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SUDANGRASS

for
summer pasture



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SUDANGRASS FOR SUMMER PASTURE

SUDANGRASS produces excellent pasture in July and August when regular pastures are often short. Farmer experiences and 14 years of trials by the North Dakota Agricultural Experiment Station at Fargo have shown that high livestock production and gains can be maintained on sudangrass pasture during July and August.

Many North Dakota stockmen are short of good pasture during July and August when weather is normally hot and dry. This shortage occurs nearly every year, unless stockmen have large acreages of native grass or alfalfa and are not afraid to risk pasturing alfalfa because of bloat hazard.

Sudangrass is an annual, warm season grass and provides excellent pasture in summer even though moisture may be slightly less than normal. Dairy cattle will maintain or increase milk production, and beef cattle and sheep will maintain or increase daily gains, on good sudangrass pasture during July, August and early September.

Sudangrass is adapted to all of North Dakota but yields highest in the southeast and southern counties where summer temperature and moisture are high. In drier areas of the state sudangrass production will be most reliable when planted on summerfallow or in rows.

PLANT CERTIFIED PIPER SUDANGRASS FOR PASTURE

The variety Piper is recommended for use as pasture in North Dakota. Piper was developed and released by the Wisconsin Agricultural Experiment

Station. It is very low in prussic acid (hydrocyanic acid or HCN) which is present in sudangrass and is a potential hazard to ruminants in high concentration.

Piper gives very high yields of protein per acre and has as good or better recovery after grazing than many available sudangrass varieties, hybrids and crosses. This variety has been tested under pasture conditions with sheep and by chemical tests at NDSU and other states for many years. No losses due to prussic acid poisoning have occurred. There has been no indication that the prussic acid content has approached the toxic level when sudangrass was grazed after plants were 15 to 18 inches tall. Even very short plants have not caused poisoning.

While no guarantee can be made that losses will not occur in pasturing Piper sudangrass, the possible gains from the use of this high-producing pasture crop appear to be much greater than the remote risk involved.

Always buy certified Piper seed, or, if uncertified, from a reliable dealer to be sure the seed is free from admixture with other forage sorghums higher than Piper in prussic acid content. Occasional cases of livestock poisoning from common sudangrass in the past have probably resulted from sorghum admixtures in the sudangrass seed planted. Pure seed is important because sudangrass and sorghums cross pollinate readily.

SUDANGRASS VARIETIES, HYBRIDS AND CROSSES?

Which is which and what's what? There are (1) open pollinated sudangrass varieties, (2) su-

sudangrass hybrids with both parents as sudangrass and (3) crosses with sudangrass as one parent. Table 1 will help clarify the differences in terminology.

For pasture the variety Piper is recommended in North Dakota. It will yield as much or more pasture per acre than the hybrid or crosses and is lower in prussic acid. Trudan I and II, the only hybrid sudangrasses adapted to North Dakota, are also very good. They yield about the same as Piper for pasture and are only slightly higher in prussic acid. They outyield Piper when cut for hay or silage. For silage the sudangrass x sorghum crosses will yield more.

Table 1. Sudangrass Classification and Use.

Types	Variety	Prussic acid	Recommended use
<u>Open pollinated</u> (includes "common" and "sweet")	Piper	low	pasture
	Wheeler	high	
	Greenleaf	high	
	Common	high	
<u>Hybrid (sudangrass x sudangrass)</u>	Trudan I	med. low	pasture
	Trudan II	med. low	
<u>Crosses (sudangrass x sorghum)</u>			
	a. Resembles sudangrass	high	pasture & silage
	b. Resembles sorghum	high	silage or bundle

NOTE: There are many of these crosses on the market. Descriptive literature from reliable seed houses will indicate the characteristics of the cross.

PASTURE 1 TO 2 COWS OR 6 TO 14 SHEEP PER ACRE

Piper sudangrass has averaged approximately 3.62 tons of oven dry forage at a pasture stage of growth during 14 years of trials at Fargo. This forage production will carry about 2 cows per acre during the period July 15 to Sept. 15. Sudangrass pasture at Fargo during 6 years of trials produced 1,050 "sheep days" of grazing per acre or enough pasture to carry 14 sheep per acre from July 1 to Sept. 15. In western and northern areas of the state carrying capacity during this period will be about 1 cow or 6 sheep per acre.

