium to tall stalks, and are not adapted to combine harvesting. They have been replaced to a large extent by the dwarf varieties, and their growth is limited mainly to farms where combines are not available for harvesting the grain. The recommended varieties are Standard Kafir, Oklahoma Blackhull, Sharon, Darso, Hegari, Dwarf Yellow milo and Sooner milo.

**Standard Kafir:** Standard kafir was formerly grown extensively in central and eastern Oklahoma. It is one of the highest yielding varieties, and the grain threshes free of hulls. It is recommended for central and eastern Oklahoma.

**Oklahoma Blackhull:** Oklahoma Blackhull is a medium late maturing kafir. It has thicker heads and larger grain than Standard kafir. Under favorable conditions, Oklahoma Blackhull produces excellent yields of grain, but when grown under adverse conditions, a high percentage of the seed retains the hull when threshed. The variety is adapted to the better soils in the central part of the state.

**Sharon:** Sharon is an early maturing selection of Standard kafir which was made at the Woodward Experiment Station. In appearance it is similar to Texas Blackhull and Western Blackhull. Sharon is recommended in the western part of the state.

**Darso:** Darso has juicy stalks, loose, open heads, and reddish brown grain. It matures in about the same time as the early kafirs. It is grown for grain and forage mainly in the central and eastern sections of the state. Common darso is susceptible to milo disease. A resistant strain, known as Oklahoma No. 1, has recently been developed by the Oklahoma Experiment Station. This strain should be used for planting wherever possible. Darso is highly resistant to weather damage and is less likely to be eaten by birds than other varieties of sorghums.

**Hegari:** Hegari is one of the most widely grown sorghums in central and eastern Oklahoma. It has juicy, leafy stalks and heads resembling those of kafir. Hegari is very erratic in grain production. Under average conditions it produces less grain than other recommended varieties. It also yields less forage than Sumac 1712 or Atlas.

**Dwarf Yellow Milo:** Dwarf Yellow milo averages 3½ feet in height and matures in 99 to 103 days. It was formerly one of the most important grain sorghums in the western part of the state. Texas milo, a selection of Dwarf Yellow, is resistant to milo disease, and will produce good yields even in areas where milo disease is present.

**Sooner Milo:** Sooner is an early maturing, dwarf yellow milo. It averages about as tall as Dwarf Yellow and sometimes lodges badly after ripening. Its chief value is as a "catch" crop, since it can be planted in July and still mature a grain crop before frost. A resistant strain has been developed and it should be used when available.

### FORAGE SORGHUMS

The forage sorghums are tall growing and have sweet, juicy stalks. They are grown mainly for cured forage and for silage. The varieties recommended in Oklahoma are Sumac 1712, Sugar Drip, Atlas and African Millet.

**Sumac 1712:** Sumac 1712 is a selection of Sumac Sorgo (Red Top) which has proved very satisfactory under Oklahoma conditions. It is medium maturing and has sweet, juicy stalks. The variety is adapted to all of Oklahoma except the extreme northwest section. It can be utilized as bundle feed, hay, or silage. Sumac 1712 is less susceptible to lodging and is more easily harvested than the taller varieties. It is drought resistant and produces excellent yields of forage. It is also a good syrup variety. Because of its wide adaptation and reliable yielding ability, Sumac 1712 is grown extensively in the state.



**Sumac 1712**—One of the most popular forage sorghums in Oklahoma. Also a good syrup variety.

**Sugar Drip:** Sugar Drip is a late maturing sweet sorghum and is grown for both forage and syrup. Under favorable conditions and on good soils, it produces very high yields. Sugar Drip is adapted in the southern and eastern parts of the state.



Sugar Drip is grown for both forage and sirup.

**Atlas:** Atlas is a forage sorghum with medium sized heads and white grain. Under favorable conditions, it produces high yields of sweet, juicy forage and a grain yield often equal to the best grain sorghums. Atlas has become very popular as a silage sorghum and is adapted on good soils in the northern half of the state.

adapted in areas of moderately low rainfall and is grown extensively in western Oklahoma. African Millet is a very dependable forage producer, even under adverse conditions.

**African Millet:** African millet is a medium late maturing selection of sourless sorgo. The plants have slender, leafy stalks and medium sized heads with buff-colored grain. It is

Table II. Yields of forage sorghums.\*

Oklahoma Experiment Station, Stillwater and Woodward

Variety	Green Forage—Tons Per Acre (7-year Average)	
	Stillwater	Woodward
Sumac 1712	9.2	4.0
Sugar Drip	10.2	4.4
Atlas	9.0	3.7
African Millet	8.6	3.4
Hegari	6.4	2.8
Darso Ok. #1	5.6	

\*New Varieties of Sorghums (Mimeograph), by Frank Davies, Associate Professor of Agronomy, Oklahoma Agricultural Experiment Station, January, 1952.

