

SORGHUM-SUDAN CROSS

Robert L. Voigt

American farmers have been enjoying increased yields from the inception of hybrids in crop after crop for the last quarter century. Sudangrass is no differ-

ent. There were two or three new sudangrass "hybrids" on the market in 1960. In 1961, seed of eight different "hybrid" sudangrasses were given to The University of Arizona for inclusion in yield trials and limited distribution to farmers through the Agricultural Extension Service.

Standard varieties of sudangrass have been sources of hay and summer pasture in Arizona for many years. Sudangrass was first obtained in 1909 from the Sudan Government as result of a search for a

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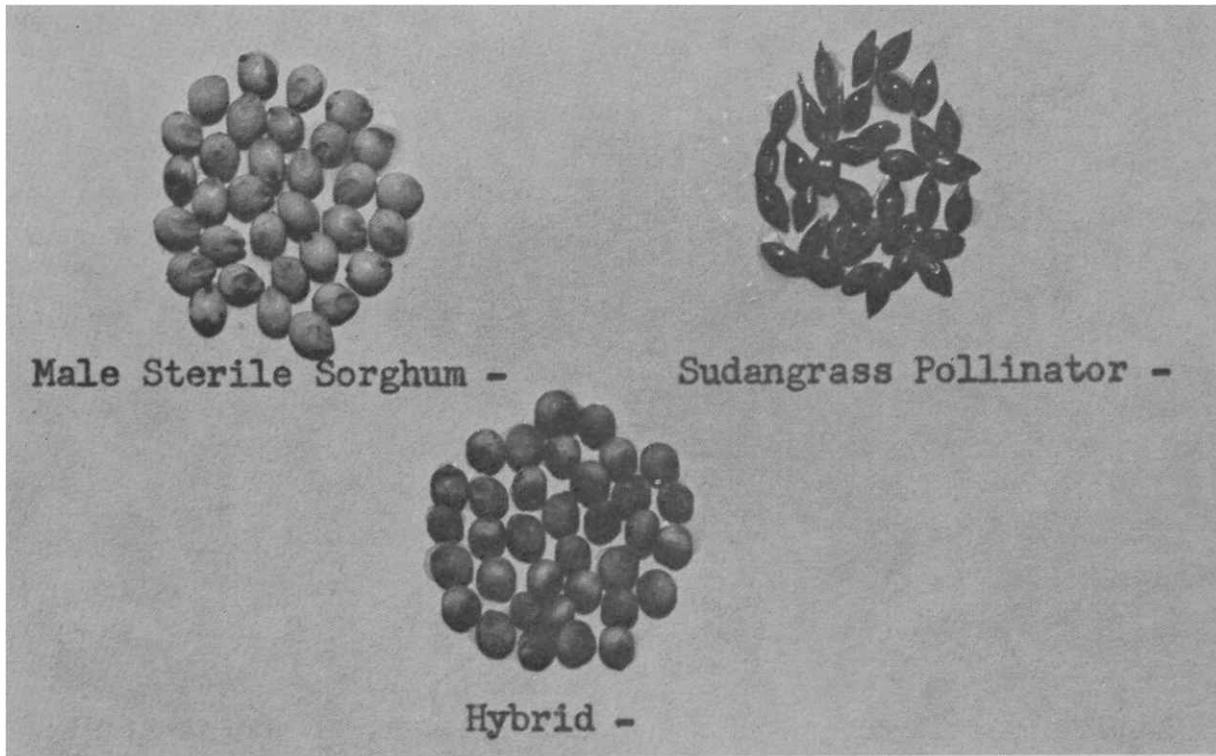
form of Johnson grass without rootstocks. It gained immediate and widespread popularity in the United States.

Usually a hybrid is produced by crossing two parents of the same species, but since suitable steriles had not been available in sudangrass, in these first "hybrids" the successful sorghum steriles have been used. How is this possible? Sorghum (grain or forage) and sudangrass are different species of the same botanical genus *Sorghum*, but have the same chromosome numbers. These chromosomes are similar in sorghum and sudangrass, enabling them to cross-pollinate readily. This fact was utilized by putting sudangrass pollen on a sorghum sterile, to produce the "hybrid" seed.

