

## PRODUCTION POTENTIAL OF DIFFERENT VARIETIES OF SORGHUM (*SORGHUM BICOLOR* L.) UNDER SEMI ARID AGRO-ECOLOGICAL SITUATIONS

S.R. Dhaka\*

Rajasthan Agricultural Research Institute, Durgapura, Jaipur 302 018, Rajasthan  
Email : smarto@in.com

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**Abstract:** Five shorgum varieties were evaluated and compared with farmers' local variety for their grain and straw yield at farmers' own field. The results revealed that sorghum varieties differed significantly for grain and straw yield. Among varieties, CSV 15 recorded highest grain (1945 kg ha<sup>-1</sup>) and straw (12200 kg ha<sup>-1</sup>) yield. The results proved that the CSV 15 was most suitable varieties under prevailing climatic condition of the study area.

**Keywords:** Shorgum, Variety, Grain, Straw yield, Production

### INTRODUCTION

Sorghum (*Sorghum bicolor* (L.) Moench) is the staple cereals and important source of fodder for animals in the semi-arid and arid parts of India (Murty *et al.*, 2007). It makes comparatively quick growth and gives not only good yield of grain but also very large quantities of fodder. It is grown for dual purpose i.e., food for home consumption and fodder for their livestock. Shorgum has enormous potential for fodder and is fast emerging as promising crop for dual purpose. Ullah *et al.* (2007) reported that its grains contain about 10-12% protein, 03% fat and 70% carbohydrates, therefore, it can replace other grains in the feeding program for dairy cattle and poultry. Sorghum is also a good substrate for ethanol production which can be added to fuel for saving precious foreign exchange (Reddy *et al.*, 2005). Sorghum is an important crop in Tonk district of Rajasthan. However, the average productivity of sorghum in the district is very low (571.00 kg ha<sup>-1</sup>) as compared to average state productivity (700.00 kg ha<sup>-1</sup>) (anonymous, 2011). Among various factors responsible for low yield, lack of suitable high yielding variety as well as poor knowledge about production practices are ascribed as main reasons for low productivity of sorghum in the district. Keeping this in view, the present study was conducted to evaluate genotypic potential among different sorghum genotypes for their grain yield and other associated characteristics under agro-climatic condition of semi arid ecosystem of Rajasthan.

### MATERIAL AND METHOD

Five sorghum varieties were evaluated at the farmers' field during the rainy season of two consecutive years 2010 and 2011 under "Action Research for Refinement of Package of Practices for Productivity Enhancement of Crops in Different Agro-Ecological Situations" of Rashtiya Krishi

Vikash Yojana. The trial was laid out in a randomized complete block design with 4 replications, farmer as a replication. Six varieties namely CSH 9, CSV 10, CSV 15, CSH 16, CSH 23 and local germplasm (farmer practice) were included in the experiment. The experiment was conducted in rainfed condition. The soils of the demonstration fields were medium to coarse textured with pH ranging from 8.32 to 8.53, medium in available nitrogen (145-160 kg/ha), phosphorus (23-34 kg/ha) and high in available potassium (345-434 kg/ha). The average annual rainfall received during crop season was about 659 mm. Plant spacing was maintained 45x15 cm. The crop was sown on 28 June, 2010 and 3 July, 2011 and harvested at maturity. Recommended fertilizer dose 40kg N and 20kg P was applied as basal dose to raise the crop. All other agronomic practices were kept uniform for all the treatments.

Five plants were selected randomly from central 2-rows of each plot for recording data on stalk and grain yield. Grain and stalk yields were recorded and then converted to kg per hectare. The data were analyzed statistically and means were compared local variety. The technology gap and technology index were calculated using the following formulas as given by Samui *et al.* (2000):

Technology gap = Potential yield – Demonstration yield

Technology index = Potential yield – Demonstration yield / Potential yield × 100

### RESULT AND DISCUSSION

#### Grain yield (kg ha<sup>-1</sup>)

Five sorghum varieties (CSH 9, CSV 10, CSV 15, CSH 16 and CSH 23) were evaluated for their grain and straw yield at farmers' field. The data revealed that sorghum varieties differed significantly for grain yield (Table-1). The highest grain yield was obtained

\*Corresponding Author

from sorghum variety CSV-15 (1945 kg ha<sup>-1</sup>) which was 83.15 % higher over farmers local germ plasm.

#### Stalk yield (kg ha<sup>-1</sup>)

Varieties also differed significantly in stalk yield (Table-1). The highest stalk yield was obtained from

varieties CSV 15 (12200 kg ha<sup>-1</sup>) which was significantly higher (29.79 %) over farmers local germ plasm. The data further showed that proved CSV 15 as dual-purpose variety under Semi-arid and transitional zones with reasonable grain and straw yields.

**Table 1.** Comparative yield performance of different sorghum varieties at farmers' field (Mean of two years)

Variety	Yield (kg ha <sup>-1</sup> )		% increase over local check	
	Grain	Straw	Grain	Straw
CSH 9	1561	12000	46.99	27.66
CSV 10	1372	11000	29.19	17.02
CSV 15	1945	12200	83.15	29.79
CSH 16	1742	11000	64.03	17.02
CSH 23	1469	10900	38.32	15.96
Local	1062	9400	-	-

Yield of the demonstrations and potential yield of the varieties under study was compared to estimate the technological gap which shows the gap in the demonstration yield over potential yield. It was observed that technological gap in variety CSV 15 (2055 kg ha<sup>-1</sup>) was substantially lower than that of all other varieties.

Technology index shows the feasibility of the variety at the farmer's field. The lower the value of technology index more is the feasibility. Table 2 revealed that, the technology index value of CSV 15 was lowest (51.38 %) followed by CSV 10 (60.80 %). The results proved that the CSV 15 was most suitable varieties under prevailing climatic condition of the study area.

**Table 2.** Yield gap and technology index of sorghum varieties at farmers' field

Year	Technology gap (kg ha <sup>-1</sup> )	Technology index (%)
CSH 9	2439	60.98
CSV 10	2128	60.80
CSV 15	2055	51.38
CSH 16	2258	56.45
CSH 23	2531	63.28

## CONCLUSION

It may concluded that sorghum varieties differed in their capability of producing higher straw and grain yield. Among the tested genotypes, CSV 15 produced higher grain and straw yield than all other varieties. Sorghum variety CSV 15 found as dual-purpose variety under semi-arid agro eco system.

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