## CERTIFIED SEED

High quality seed of an adapted variety is an important factor in producing a good crop. Certified seed is the best class of seed available for general distribution. It is produced from approved seed stocks of known origin and is grown by farmers who specialize



Inspecting a field of kafir for certification.

in the production of high quality planting seed. Each field is inspected to determine the condition of the crop with respect to purity, freedom from disease, objectionable weeds, and other factors which affect the desirability of the seed for planting purposes. The harvested seed is tested for germination and purity. Planting certified or registered seed is the farmer's best assurance that he is getting good seed of a desirable variety.

## SEED TREATMENT

(For description of diseases, see pages 18 and 19.)

Sorghum seeds should be treated before planting to control kernel smut and to improve stands. The smuts are prevalent throughout the state and cause considerable damage to the sorghum crop every year. The disease organisms which cause seed rotting and seedling blight are most harmful in seasons when cold, wet weather prevails at planting time.

These diseases are effectively controlled by treating the planting seed with Arasan. This chemical is relatively non-poisonous and does not injure germination, even when more than the recommended dosage is used. Spergon and Ceresan M are also effective in the control of kernel smuts, seed rots and seedling blight.

It is important that the chemicals be used according to directions printed on the containers. Overdosage of Ceresan M may

injure germination of the seed. The usual dosage is 1 ounce of Arasan, 1 ounce of Spergon, or 1/2 ounce of Ceresan M.

The method of treatment is simple, and expensive equipment is not required. Good results can be obtained by placing the seed and dust in a closed container and shaking until each kernel has come in contact with the dust. For treating larger quantities of seed, a gravity type treater or a revolving barrel treater can be used.

Treated seed may be stored 6 months or longer without injury to germination, if placed in a dry bin with good circulation of air.

**Ceresan is poisonous to farm animals. Treated seed, regardless of the chemical used, should not be fed to livestock.**

#### SEEDBED PREPARATION

Careful preparation of the seedbed is one of the most important steps in grain sorghum production, and additional time spent on this operation reduces the amount of cultivation required after the crop is planted. The chances of getting a good yield are also increased. A seedbed is prepared to destroy weeds, conserve moisture, warm the soil, and provide favorable soil conditions for seed germination. A warm, firm, moist seedbed is essential, and any method which will provide this condition is satisfactory. The kind of equipment available, type of soil, and climatic conditions largely determine the method used in seedbed preparation.

Preparation of the land for sorghums should be started as early as conditions will permit. In the western part of the state listing or using a field tiller in late fall is a common practice. Listing or furrowing on the contour is more effective in conserving both soil and water. On land where wind erosion is likely to be severe, listing or furrowing east and west or at right angles to the direction of the prevailing winds may be advisable to reduce the hazard of soil blowing. When weed growth starts in the spring, a field cultivator or some other suitable implement can be used to destroy weeds, conserve moisture and prepare the seedbed for planting.

In the central and eastern sections of the state, plowing or listing in late fall or early winter is advisable for soils which are not highly susceptible to erosion. Where erosion is severe, however, fall plowing may result in heavy losses of soil during the winter and early spring. Under such conditions, later plowing is advisable. The land may then be worked with a disk or field cultivator to destroy weed growth and prepare a firm, uniform seedbed for planting.

## RATE OF PLANTING

The rate of planting will depend upon the variety, location, condition of the seedbed, available moisture and germination of the seed. It is advisable to plant twice as much seed per acre as would be required to give the desired number of plants in the row if every seed produced a plant.

In western Oklahoma, highest yields have been obtained by spacing grain sorghum plants 6 to 8 inches and forage sorghum plants 4 to 6 inches in the row. In areas of higher rainfall, slightly closer spacings may be advisable. The usual rate of planting for combine varieties, including both milos and kafirs, is 2 to 3 pounds per acre. The standard varieties of grain sorghums are planted at the rate of 2 to 4 pounds of seed per acre.

The rate of planting for most varieties of forage sorghums in the western part of the state is 3 to 5 pounds of seed per acre. In the eastern section, the recommended rate of planting is 5 to 8 pounds per acre. Sumac 1712 should usually be planted at a rate not exceeding 5 pounds per acre. When sorghums are drilled for hay, 25 to 40 pounds of seed per acre will be required for best results.

### Drill Planting of Grain Sorghum

The practice of drill planting sorghums for grain production is best adapted in the western part of the state where weed growth can largely be controlled in the preparation of the seedbed, and the crop can be planted late. The practice will be most useful on farms used largely for wheat production and where row planting and cultivating equipment are not available.

