

SHORT COMMUNICATIONS

PERFORMANCE OF SINGLE CUT FORAGE SORGHUM GENOTYPES TO DIFFERENT FERTILITY LEVELS

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SUMMARY

A field experiment was conducted at main Forage Research Area, CCSHAU, Hisar with five single cut sorghum genotypes (SPV 1846, SPV 1847, PC 1003, CSV 21F and HC 308) grown with four fertility levels viz., control, 50 per cent recommended dose of fertilizer (RDF), 100 per cent RDF (80 kg N+30 kg P₂O₅/ha) and 150 per cent RDF. The plant height, number of tillers per meter row length, green fodder and dry matter yield of sorghum genotypes were significantly influenced by different fertility levels. The highest green fodder yield (523.6 q/ha) and dry matter yield (140.4 q/ha) were recorded in genotype CSV 21F followed by genotype PC 1003. The maximum plant height, number of tillers, green fodder and dry matter yield were recorded at 150 per cent of recommended dose of fertilizer (RDF), which was significantly higher than lower doses of fertilizer. An increase of 55.35, 22.36 and 11.82 per cent in green fodder yield and 90.42, 36.04 and 17.78 per cent in dry matter yield was recorded with the application of 150 per cent RDF over control, 50 per cent RDF and 100 per cent RDF, respectively. The highest crude protein yield and digestible dry matter (DDM) were also recorded with 150 per cent RDF which were significantly higher than lower fertility levels.

Key words : Single cut forage sorghum, fodder yield, crude protein, digestible dry matter

Sorghum is an important forage crop in India. As forage it is fast growing, palatable, nutritious and utilized as silage and hay besides fresh feeding. The yield potential of sorghum is much higher than other forage crops but the production of this crop is low. The low fodder yield of sorghum is due to many constraints but the use of low yielding and outdated varieties and plant nutrition are considered major factors. The potential of existing varieties of sorghum is deteriorating with the passage of time either due to loss in genetic stability or due to changed environmental condition. New genotypes of fodder sorghum evolved with better yield potential. These genotypes required to be tested against the check for their performance under various fertility conditions because the information on the response of newly evolved genotypes to fertility levels is scanty. Keeping

this, in view the present experiment was framed to be conducted.

The field experiment was conducted at main Forage Research Area, CCSHAU, Hisar during **kharif** 2009. The experiment was laid out in split plot design with three replications. Treatments comprised of five single cut sorghum genotypes (SPV 1846, SPV 1847, PC 1003, CSV 21F and HC 308) and four fertility levels [control, 50% recommended dose of fertilizer (RDF), 100% RDF (100 kg N+30 kg P₂O₅/ha) and 150% RDF]. The soil of experimental field was clay loam in texture, low in organic carbon and available nitrogen and medium in available phosphorus and potassium. The full dose of phosphorus and half dose of nitrogen was given at the time of sowing, remaining half dose of nitrogen was top dressed at crop knee height stage. The crop was grown

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as per the recommended package of practices. The crop was harvested at 50 per cent flowering stage. Plant samples were collected at harvest and analyzed for quality parameters by standard procedures.

Plant height, number of tillers, green fodder yield and dry matter yield were influenced significantly by different genotypes (Table 1). The maximum plant height (258 cm) was attended by genotype CSV 21F which was significantly superior over SPV 1846 and SPV 1847. The maximum number of tillers/mrl was recorded in genotype CSV 21F, which was significantly superior over other genotypes except PC 1003. The highest green fodder yield (523.6 q/ha) and dry matter yield (140.4 q/

ha) were recorded in genotype CSV 21F followed by genotype PC 1003 (Table 2). Genetic superiority in realization of full potential of CSV 21F at adequate supply of nutrients resulted in more value of plant height and number of tillers which have ultimately contributed significantly to higher green fodder and dry matter yield. Several workers have also noticed the variation among the genotypes of sorghum for forage yield and growth characteristics (Shivdhar *et al.*, 2003; Bhatt *et al.*, 2012).

