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Effect of Genotypes and Integrated Use of Inorganic and Organic Sources of Nutrients on Yield of Forage Sorghum

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ABSTRACT

The experiment was conducted at Research Farm, College of Agriculture, R.V.S.K.V.V., Gwalior (M.P.) during Kharif season 2014-15. It was laid out in factorial randomized block design (F.R.B.D.) replicated three times with 12 treatment combinations Sorghum varieties were grown by considering recommended package of practices. At both cutting, treatment 50% of RDF + 5 t FYM + Azotobacter + PSB (F_3) produced significantly maximum green fodder yield (400 and 320 q/ha by I^{st} and II^{nd} cut, respectively) than rest of the other fertility levels. At both cut, maximum green fodder yield was recorded with V_1 F_3 (723 q/ha) followed by V_2 F_3 (719 q/ha) which are statistically at par from each other and significantly higher over rest of other treatment combination.

Key words: *Sorghum, Green Fodder, Yield*

INTRODUCTION

Sorghum [*Sorghum bicolor* (L.) Moench] is an important crop widely grown for grain and forage purpose. It has the ability to grow under varying soils and agro-climatic situations. As a forage crop it is fast growing, palatable, nutritious and utilized for silage and hay making besides fresh feeding. When harvested at flowering stage, the forage contains about 6-7% crude protein, 30- 31% crude fibre and 9-10% mineral matter. The area under the sorghum crop in India is about 5.82 million hectares and total production is 5.39 million tonnes. In M.P. total cultivated area and production of sorghum crop are 0.23 million hectares and 0.29 million tonnes; respectively. Average yield in India and Madhya Pradesh is 926 and 1247 kg/ha, respectively[1]. Sorghum crop occupies around 30% of the cultivated area under forages and therefore attracts greater attention of researchers for improvement in herbage productivity and quality[3].

MATERIALS AND METHODS

The experiment was laid out in research field at the College of Agriculture, Gwalior during *kharif* season of 2014 and on 852 m^2 area having fairly uniform topography with gentle slope and adequate drainage. The soil of the experimental field was sandy clay loam in texture.

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The experiment was conducted in randomized block design (factorial) with 3 replications and 12 treatment combinations (combination of 2 varieties and 6 levels of fertility). The treatment combinations include 10 t of FYM + ICSSH 28 (T_1), 50% of RDF + ICSSH 28 (T_2), 50% of RDF + 5 t FYM + Azotobacter + PSB + ICSSH 28 (T_3), 75% RDF + ICSSH 28 (T_4), 75% of RDF + 2.5 t FYM +Azotobacter + PSB + ICSSH 28 (T_5), 100% RDF + ICSSH 28 (T_6), 10 t of FYM + IS17349 (T_7), 50% of RDF + IS17349 (T_8), 50% of RDF + 5 t FYM + Azotobacter + PSB+ IS17349 (T_9), 75% RDF + IS17349 (T_{10}), 75% of RDF + 2.5 t FYM + Azotobacter + PSB + IS17349 (T_{11}) and 100% RDF + IS17349 (T_{12}). Required quantity of nitrogen, phosphorus and potash were applied in the form of Urea, DAP and MOP, respectively. Full dose of phosphorus and potassium and ½ dose of nitrogen were given at basal and left ½ dose of nitrogen was given after Ist and IInd cut of green fodder. The seeds of Sorghum [*Sorghum bicolor* (L.) Moench] varieties ICSSH 28 and IS17349 were sown on 20 July 2014, using the seed rate of 100 kg/ha. The spacing between row to row was kept at 45 cm. sowing was done in line by making furrows which were covered by soil after sowing.

RESULTS AND DISCUSSION

Effect of varieties

The fodder yield at I[st] and II[nd] cut (50 and 95 DAS stage) was significantly influenced due to both varieties (Table -1). In both cuts, variety ICSSH-28 (V_1) recorded significantly higher green fodder yield over to variety IS-17349 (V_2). In respect of total fodder yield (Table -2), variety ICSSH-28 (V_1) recorded significantly higher yield (589 q/ha) as compared to variety IS-17349 (V_2) which produced 558 q/ha fodder yield. The differences in growth characters due to varieties may be attributed to their inherent characteristics. This clearly indicates the superiority of variety in respect of its forage yield. Similar results were also mentioned by Ayub *et al*[2]., and Joshi *et al*[5].