Protein production per acre from sudangrass is excellent. Analyses of forage at a pasture stage at Fargo during 7 years of trials, involving 5 different varieties, gave an average production of 792 pounds of crude protein per acre. This is equal to the protein in 1,800 pounds of soybean

meal. This protein is worth about \$75 to \$85 an acre, depending on soybean meal prices.

Yields (table 2) were obtained in years having fairly adequate, but not unusually high, rainfall. Seeding has been on fallow or on areas cropped the previous year and fertilized with nitrogen. Sudangrass is drought resistant and will produce even during short dry periods. It can go dormant during prolonged dry periods and come back very vigorously with abundant forage production when soil moisture becomes available again and if the weather is still warm.

Table 2. Forage production of sudangrass, sudangrass x sorghum crosses and sudangrass hybrids (Trudan I & II) in drilled plots harvested twice at 2 and 6 inch stubbles and in 3 foot cultivated rows harvested once for silage at 2 inch stubble at Fargo and Edgeley.

	Tons of dry forage per acre			
	Fargo, 1965-67		Edgeley, 1964-66	
	Pasture & hay		Silage ^{1/}	
	2"	6"	2"	2"
Piper	3.69	2.76	3.52	1.80 ^{2/}
Trudan I	3.31	2.64	4.20	2.09
Trudan II	3.70	2.94	4.34	- ^{3/}
Crosses	3.42	2.97	5.13	2.88

^{1/} For approximate silage yields at 70 per cent moisture, multiply dry forage yields by 3. Yields represent one harvest only at maturity.

^{2/} Five year average at Edgeley of drilled Piper for hay was 2.81 tons per acre, 1960-64.

^{3/} Trudan II was not included at Edgeley.

USE SURPLUS FOR SILAGE

Any surplus sudangrass left after pasturing is best used for silage. Silage yields may nearly equal corn yields, but the nutritive value is only about 88 per cent the value of well-eared corn silage. As it stands in the field on Sept. 15, sudangrass contains approximately 65 to 70 per cent moisture, ideal for ensiling as "grass" silage.

Piper averaged 4.23 tons of hay annually from drilled plots at Fargo, 2 cuttings, for the period 1951-67. Expected hay yields of Piper in central and western North Dakota are approximately 2.3 and 1.5 tons per acre, respectively. These estimates are based on earlier yield trials at the various branch stations throughout the state. Sudangrass hay, however, is coarser and less palatable than other good hay.

PLANT LATE MAY OR EARLY JUNE

Sudangrass is a warm season crop. It should be planted during late May or early June, approximately 2 weeks later than corn. Planting can be

delayed until the third or fourth week of June and still give very good yields.

The seedbed should be worked up and weeds controlled until planting time. This can be effective in wild oat control. Broadleaf weeds can be controlled with 1/4 to 1/2 pound 2,4-D amine per acre when the sudangrass is 4 to 12 inches tall. A firm seedbed similar to that used for flax is desirable. As sudangrass grows during the warmer period of the year, nitrogen fertilizer usually is not necessary unless the crop is grown under irrigation and large yields of forage are being produced. If nitrogen is deficient on nonfallow land, 10 to 60 pounds of actual nitrogen per acre, based on stored soil moisture at planting time and area of the state, should be applied. On fallow land, 0 to 35 pounds of actual nitrogen per acre are recommended. Very little response from phosphorus has been observed except on soils testing low in this nutrient. Fifteen to 25 pounds P_2O_5 per acre are recommended for these soils. Sudangrass seed should be treated with Arasan or Captan, especially if it is to be planted in cool soil.

Plant 1 to 1½ inches deep in normal soil and slightly deeper on light soils. Plant 25 to 30 pounds of seed an acre with a press drill. Sudangrass can be planted in cultivated rows at 5 to 8 pounds an acre for pasture or silage and this may be desirable in drier areas. When planted in rows the height and maturity of sudangrass may be more advanced at harvest time. In favorable years forage production probably will be slightly less than in drilled seedings but protein production is higher because the plants are leafier.