Seed Looks Like Sorghum

Those who have tried some of these sudangrass "hybrids" may have remarked about the seed they planted, "But this seed looks just like sorghum seed, not sudangrass seed." True—it does look just like sorghum seed since it was produced on a sorghum plant. Note the comparison of seed of a grain sorghum, one of the "hybrid" sudangrasses and sudangrass in the photograph.

The proof of the pudding comes in growing out the hybrid seed. These plants are what the farmer will grow and use. The hybrid plant produced shows some characteristics of both parents. The hybrid sudangrass from the cross "sorghum x sudangrass" has a stem or stalk which is intermediate in size and fineness between the fine, grassy stem of sudangrass and the heavier stalk of the sorghum. The leaves are also intermediate in width and size. The heads are more open or sprangled than sorghum, which is characteristic of the sudangrass parentage, and the seed set may be rather sparse. The most noticeable difference is in height. When headed out, the hybrids may be nine to ten feet tall compared to five to seven feet for sudangrass varieties. Some of these differences or characteristics of the hybrid sudangrass will vary a little from one hybrid to another, depending on the parentage.



NOTE SIMILARITY in size and shape of seed of the sorghum sterile used in production of the "hybrid" sudangrass seed and the "hybrid" seed itself.

Table 1. — Dry Matter Production of Sudangrass "Hybrids" and Varieties Under Two Management Practices. Average Yields of All Varieties Expressed as 100 Per Cent and Average Yields of All Hybrids in Per Cent of the Varieties Within Any Year and Location.

<i>All Entries Cut for Hay at 50 Per Cent Bloom</i>				
	1960	1961		
	Mesa	Mesa	Chino	Valley
Varieties - - - - -	100%	100%	100%	
"Hybrids" - - - - -	124%	110%	119%	
<i>All Entries Clipped at 24 Inches to Simulate Grazing</i>				
	1960	1961		
	Mesa	Mesa		
Varieties - - - - -	100%	100%		
"Hybrids" - - - - -	80%	69%		

Outyield Standard Varieties

These "hybrids" gave a 15 to 20 per cent increase in production over standard varieties of sudangrass when the growth cycle was allowed to progress toward seed production as shown in Table 1. When cut two to three times for hay the hybrids outyielded varieties from 10 to 24 per cent. This is the normal yield increase experienced for other hybrids, such as grain and silage sorghums.

When the entries were cut repeatedly at about 24 inches to simulate grazing

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One Harvest, Two Crops

Frank Wiersma

Arizona grain sorghum producers may be able to enjoy the benefit of an extra ton per acre yield without the expense of an extra harvest.

Arizona areas below 2000 foot elevation have a longer growing season than needed to raise one crop of grain sorghum, but not long enough for two complete crops on the same field. However, grain sorghum is not a plant to let good sunshine go to waste and call it a year just because it has produced a mature

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conditions, the hybrids dropped in total seasonal production to 70 to 80 per cent of the varieties, as shown in Table 1. Recovery of the hybrids became slower and the stands thinner with each cutting.

Table 2 illustrates the continuous drop in production experienced per cutting of the average hybrid, relative to the average variety through the 1961 season at Mesa. Thus the use of these hybrids may not be the same as for varieties. The hybrids tested had poor recovery under conditions of repeated clipping. Probably these hybrids should best be utilized under some management practice where they are allowed to at least reach bloom stage, such as for hay or silage purposes.

Advantages and Disadvantages

Hybrid sudangrasses have slightly coarser stalks than sudangrass varieties but can still be used for grazing. They probably will not withstand trampling by grazing livestock quite as well as sudan-

crop. Given water and warm weather after harvest, it will start producing another crop from the established stalk and root system.