Table 1: Effect of varieties and fertility levels on green fodder yield (q/ha) of sorghum

Treatments	Green Fodder yield (q/ha)					
	I[st] Cut			II[nd] Cut		
	V_1: ICSSH 28	**V_2:** IS17349	**Mean**	**V_1:** ICSSH 28	**V_2:** IS17349	**Mean**
F_1: 10 t of FYM	363	351	**357**	283	271	**277**
F_2: 50% of RDF	214	212	**213**	134	132	**133**
F_3: 50% of RDF + 5 t FYM + Azotobacter + PSB	401	399	**400**	321	319	**320**
F_4: 75% RDF	290	235	**263**	210	155	**183**
F_5: 75% of RDF + 2.5 t FYM + Azotobacter + PSB	385	383	**384**	305	302	**303**
F_6: 100% RDF	352	334	**343**	272	254	**263**
Mean	**334**	**319**	**327**	**254**	**239**	**247**
	V	F	VxF	V	F	VxF
S.E.(m)±	3.477	6.022	8.516	3.505	6.071	8.585
C.D. (at 5%)	10.246	17.747	25.098	10.330	17.891	25.302

Table 2: Effect of varieties and fertility levels on total green fodder yield (q/ha) of sorghum

Treatment	Total green fodder yield (q/ha)		
	V_1: ICSSH 28	**V_2:** IS17349	**Mean**
F_1: 10 t of FYM	647	621	**634**
F_2: 50% of RDF	347	343	**345**
F_3: 50% of RDF + 5 t FYM + Azotobacter + PSB	723	719	**721**
F_4: 75% RDF	501	389	**445**
F_5: 75% of RDF + 2.5 t FYM + Azotobacter + PSB	689	685	**687**
F_6: 100% RDF	625	589	**607**
Mean	**589**	**558**	**573**
	V	F	VxF
S.E.(m)±	6.980	12.089	17.097
C.D. (at 5%)	20.571	35.630	50.388

(F : Fertility level V: Variety)

Effect of fertility levels

The green fodder yield was significantly influenced due to different fertility levels at Ist and IInd cuts. Results indicated, the maximum green fodder yield was recorded in Ist cut whereas minimum under IInd cut in both the varieties. At both cutting, treatment 50% of RDF + 5 t FYM + Azotobacter + PSB (F_3) resulted significantly maximum green fodder yield (400 and 320 q/ha by Ist and IInd cut, respectively) than rest of the $_{fertility}$ levels. Application of 50% of RDF (F_2) produced minimum green fodder yield as compared to other levels. The results are in the line with the work of Kumar *et al*[6]., Shekara *et al*[7]. and Lattief[4]. In respect of total forage yield (Table -2), treatment 50% of RDF + 5 t FYM + Azotobacter + PSB (F_3) gave maximum green fodder yield (721 q/ha) which was significantly higher over rest of the fertility levels but statistically at par with 75% of RDF + 2.5 t FYM + Azotobacter + PSB (F_5). It is revealed from the results (Table -1) that the application of 50% of RDF + 5 t FYM + Azotobacter + PSB (F_3) produced maximum green fodder yield at both cuts, which was significantly superior over all other treatments but statistically at par with 75% of RDF + 2.5 t FYM + Azotobacter + PSB (F_5).

Interaction effects

The interaction effects due to varieties and fertility levels on green fodder yield of both cuttings were significant and are presented in Table 1 & 2. Maximum green fodder yield of both cuttings was recorded with V_1F_3 (ICSSH-28: 50% of RDF + 5 t FYM + Azotobacter + PSB) followed by V_2F_3 (IS17349: 50% of RDF + 5 t FYM + Azotobacter + PSB) which are statistically at par from each other and significantly higher over other treatment combinations. The results also confirm the findings of Singh and Sumeriya[8].

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