GRAZE AT 18 INCHES FOR SAFETY

Proper grazing management of sudangrass is important for top production and to avoid the hazard of prussic acid poisoning.

In grazing tests at NDSU, sheep have never shown injury even from close grazing of Piper or common sudangrass. As a special safety factor, however, do not graze sheep until the plants are 12 to 15 inches tall. Grazing with cattle should not be started until plants are 18 inches tall. Delayed grazing also allows a period of time for development of a good root system.

Cattle grazing can be delayed until the plants are 3 feet or more tall, because sudangrass remains palatable over a long period. The prussic acid in sudangrass is highest when plants are very small and decreases rapidly as the plants mature or get taller.

GRAZE CATTLE AND SHEEP DIFFERENTLY

When cattle are being grazed on Piper sudangrass, stock the pasture so the height of the grass is kept about 15 to 18 inches, or graze on a pasture rotation basis.

Dry weather may reduce the vigor and rate of sudangrass growth so that the pasture is grazed too short and becomes unproductive. If this occurs, move the animals to another pasture to allow the sudangrass time to recover to a height adequate for best plant growth. The inconvenience caused by short pasture due to summer drouth can often be avoided by dividing the pasture into at least 2 areas and grazing these in rotation.

When sheep are grazed on Piper sudangrass pasture, dividing the pasture into 3 or more areas and grazing in rotation are desirable. Sheep tend to graze part of a pasture down very short and to keep it that way while other areas grow tall and coarse. Under rotation grazing, sheep are forced to graze more evenly. A small area can be grazed down quickly to a height of 5 to 6 inches, then move the sheep to another area. Recovery of grazed areas normally takes 2 or 3 weeks.

SUDANGRASS FOR SOILING OR "GREEN CUT" FORAGE

Tests at Fargo with sheep and dairy cattle have shown that sudangrass cut green and fed to animals in dry lot increases the carrying capacity 50 per cent per acre. Waste from trampling and other means is eliminated. The sod is weak, so chopping with heavy equipment must be delayed when the soil is very wet. An early first cut is recommended to prevent the loss of tillers from shading and to promote quicker recovery.

Piper sudangrass and other open pollinated varieties recover rapidly after harvest and are well adapted to soiling use. Recovery growth originates from the crown buds so the crop can be cut reasonably close to the ground. The first harvest should begin when the crop is about 18 inches tall.

Several sudangrass x sorghum crosses will outyield open pollinated sudangrass for soiling purposes. Much of their recovery growth comes from axillary buds on the stem; therefore, a 4-to 6-inch stubble should be left when harvesting to promote rapid regrowth. The first harvest should begin when the crop is about 24 inches tall.

FROST NOT SERIOUS AS POISONING HAZARD

Although the first frost usually kills all top growth of Piper sudangrass, this frosted forage is not a poisoning hazard to animals. If a warm, moist period follows a killing frost, small new shoots or regrowth may occur from the base of the plant. Any poisoning hazard associated with frost is in this regrowth.

As the frozen forage dries, the prussic acid changes to gas and escapes. Frozen forage after drying contains less prussic acid than before freezing. Grazing may be delayed until the frosted forage dries, as an extra safety factor especially with crosses. New growth after frost is especially hazardous.

Nitrate accumulation can occasionally occur in sudangrass and sudangrass x sorghum crosses

under certain growing conditions the same as it can occur in corn, oats or other annual forages. Dangerous levels are more apt to occur under extreme drouth conditions or when sudangrass is grown on fields that have been manured heavily or have had legumes in the rotation recently or have received excessive applications of nitrogen fertilizer. Although the chance of high nitrates occurring in sudangrass are slight farmers should be aware that it can happen.

SEED PRODUCTION IN NORTH DAKOTA RISKY

Growing Piper sudangrass for seed in North Dakota involves considerable risk. Early frost and other factors usually results in seed of low germination. Most sudangrass seed is produced in the Southern Great Plains region and in the irrigated valleys of Arizona and California.



Acknowledgement is given Dr. J.F. Carter, Professor and Chairman, Department of Agronomy, for earlier research data upon which many of these management recommendations are based.