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# Rancher

*File Copy*

*A Low Hydrocyanic Acid Forage*

# Sorghum



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# Rancher

*A Low Hydrocyanic Acid Forage*

# Sorghum

C. J. FRANZKE<sup>1</sup>

Rancher sorghum has the lowest hydrocyanic acid content of any named forage sorghum variety in production. It contains about one-third of the hydrocyanic acid content of the low-acid Dakota Amber 39-30-S released in 1937 and only about one-tenth of the hydrocyanic acid content of commercial varieties (Table 1). It was developed by the South Dakota Agricultural Experiment Station from a cross of the low hydrocyanic acid strain 39-30-S and a high acid strain 19-30-S and back crossed with the low acid strain 39-30-S. Both strains were selected from Dakota amber variety.

Considerable losses of cattle and sheep have occurred in South Dakota from hydrocyanic poisoning in sorghum. These losses occur from either feeding cured sorghum fodder or pasturing livestock on sorghum stubble. Many farmers and ranchers have discontinued producing sorghum because of this danger.

All members of the sorghum family, including Sudan grass, contain this dangerous hydrocyanic acid. The factors which control the content of hydrocyanic acid in sorghum are heritable, and subject to modification by selection and breeding (Table 1). Also the amount of hydrocyanic acid occurring in the sorghum plants is subject to decided modifications by soil, climate, storage, and maturity. Small sorghum plants or plants retarded in growth (by drought, thin soils, injury, etc.), young side branches, tillers and second growth usually are high in hydrocyanic acid. Most of the hydrocyanic acid is found in the leaves, particularly in the younger leaves and new growth. Freezing of unharvested sorghum is not the cause of an increased hydrocyanic acid content in the plants. Experimental results show second growth amber cane tested 12 hours after a killing freeze had lost 65 percent of its original hydrocyanic acid content.

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Table 1. Comparative Range of Hydrocyanic Acid Content in Sorghum

Variety	Range of hydrocyanic acid p.p.m.
Rancher .....	Trace to 300
39-30-S .....	470 to 890
Commercial Amber .....	1200 to 3380

The hydrocyanic acid generally decreases in the plants as they approach maturity. Matured sorghum plants with ripe seeds are seldom dangerous, especially if the growth has been normal and few tillers or side-branches are present. Sorghums harvested at the matured stage make a poor quality forage. Sorghum plants tiller freely and these tillers develop later than the main plant. Sorghum harvested at the proper stage for high quality forage will contain considerable of this new growth. Consequently the cured fodder may retain much of the poisoning which is dangerous to livestock. The losses of livestock from forage poisoning can be prevented to a large extent by growing a low hydrocyanic acid sorghum such as Rancher for forage.

**Description.** Rancher is early in maturity. It is medium height, varying from 60 to 69 inches or more. Its stems are mid-stout and are heavier and leafier than the stems of Dakota amber strain 39-30-S. It tillers freely. The kernel is light brown, somewhat elliptical shaped and enclosed by large black glumes flaked with reddish brown. It is a good yielder of both forage and seed.

**Adaptation.** Rancher sorghum is well adapted to all parts of South Dakota because it matures in about 90 to 100 days. It is adapted to a wide range of soils, but

does best on well-drained, deep, fertile, loam soils. Heavy clay soils that warm up slowly in the spring and bake easily are less satisfactory than the loamy types of soils. Heavy clay soils that are well drained will produce a large crop of sorghum, if properly handled. Very sandy soils are not desirable, especially if rainfall is limited because difficulty is



Fig. 1. Growth characteristics of Rancher sorghum plants

often experienced in storing sufficient moisture for the use of the crop. Shallow and low-fertility soils that do not produce a crop of corn or wheat seldom produce a good crop of sorghum.

**Seedbed Preparation.** Seedbed preparation for sorghum is very important. Preparation of the seedbed is the same as that for corn, but with more attention given to killing weeds before planting. Sorghum seedlings, during the first two or three weeks, grow slowly and weeds are difficult to control at this stage. Therefore, the seed should be planted in a warm, clean, mellow, firm soil in order to obtain conditions favorable for quick germination and more rapid seedling development.

**Seed Treatment.** Sorghum seed should be treated to insure better stands and for the control of sorghum smut. Seed treatment helps prevent seed rots when the seed is planted early or when it is planted during unseasonably cold weather. Treatment of sorghum seed with an effective fungicide is a cheap form of crop insurance and should be practiced every year.

The following dust treatments are available and can be used for sorghum: Copper carbonate, 2 to 3 ounces per bushel; New Improved Ceresan,  $\frac{1}{2}$  ounce per bushel; New Improved Semesan Jr., 2 ounces per bushel. The latter two may injure germination of seed if applied more than two months before planting. Arasan and Spergon, both 1 to 2 ounces per bushel, are two new materials which are satisfactory for treating

sorghum seed and may be used if available. The liquid formaldehyde treatment is a satisfactory smut control, but has generally been discarded in favor of the dust treatments. The dust treatments are applied by thoroughly mixing with the seed the proper amount of chemical dust.