With this head start, it is possible to produce two crops of grain sorghum in one season. The second growth is not as productive as the first, but can add a ton per acre to the total yield. A few growers in Arizona have planted early and "double-harvested" with pleasing success.

There is a Problem, Though

There's a problem in harvesting, however, that can cause difficulties at combining time. The plant gets a bit eager and unless it is stressed to near the wilting point, the regrowth heads will appear before the first growth is dry enough to harvest and store. If the weather at harvest time is on the wet side, as it often is in July and August, a delay of only a few days is time enough for these green heads to reach nearly the same height as the mature grain. It is impossible then to combine and get all the ripe heads without cutting some of the green ones at the same time. This not only reduces the total yield potential by damaging the regrowth crop, but also cuts down on the

grass varieties. The heavier stem makes the hybrid perhaps a little better for green chop and more desirable than varieties for silage purposes. Hybrids make coarser hay than do varieties. It is possible to cut the hybrids for silage two or three times compared to once for regular silage sorghum. This could make for a more constant supply of feed during the growing season.

May Find Useful Place

While sudangrass acreages in Arizona have not increased materially in recent years, it is very possible that these new hybrid sudangrasses, with their ability to bridge the gap in use between standard sudangrass variety and a silage forage sorghum, will find a place in the forage production picture of Arizona.

Plant breeders are working to perfect sterility in sudangrass so that sudangrass hybrids may be produced from crosses of different sudangrasses. First of such true hybrids may be ready for commercial release in 1962 or 1963.

quality of the harvested grain by the addition of these green kernels.

An alternative method of harvest which showed promise was tried at the Marana Experiment Farm this past season. The first crop of grain was not combined until the second one was also ready for the bin. This eliminated the difficulty of properly timing the first harvest, reduced harvesting costs to that of a single operation and permitted irrigation on a regular schedule.

Risky? Somewhat, no doubt. Nature may occasionally make a farmer wish he had his grain safely stored in a bin. In an area where bird damage is notably severe, field losses would be too great. The farmer who knows the history of the area and his land would consider these and other things in selecting a method of harvest.

Yields Were the Same

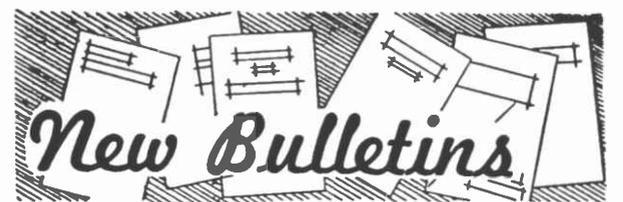
Under normal seasonal conditions, how does the yield and quality resulting from the two harvesting methods compare? These two considerations were studied in a test of harvesting methods at the Marana Farm. Half the field in the test was harvested as each crop became mature and the other half was not harvested until all of it was mature. If any yield losses resulted from leaving the first crop in the field, they were compensated by gains from other factors because the yields were the same regardless of method of harvest. Reduced harvesting damage and optimum moisture level through maturity made up for losses from birds, insects, and shattering in the once over late harvest.

The grain also retained its quality even though exposed to the great outdoors. Analyses of the grain for protein indicated the quality had not been affected.

Reduction in yield and quality do not appear to be considerations in selecting the alternative method of double harvesting suggested. If the risks in a particular area are not too great, a producer can enjoy the benefits of an extra ton per acre yield without the expense of the extra harvest.

Table 2. — Dry Matter Production of Sudangrass "Hybrids" and Varieties Cut at 24 Inches of Height to Simulate Grazing at Mesa in 1961. Average Yields of All Varieties Expressed as 100 Per Cent and Average Yield of All Hybrids in Per Cent of the Varieties Within Cuttings.

	Cutting					
	1	2	3	4	5	6
Varieties	100%	100%	100%	100%	100%	100%
"Hybrids"	106%	77%	72%	49%	59%	51%



A2—Cotton Insect Control in Arizona (1962)

Folder 96—Aging Cattle by Examination of Teeth

Folder 81 (Reprint)—The Rug-Carpet Picture