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PERFORMANCE OF SORGHUM-SUDANGRASS HYBRID (SADABAHAR)

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Investigations on the forage yields, protein content and reduction of forage yield in advance generations of sorghum and sorghum sudangrass hybrid (Sadabahar) have shown that forage yield of sadabahar was significantly higher than local varieties of sorghum. The forage yield depression that occurred from F1 to F2 was only 4 per cent whereas in F3 it went upto 43 per cent. These results indicated the feasibility of using F2 seed for raising one more commercial crop. The protein content of sadabahar fodder was higher than that of the available varieties of sorghum by 5.5 per cent. The continued harvest of green fodder from April to November proved that this fodder has the potential of overcoming fodder scarcity periods which are most common in April/May and October/November.

INTRODUCTION

With ever increasing demand of animal protein required to improve the standard of health of all sections of the population, the development of livestock industry is of paramount importance. To achieve this object the balanced ration fulfilling all the International standards is of basic importance and includes liberal supply of green and palatable fodder throughout the year. It is established that reasonably productive dairy cattle can produce 7 to 10 litre of milk per day on good quality forage alone. We are also aware that forage will be the most economical source of nutrition for Pakistani livestock in future but still it remains to be most neglected field in our research. The yield of fodder per hectare is much less due to inadequate fertilization, low yielding varieties, poor management practices, and non-availability of quality seed.

The present studies were carried out to investigate forage yields, protein content and reduction of forage yield in advanced generations of sorghum x sudangrass hybrid (Sadabahar). Little work in this direction has been done in Pakistan. Results of some foreign workers are reported here.

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Benerlein *et al.*, (1968) observed reduced dry matter production potential within a planting date by increasing the number of harvests and this reduction was due to stand reduction and general loss of vigour by the plants.

Craigmiles *et al.*, (1961) compared advanced generations of sorghum x sudangrass hybrid with F_1 and reported 5 per cent reduction of yield in the second generation but on advancing F_2 generation to F_3 the reduction was as high as 30 per cent.

Burger and Campbell (1961) established that tillering compensated for lower plant population after the initial harvest of sudangrass hybrids. Hugues (1968) concluded that sudangrass and sorghum x sudangrass hybrids can ensure, during the summer, several successive harvests of a forage having high nutritive value. He added that delaying harvests give a larger crop of green and dry matter per hectare, but on the other hand lowers protein content.

MATERIALS AND METHODS

The studies were carried out to evaluate the various aspects of approved variety 'Sadabahar'. The variety 'Sadabahar' is a hybrid of redlane sorghum and piper sudangrass and when planted in March for green fodder succeeds to give as many as four good cuttings.

Experiments to ascertain forage yield, protein and dry matter contents, and reduction of yield in advanced generations of sorghum x sudangrass hybrid, cultivar 'sadabahar' were conducted on a well drained loam soil at the Maize and Millets Research Institute, Yousafwala, Sahiwal. The crop was sown in rows 60 cm apart, by using the seed at the rate of 20 kg/hectare in randomized blocks with four replications. Fertilizer at the rate of 50 kg. per hectare P_2O_5 was disced in at planting. Ten days after emergence 50 kg/ha N and 15 kg/ha insecticide were side dressed with first irrigations. Lateron 50 kg/ha N and 15 kg/ha of insecticide were regularly side dressed with first irrigation after each cutting. The research material comprised various generation of sadabahar viz., F_1, F_2 and F_3 alongwith local tall sorghum varieties and new short statured introduction from the U.S.A. The sowings for forage yield were completed in the 3rd week and 4th week of March, 1971 and 1972 respectively.