**Date of Planting.** The date of planting sorghum depends upon seasons, soil type and seedbed preparation. Sorghum is not so exacting in its moisture requirements as in its temperature relations. It is a warm weather plant and requires warmer soil temperatures for germination than corn. If sorghum is planted too early, there is difficulty in obtaining good stands and the young seedlings frequently do not grow satisfactorily. Dates of planting sorghum which are most favorable for fodder production are also most favorable for grain production. The growing season in South Dakota is sufficiently long to allow some range in planting dates. The general dates for planting sorghum are from May 25 to June 10. These dates are generally 10 days to two weeks after normal corn planting.

**Rate of Planting.** The rate of planting sorghum in cultivated rows is more important when the crop is grown for grain than when it is grown for forage. Rancher stools or tillers freely. If it is planted and grown where soil moisture is plentiful or fertile soil and the stand is thin, each plant will produce a large number of tillers. This habit tends to equalize, in a measure, differences in

the initial stand. The practice of seeding sorghum at a heavy rate per acre in order to make thinner stalks and a larger yield is disastrous when there is not enough moisture to support a heavy stand. Seedlings should be made at a rate to permit a normal development of the plants. Sorghum for forage may have one plant for each two to six inches within the cultivated row, depending on moisture supply. For seed production, the stand should be lighter. It requires from 6 to 10 pounds of seed to plant an acre.

**Depth of Planting.** One and one-half inches is the most desirable depth to plant sorghum. If the seed is planted too shallow the surface soil may dry out before germination can take place, causing a poor stand. But, if the seed is planted too deep, the seeds may rot or the seed-

lings will fail to emerge, also causing thin stands. Seed planted at the proper depth in a warm moist soil will germinate immediately and give a uniform stand. Also, the seedlings will get an early start on the weeds. If moisture level is too far below the surface level of the soil for proper depth of planting, use the furrow opener attachments on the planter. This will enable the grower to plant the seed at the proper depth in moist soil, insuring prompt emergence.

**Method of Planting.** The method of planting sorghum depends upon the area and type of equipment on hand. In eastern South Dakota, the more humid part of the state where fall or spring plowing is practiced, sorghum is usually surface planted, being drilled with corn planters in which proper sized plates are used. In the drier central and western



Fig. 2. Seed plot of Rancher Sorghum at South Dakota Agricultural Experiment Station, 1944

part of the state, sorghum is often planted with a lister. In light or sandy soils that warm up fast, listing and planting may be done in one operation. In heavier soils, it is best to blank list in the fall or early spring. When the weeds start to grow in the spring, the ridges should be leveled down. At planting time, the lister or corn planter equipped with furrow openers can be run in the original furrows, but a little shallower than the first time. The slope of the furrows should be gentle to prevent danger of washing and covering during heavy rains.

**Cultivation.** The cultivation of sorghum is similar to that of corn. The early growth of sorghum is slow and the young plants require care to kill the weeds. The first cultivation on surface

planted sorghum can be accomplished with an ordinary spike tooth harrow or a rotary hoe. If the field is listed, the first cultivation can be made with an ordinary harrow or a disk weeder. The first cultivation should start soon after the sorghum has emerged. This is followed by ordinary cultivations, as may be necessary to control weeds.

**Harvesting for Forage.** Rancher is a good forage and seed producer, (Table 2). The best time to harvest it for fodder is when the seeds on the main stems have reached the medium hard-dough stage. Sorghum harvested at this stage will produce a large tonnage of high quality, palatable fodder. For silage, sorghum should be harvested at the more mature stage. Silage made from more mature sorghum becomes less acid and does not spoil when properly ensiled.

Table 2. Two-Year Average Yields of Forage and Grain in Forage Sorghums at Brookings

Variety	Lbs. Forage Per Acre			Lbs. Grain Per Acre		
	1943	1944	2 yr. average	1943	1944	2 yr. average
Rancher .....	9220	12774	10997	1840	2268	2054
39-30-S .....	8280	10560	9420	1945	2947	2446
Commercial Amber .....	6240	10294	8267	1004	1730	1365

**Seed Production.** Certification of Rancher sorghum seed is the only way the low hydrocyanic acid content can be maintained because the factors which control the content of hydrocyanic acid are heritable. All sorghums and Sudan grass will cross pollinate. Forage sorghums are more often mixed as a variety than grain sorghum because the seed

crop is secondary in importance to the fodder.

It is necessary to plant Rancher for seed production on land that had not been planted the previous year in sorghum or Sudan grass due to the danger from volunteer plants contaminating the crop. The field should be isolated from

other fields of sorghums and Sudan grass to prevent cross pollination. Sorghum seed fields should be rogued carefully for off-type plants (see Fig. 2), otherwise the presence of stray plants will result in endless hybridization. The rogues which are hybrids can generally

be distinguished by their greater height and vigor. Other mixtures can be detected by such differences as color of grain or hulls, type of heads, and the general appearance of the leaves and stalks when height of plants is the same.