It is very important that the land be thoroughly worked to destroy weeds before planting. The spacing of the drill rows should be not less than 14 inches and not more than 21 inches. The recommended rate for drilling is about twice the rate used for row planting. In no case should the rate exceed 8 pounds of seed per acre.

Drill planting of sorghums for grain production is not recommended in the central and eastern sections of Oklahoma.

### Time of Planting

Sorghum is a warm weather crop and planting should not be done until all danger of frost is past and the soil is warm. Early planted sorghums often require a longer time to reach maturity than those planted after conditions become favorable. In that part of Oklahoma where milo is grown, planting should be done in June. In the remainder of the state, where insects are a limiting factor, planting should be done as early in May as weather conditions will permit.

### METHOD OF PLANTING

Planting may be done with a lister planter or with a one-row or two-row corn planter. Special sorghum plates are available for planters. Seed should be planted in moist soil and covered in a depth of one to two inches.



**Sorghums should be planted on the contour. When harvesting for forage, the stalks should be cut, leaving as much stubble as possible for protection against soil blowing.**

### CULTIVATION

The methods of cultivating sorghums are about the same as for corn and cotton. The primary purpose is to control weeds and the number of cultivations will depend largely upon weed growth.

The method of cultivation will depend, to some extent, upon whether the crop is planted with a surface planter or with a lister planter. For surface planted sorghums, the row-type rotary hoe is the best implement to use for one or two early cultivations to break crusts and destroy weeds. Many farmers use a harrow soon after the young plants emerge. The crop will then need two or three additional cultivations which can be given with a regular row cultivator.



If the crop is planted with a lister planter, the first cultivation should be given with a "curler" or regular lister cultivator. Later cultivations may be given with the same implement or with any other suitable type of row cultivator. All cultivations should be just deep enough to destroy weeds. Late cultivations should be very shallow to prevent injury to the plant roots.

### HARVESTING AND STORING

The proper time to harvest sorghums is determined by the variety, method of harvesting and intended use of the crop. When sorghums are grown for grain, harvesting should not be started until the heads are well matured. This is indicated by the color, hardness, and moisture content of the grain. In western Oklahoma, it is a common practice to leave the grain in the field until after frost. Some varieties have a tendency to lodge (break over) and should be harvested without delay. In eastern Oklahoma where weather damage may occur and birds often cause considerable loss, harvesting should be done as soon as the grain can be safely stored. Forage sorghums are usually harvested when the grain is in the hard or late dough stage, and before loss of lower leaves has occurred.

The most popular method of harvesting grain sorghum is by direct combining. This final step in the complete mechanization of grain sorghum production has been made possible by the development of dwarf and double dwarf varieties which are well adapted to combine harvesting. Hand harvesting is practiced only on farms where standard varieties, not adapted to combine harvesting, are still grown.

In combining sorghums it may be necessary to make certain adjustments to avoid cracking large amounts of grain. This can be done by reducing the cylinder speed and increasing the spacing between the striking surfaces.

The moisture content of sorghum grain should not be more than 12 per cent when it is placed in storage. This is especially important if the grain is to remain in storage for several months. When sorghums are harvested by direct combining, the grain may contain excessive amounts of moisture. The moist grain should be spread out thinly in a well ventilated place for drying before it is stored in bins. This will reduce storage losses and preserve the grain in better condition.

### Artificial Drying

Preliminary experiments indicate that the moisture content of sorghum grain can be effectively reduced by means of artificial dryers which can be built and operated on farms. Artificial drying is most practical on farms where large acreages of sorghum are grown and the grain is harvested with too much moisture for safe storage or shipment. Plans for building and operating farm dryers can be obtained at the County Agent's office or by writing to the Extension Service, A. and M. College, Stillwater, Oklahoma.

### DISEASES

The most important diseases of sorghums in Oklahoma are kernel smuts, milo disease, charcoal rot, seed rots, and seedling blight.

#### Kernel Smut

Covered kernel smut includes several different forms, each of which may attack certain varieties of sorghums. One or more forms of this disease may attack nearly all varieties of both grain and forage sorghums. In affected heads the kernels are transformed into masses of black spores.