The fresh weights were determined to the nearest 1/20th kg immediately after cutting each repeat. The protein analysis was completed by the Pakistan

FIG.1 GREEN FODDER YIELD OF SORGHUM AND SADABAHAR AT DIFFERENT LOCATIONS

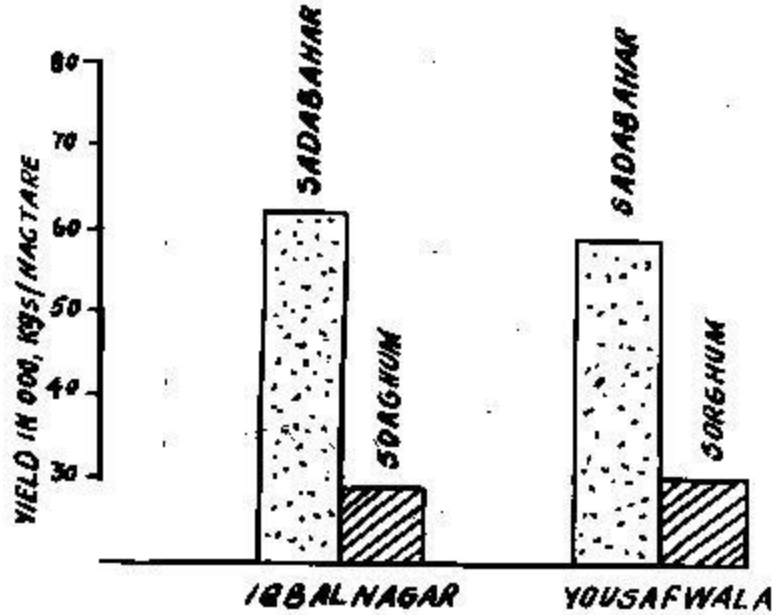


FIG.II GREEN FODDER COMPARISON OF SORGHUM VARIETIES WITH SADABAHAR.

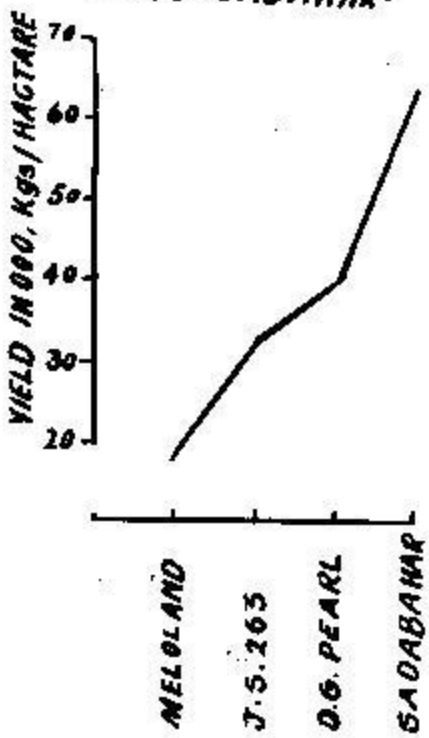
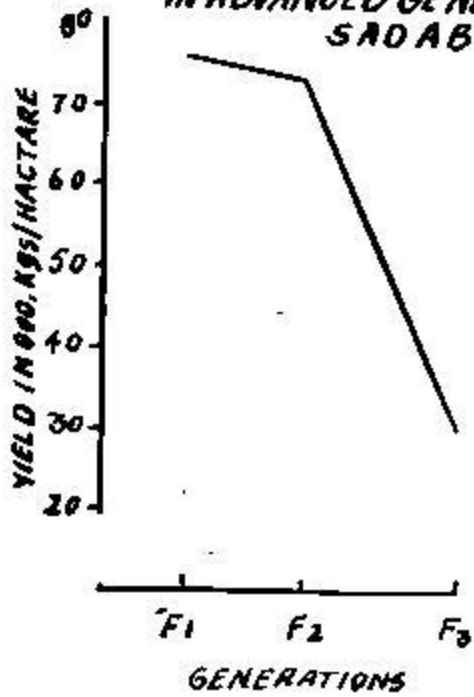


FIG.III REDUCTION OF FODDER YIELD IN ADVANCED GENERATIONS SADABAHAR



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RESULTS AND DISCUSSION

The results of the performance tests conducted on sadabahar and local sorghum at different locations are given in Figures I and II. Forage yield differences due to varieties are highly significant. The location also did not appear to have any effect on the variety. Sadabahar yield was much more and highly significant compared to the yields obtained from sorghum varieties included as checks. The higher forage yield was mainly due to more number of cuttings and good tillering obtained from sadabahar. These results are in agreement with those reported by Hugues (4) who obtained higher yields from successive cuttings from sorghum x sudangrass hybrids.

