

RESPONSE OF MULTICUT 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 three multicut genotypes of sorghum (SPH 1626, SPH 1627 and CSH 20MF) were grown with four fertility levels viz., control, 50 per cent recommended dose of fertilizer (RDF), 100 per cent RDF (100 kg N+30 kg P₂O₅/ha) and 150 per cent RDF. The plant height, green fodder and dry matter yield of multicut sorghum genotypes were significantly influenced by different fertility levels. The green fodder and dry matter yield of CSH 20 MF were significantly higher over SPH 1626 and SPH 1627 on the basis of total of two 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 was significantly higher than lower doses of fertilizer during both the cuts. 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 : Sorghum, Genotypes, Fertility levels, Quality

Among the annual cereal fodder crops, sorghum can be grown throughout the year with high fodder production. It is fast growing, palatable and nutritious in nature, thus utilized as silage and hay besides fresh fodder. Genetic factor plays vital role in increasing the fodder production and multicut ability reduces the cost of establishing new crops. The new multicut genotypes of sorghum are heavy feeder of nutrients and remove large amount of nutrients from the soil. These genotypes are responding well to the high doses of fertilizer. Hence, identification of suitable genotypes for high fodder production at different levels of fertility can be worked out. Keeping this in view, the present investigation was carried out to find out suitable multicut variety of sorghum for high fodder production and its nutrient requirement.

MATERIALS AND METHODS

A field experiment was conducted during **kharif** season of 2009 at main Forage Research Area, CCSHAU, Hisar. The soil of experimental field was low in organic matter and available nitrogen and medium in available phosphorus and available potassium. The experiment was

laid out in factorial randomized block design with three replications. Three multicut genotypes of sorghum (SPH 1626, SPH 1627 and CSH 20MF) were grown with four fertility levels viz., control, 50 per cent recommended dose of fertilizer (RDF), 100 per cent RDF (100 kg N+30 kg P₂O₅/ha) and 150 per cent RDF. The full dose of phosphorus and half dose of nitrogen was given at the time of sowing, second half dose of nitrogen was top dressed at crop knee height stage. The crop was sown on May 21, 2009 and all agronomic practices were given uniformly to all the treatments. The crop was harvested at 50 per cent flowering stage. Plant samples were collected at harvest and analyzed for quality parameters by standard procedures.

RESULTS AND DISCUSSION

The plant height, green fodder and dry matter yield of multicut sorghum were significantly influenced by the genotypes (Table 1). The data on various parameters studied indicated that CSH 20MF produced significantly higher plant height (212.8 cm), green fodder yield (961.3 q/ha) and dry matter yield (239.2 q/ha) than SPH 1626 and SPH 1627. This may be due to the genetic

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TABLE 1
Effect of forage sorghum genotypes on plant height, number of tillers, green and dry matter yield under different fertility levels (multicut)

Treatment	Plant height (cm)		No. of tillers/m row length		Green fodder yield (q/ha)			Dry matter yield (q/ha)		
	I cut	II cut	I cut	II cut	I cut	II cut	Total	I cut	II cut	Total
A. Genotypes										
V ₁ -SPH-1626	190.0	189.0	28.0	18.3	559.2	320.6	879.8	134.4	79.5	213.9
V ₂ -SPH-1627	181.0	208.0	27.9	19.4	542.0	343.4	885.4	124.5	84.4	209.0
V ₃ -CSH-20 MF	212.8	195.8	33.0	19.0	625.9	335.4	961.3	157.2	82.0	239.2
S. Em±	1.3	4.4	1.4	0.6	10.3	9.7	15.1	3.4	2.9	5.7
C. D. (P=0.05)	5.3	NS	NS	NS	40.1	NS	57.8	13.2	NS	22.3
B. Fertility levels										
Control	170.2	170.1	23.1	15.7	448.8	237.6	686.5	97.0	53.4	150.4
50% RDF	185.8	191.4	28.4	18.1	581.3	319.8	901.1	132.3	74.0	206.3
100% RDF	203.2	207.6	31.6	20.2	625.6	365.8	992.4	151.2	92.0	243.3
150% RDF	220.4	221.4	36.0	21.6	675.8	409.4	1085.3	174.3	108.5	282.8
S. Em±	0.53	1.4	0.4	0.16	5.7	4.5	8.4	2.0	0.9	2.1
C. D. (P=0.05)	1.60	4.3	1.2	0.49	17.1	13.4	25.0	6.1	2.9	6.3

NS–Non-significant.

make-up, which might contribute for more plant height and result in higher yield.