The maximum crude protein content (9.52%) was observed in genotype SPV 1846 though the difference between genotypes was not significant. Whereas crude protein yield was influenced significantly

TABLE 1
Effect of different fertility levels on growth, yield and quality of fodder sorghum genotypes

Treatment	Plant height (cm)	No. of tillers/ meter row length	Green fodder yield (q/ha)	Dry matter yield (q/ha)	Crude protein content (%)	Crude protein yield (q/ha)	IVDMD (%)	DDM (q/ha)
A. Genotypes								
V ₁ -SPV 1846	182.9	25.0	437.9	106.3	9.52	10.85	46.55	52.61
V ₂ -SPV 1847	166.8	21.7	345.1	84.8	9.13	7.78	40.55	34.65
V ₃ -PC 1003	249.5	27.3	514.0	136.4	9.19	12.34	43.00	56.87
V ₄ -CSV 21F	258.0	29.1	523.6	140.4	8.86	12.80	42.15	61.19
V ₅ -HC 308	248.9	25.1	495.0	119.0	9.14	10.70	43.85	51.78
S. Em±	3.2	0.6	17.1	4.4	0.22	0.47	0.71	0.60
C. D. (P=0.05)	10.5	2.2	56.6	14.4	NS	1.86	2.76	2.36
B. Fertility levels								
Control	174.8	22.3	355.4	79.3	9.54	7.85	45.92	38.09
50% RDF	218.7	24.3	451.2	111.0	8.84	9.86	41.90	46.93
100% RDF	238.2	26.8	493.7	128.2	9.10	11.81	42.12	54.57
150% RDF	253.2	29.2	552.1	151.0	9.19	14.06	42.94	66.10
S. Em±	1.5	0.1	5.2	1.6	0.14	0.29	0.61	1.21
C. D. (P=0.05)	4.5	0.3	15.1	4.6	0.44	0.88	1.83	3.66

NS-Not Significant.

TABLE 2
Interaction effect of genotypes and fertility levels on green and dry matter yield of single cut forage sorghum

Treatment	Green fodder yield (q/ha)					Dry matter yield (q/ha)				
	Control	50% RDF	100% RDF	150% RDF	Mean	Control	50% RDF	100% RDF	150% RDF	Mean
V ₁ -SPV 1846	317.3	431.5	469.6	533.1	437.9	66.6	104.7	114.2	139.6	106.3
V ₂ -SPV 1847	276.0	333.2	368.1	402.9	345.1	60.2	76.1	95.2	107.8	84.8
V ₃ -PC 1003	425.2	507.7	545.8	596.5	514.0	98.3	130.1	145.9	171.3	136.4
V ₄ -CSV 21F	428.4	507.7	555.3	602.9	523.6	98.3	133.2	155.4	174.5	140.3
V ₅ -HC 308	349.0	476.0	529.9	625.1	495.0	72.9	110.0	130.0	161.8	119.0
Mean	355.4	451.2	493.7	552.1		79.3	111.0	128.2	151.0	
C. D.	Factor B at same level of A =37.1					Factor B at same level of A =11.3				
C. D.	Factor A at same level of B =63.7					Factor A at same level of B =17.0				

by genotypes and maximum crude protein yield (12.80 q/ha) was recorded in genotype CSV 21F, which was significantly higher than other genotypes except PC 1003. The maximum IVDMD per cent (46.55%) was recorded in genotype SPV 1846, whereas the maximum DDM (61.19 q/ha) was recorded in genotype CSV 21F. The differences in crude protein yield and DDM among the genotypes were largely due to the variations in dry matter production.

Plant height, tillers per meter row length, green fodder yield, dry matter yield, crude protein yield and DDM yield of sorghum increased with successive increase in fertility levels in both the cuts. The maximum plant height, number of tillers, green fodder and dry matter yield were recorded at 150 per cent of recommended dose of fertilizer (RDF), which were significantly higher than lower doses of fertilizer. An increase of 55.35, 22.36 and 11.82 per cent in green fodder yield and 90.42, 36.04 and 17.78 per cent in dry matter yield was recorded with the application of 150 per cent RDF over control, 50 per cent RDF and 100 per cent RDF, respectively. This assumption is well justified that higher nutrient status of plants under fertilizer application is due to their greater availability in soil environment as well as their better extraction by roots and therefore, translocation within plant system.

Superiority of fertility levels appears to have resulted on account of improved crop growth and better productivity favoured by improved nitrogen and phosphorus nutrition. Bhatt *et al.* (2012) also reported that application of 150 per cent RDF produced significantly higher plant height and fodder yield of sorghum as compared to lower levels of fertilizer.

The highest crude protein yield and digestible dry matter (DDM) were also recorded with 150 per cent RDF which was significantly higher than lower fertility levels. Higher crude protein yield and DDM at 150 per cent RDF might be due to its higher dry matter yield. Similar results were also obtained by Pankhaniya *et al.* (1997).

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