The results of the experiment conducted to determine the extent of reduction in forage yield when F_1 generation was advanced to F_3 generation (Figure III) revealed that reduction in yield in F_2 was hardly 4 per cent whereas advancing of F_2 generation to F_3 the reduction in fodder yield was as high as 43 per cent. These results confirm earlier investigations carried out by Craigmiles *et al.* (3), who obtained 5 per cent and 30 per cent lower forage yields in F_2 and F_3 advanced generations of the cross between grain sorghum and sudangrass. Visual observations indicated profused tillering after the first cut in the F_2 generation. Probably the segregating plants of sorghum did not resprout and in view of plant competition the interplant space was covered by the tillers of the sadabahar and piper sudangrass. Similar results were reported by Burger and Campbell (2) who established that tillering compensated for lower plant population after the initial harvest of sudangrass hybrids.

Sadabahar gave on an average 5.49 per cent higher protein compared to sorghum (Table 1). From these results it can safely be interpretted that sadabahar is decidedly a better fodder than sorghum. When sadabahar alone was analysed results were non-significant (Table 2) except where the crop was planted on 10-2-1972. The reduction in protein on dry weight basis might have been due to delayed cut in the crop. The trend of results, in the present studies, is similar to those reported by Hugues (4) on sudangrass and sorghum x sudangrass

TABLE 1. *Evaluation of protein content in sadabahar and sorghum.*

Sadabahar		Sorghum	
Plot No.	Protein Percentage	Plot No.	Protein Percentge
1	20.175	2	14.45
7	20.750	3	13.75
11	19.375	4	14.62

Data analysed by PCSIR, Lahore.

TABLE 2. *Evaluation of dry matter and protein content in sadabahar sown on different dates.*

Variety	Date of planting	Date of harvesting	Dry Matter Percentage	Total Protein Dry Basis percentage
Sadabahar	10-2-1972	20-5-1972	22.75	9.80
	25-2-1972	-do-	18.17	11.20
	10-3-1972	-do-	17.27	13.65
	25-3-1972	-do-	19.23	14.35
	10-4-1972	-do-	16.49	14.35

Data analysed by Agricultural Chemist (Biochemistry), Ayub Agricultural Research Institute, Faisalabad.

hybrids where he established that delayed harvest gave larger crop of green and dry matter per hectare, but on the other hand lowered the protein yields by 8 to 10 per cent. The reduction of protein in the present findings was 4.55 per cent.

LITERATURE CITED

Beuerlein J.E., Fribourg H.A. and Bell F.T. 1968. Effects of Environment and Cutting on the Regrowth of a Sorghum x Sudangrass Hybrid. Crop Science No 2 Vol. 8, 152-155.

Burger A.W. and Campbell W.F. 1961. Effect of Rates and Methods of Seeding on the Original Stand, Tillering, Stem diameter, Leaf Stem ratio, and Yield of Sudangrass. Agron. Jour. Vol. 53, No. 5, 289-291.

Craigmiles J.P., Newton J.P., Harries H.B. and Dobson Jr. J.W. 1961. Studies on Forage Yield of 2nd and 3rd generation seed of F_1 Hybrid Sudangrass and Sudangrass x Grain Sorghum. Sorghum News - letter Vol. 4, 18.

Hugues P. 1968. Experiments on Forage Sorghum in the South of France 1966 and 1967. Sorghum Newsletter Vol. 11, 16-18.