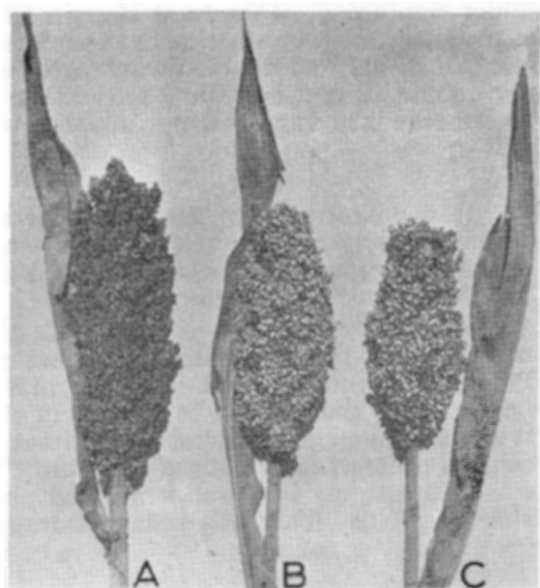
Loose kernel smut is similar to covered smut except that the masses of spores are longer and more frequently broken.

Spores of both the covered and loose kernel smuts are carried on the seed, and both forms of the disease can be controlled by seed treatment (See page 13).

#### Sorghum kernel smut.

A. Healthy head

B. and C. Heads affected with kernel smut.



### Milo Disease

Milo disease attacks the milos and darso. It is especially destructive of milo. It usually occurs on land where milo or darso is grown continuously or in short rotations.

In heavily infested soil the disease may appear when the plants are only 6 to 9 inches high. The first indication of the disease is a stunting of plants and a slight rolling of the leaves. The older leaves turn yellow at the tips and around the edges. This yellowing and drying continues to develop until all the leaves are affected and the plants die, usually without heading. In such cases small, poorly filled heads may be produced.

Milo disease also affects the root system of the plant. It destroys the fine roots and the outer part of the larger roots. The tissues at the base of the crown turn dark red and the reddish color extends up into the base of the stalk. The disease may be spread by running water, wind, farm implements or by any other agency which transports soil from infested fields. The disease is not controlled by seed treatment or by crop rotation. The only effective means of control is the growing of resistant varieties, several of which have been developed. All of the grain and forage sorghum varieties recommended in Oklahoma are resistant to the disease.

### Charcoal Rot

Charcoal rot is a fungus disease which affects the roots, stalks, and heads of sorghum plants. It seems to be associated with certain unfavorable growing conditions such as extreme heat or drought. It may also occur on dry spots in a field, such as knolls or claypan areas.

Injury to plants usually does not become evident until they approach maturity. Close examination of affected plants at that time will reveal poorly filled heads, light weight kernels, premature ripening and drying of entire stalks, and the presence of lodged (fallen) stalks. Many of the affected stalks are soft and discolored at the base. The fibers in the stalks are separated and have a shredded appearance. The disease organisms are carried in the soil and seed treatment is not effective. The kafirs seem to be less susceptible than the milos or darso, but none of the varieties of sorghum grown in Oklahoma at present are completely resistant to charcoal rot.

### Seed Rot and Seedling Blight

When sorghum seed is planted in a cold soil, or when unfavorable weather conditions follow planting, poor germination may result. Also, some of the young seedling plants may be injured or destroyed before or after they emerge. These conditions are caused by disease organisms which live mainly in the soil but may also be carried on the seed. The diseases can be controlled by dusting the seed with a recommended seed disinfectant. (See page 13).

### INSECTS INJURIOUS TO GRAIN SORGHUMS

The insects which cause greatest damage to sorghums in Oklahoma are the chinch bug and sorghum webworm. Some damage is also caused by the corn earworm and the southwestern corn borer.

#### Chinch Bugs\*

Chinch bugs occur in greatest numbers in the northeastern, central, and southwestern parts of the state. They are seldom injurious in the southeastern and northwestern sections. Very little injury from cinch bugs occurs west of the 25 inch rainfall line.

The first generation of chinch bugs feed largely on wheat and barley, and to some extent on oats. As the small grain crops mature, the insects migrate to sorghums and corn. Early planting of sorghums to permit the young plants to become better established before chinch bug migrations start is a good practice. It is also desirable to plant sorghums as far as possible from fields of small grain, particularly winter barley.

#### Sorghum Webworm

The sorghum webworm often causes serious damage to grain sorghums, especially in the central and southeastern parts of the state. The insects are usually more numerous during seasons of ample rainfall and moderate temperatures during the summer and early fall. The adult insects lay their eggs in the flowers of the sorghum heads. The larvae feed in the flowers and young kernels, and affected parts of the head fail to develop grain. When the insects are numerous, severe damage may result. Late planted and late maturing sorghums are damaged most seriously.

Early planting of sorghums seems to be the most practical means of control. Sorghums which mature in late August or early September are more likely to escape serious injury than those maturing later in the fall.

**\*For further information on recommended methods of chinch bug control, see Okla. Ext. Cir. No. 369, "Chinch Bug Control Practices for Oklahoma Farms."**