The maximum plant height of 212.8 cm (I cut) was recorded in CSH 20 MF which was significantly higher than SPH 1626 and SPH 1627 at the time of first cut but the differences were non significant during second cut. The number of tillers per metre row length was not influenced significantly among different genotypes of multicut sorghum. The green fodder and dry matter yields of CSH 20MF were significantly higher over SPH 1626 and SPH 1627 on the basis of total of two cuts. However, the differences between SPH 1626 and SPH 1627 were non-significant. In first cut, green and dry matter yields were influenced significantly by genotypes and higher yield was recorded during first cut as compared to second cut. CSH 20MF produced 6.57 and 8.57 per cent higher green fodder yield and 11.83 and 14.45 per cent higher dry matter yield over SPH 1626 and SPH 1627, respectively. The increased herbage yield of CSH 20MF could mainly be attributed to comparatively higher plant height of genotype. Several workers have also noticed the variation among the genotypes of sorghum for forage yield and growth characteristics (Ammaji and Suryanarayana, 2003; Shiva Dhar *et al.*, 2003; Bhatt *et al.*, 2012). The crude protein per cent, crude protein yield, IVDMD and DDM remained

unaffected among various genotypes.

Plant height, tillers per metre 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 (Table 2). 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 during both the cuts. An increase of 58.1, 20.4 and 9.4 per cent in green fodder yield and 88.0, 37.1 and 16.2 per cent in dry matter yield was recorded with the application of 150 per cent RDF over control, 50 and 100 per cent RDF, respectively. The higher levels of fertility increased the availability and absorption of nutrient to plants, which resulted in more vegetative growth due to increase in plant height and number of tillers on the account of enlargement of cells and enhanced photosynthesis (Sheoran *et al.*, 2008; Bhatt *et al.*, 2012) also reported that application of 150 per cent RDF produced significantly maximum 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 were significantly higher than lower fertility levels. Though the crude protein and IVDMD

TABLE 2
Effect of forage sorghum genotypes on quality of fodder under different fertility levels (multicut)

Treatment	Crude protein content (%)			Crude protein yield (q/ha)			IVDMD (%)			DDM (q/ha)		
	I cut	II cut	Average	I cut	II cut	Average	I cut	II cut	Average	I cut	II cut	Average
A. Genotypes												
V ₁ -SPH-1626	8.31	8.38	8.35	11.25	7.06	18.31	37.30	29.50	33.40	50.58	24.92	75.50
V ₂ -SPH-1627	8.48	8.59	8.53	10.45	7.10	17.56	37.45	30.25	33.85	46.59	25.08	71.67
V ₃ -GSH-20 MF	8.43	7.66	8.04	13.49	6.37	19.87	38.70	30.65	34.68	61.85	26.00	87.85
S.Em±	0.05	0.12	-	0.39	0.13	-	1.44	0.52	-	2.58	1.34	-
C. D. (P=0.05)	NS	NS	-	NS	NS	-	NS	NS	-	NS	NS	-
B. Fertility levels												
Control	8.31	8.34	8.32	8.19	4.52	12.71	37.27	28.87	33.07	36.76	15.73	52.49
50% RDF	8.61	7.95	8.28	11.46	5.97	17.43	37.93	29.93	33.93	50.71	22.51	73.22
100% RDF	8.39	8.61	8.50	12.92	8.08	21.00	38.33	31.80	35.07	59.20	29.82	89.02
150% RDF	8.31	7.95	8.13	14.37	8.81	23.18	37.73	29.93	33.83	63.35	33.27	98.62
S.Em±	0.05	0.27	-	0.45	0.17	-	1.17	0.83	-	2.06	0.94	-
C. D. (P=0.05)	NS	NS	-	1.44	0.56	-	NS	NS	-	6.62	2.99	-

NS-Non-significant.

per cent remained unaffected due to 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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