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EFFECT OF FERTILITY LEVELS ON GROWTH, YIELD AND QUALITY OF MULTICUT FORAGE SORGHUM [*SORGHUM BICOLOR* (L.) MOENCH] GENOTYPES

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SUMMARY

A field experiment was conducted at main Forage Research Area, CCSHAU, Hisar with three multicut genotypes of sorghum (SPH 1622, CSH 20MF and CSH 24MF) grown with four fertility levels viz., control, 50 per cent recommended dose of fertilizer (RDF), 100 per cent RDF (100 kg N+30 kg P_2O_5/ha) and 150 per cent RDF. The plant height, green fodder and dry matter yield of multicut sorghum genotypes were significantly influenced by different genotypes and fertility levels. The green fodder and dry matter yield of CSH 20MF were superior over SPH 1622 and CSH 24MF 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 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 at 150 per cent RDF.

Key words : Multicut sorghum**,** fertility levels, green fodder and dry matter yield

In India, there is a short supply of about 38 per cent green fodder. Sorghum is the important forage crop grown for green as well as dry forage production over wide areas, particularly during the **kharif** season. As forage, it is fast growing, palatable, nutritious and mainly utilized as green forage crop. The available varieties were of single cut type and were not suitable for their distribution of fodder for longer period of the year. Considering this, multicut genotypes were developed for continuous supply of green fodder for a longer period. These multicut varieties have high nutritive value than single cut under same set of management (Malik *et al*., 1992). Being an exhaustive crop, yield and quality of sorghum fodder suffers heavily if proper amount of fertilizer is not applied. Therefore, these new multicut genotypes were grown under different fertility conditions to get information on their forage production potential and nutritive value under different fertility levels.

MATERIALS AND METHODS

A field experiment was conducted during **kharif** season of 2010 at main Forage Research Area, CCS HAU, 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 split plot design with three replications. Three multicut genotypes of sorghum (SPH 1622, CSH 20MF and CSH 24MF) 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 P_2O_5/ha) and 150 per cent RDF. The full dose of phosphorus and half dose of nitrogen were given at the time of sowing, remaining half dose of nitrogen was top dressed at crop knee height stage. The crop was grown 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.

RESULTS AND DISCUSSION

Data presented in Table 1 reveal that plant height, number of tillers per meter row length, green fodder yield and dry matter yield of multicut sorghum were significantly

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TABLE 1
Effect of different forage sorghum (multicut) genotypes and fertility levels on fodder yield and its parameters

Treatment	Plant height (cm)		No. of tillers/meter 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 1622	179.1	213.0	27.5	16.0	448.3	270.7	719.0	102.3	82.0	184.3
V_2–CSH 20MF	201.4	176.5	30.5	11.7	511.2	244.8	756.0	127.6	69.0	196.6
V_3–CSH 24MF	185.7	190.1	28.8	14.0	487.5	252.8	740.3	112.2	77.7	189.9
S. Em±	2.9	2.8	0.3	0.4	5.6	4.7	7.9	1.3	1.4	2.1
C. D. (P=0.05)	11.6	11.0	1.2	1.7	22.1	18.6	NS	5.4	6.0	8.4
B. Fertility levels										
Control	160.4	166.6	24.6	12.3	388.0	183.3	571.3	83.0	55.9	138.9
50% RDF	181.4	186.7	27.7	13.1	444.0	236.8	680.8	100.3	68.2	168.5
100% RDF	200.7	204.7	30.5	14.3	511.4	283.6	795.0	122.5	83.8	206.3
150% RDF	212.4	215.7	32.7	15.8	585.4	320.6	905.0	150.4	97.0	247.4
S. Em±	2.5	1.8	0.2	0.2	4.4	3.6	5.5	1.95	1.2	2.2
C. D. (P=0.05)	7.6	5.4	0.6	0.6	12.0	10.8	16.6	5.41	3.6	6.5

NS–Not Significant.

influenced by genotypes. The maximum plant height and number of tillers per meter row length were obtained by CSH 20MF in first cut and by SPH 1622 in second cut. This shows that genotype SPH 1622 has higher regeneration ability as compared to CSH 20MF and CSH 24MF. The variation in plant height and number of tillers of the genotypes might be related to inherent difference and their high vigour. The differential behaviour of these genotypes could also be explained solely by the variation in their genetic constituent (Meena *et al.*, 2012).

The higher green fodder yield (511.2 q/ha) and dry matter yield (127.6 q/ha) registered by genotype CSH 20MF during first cut and by genotype SPH 1622 (270.7 and 82.0 q/ha green fodder and dry matter yield, respectively) in second cut. The green fodder yield and dry matter yield is a resultant of plant height and numbers of tillers. The maximum total green fodder and dry matter yield was recorded in genotype CSH 20MF. CSH 20 MF produced 5.15 and 2.12 per cent higher green fodder and 6.67 and 3.53 per cent dry matter yield over SPH 1662 and CSH 24MF, respectively. The increased herbage yield of CSH 20MF could mainly be attributed to comparatively higher plant height of genotypes. Several workers have also noticed the variation among the genotypes of sorghum for forage yield and growth characteristics (Meena *et al*., 2012; Rana *et al.*, 2012; Bhatt *et al*., 2012).

The crude protein content remained unaffected among various genotypes but the highest crude protein yield (17.48%) and average IVDMD per cent were recorded with genotype CSH 20MF. Whereas the highest DDM (94.63 q/ha) was recorded with genotype CSH 24MF.

Plant height, tillers per meter row length, green fodder yield and dry matter yield of sorghum increased with successive increase in fertility levels in both the cuts (Table 1). 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. An increase of 58.41, 32.93 and 13.83 per cent in green fodder yield and 78.11, 46.82 and 19.92 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. It may be due to the fact that nitrogen and phosphorus application enhanced the growth parameter like plant height, number of tillers, which ultimately reflected in increased total green fodder and dry matter yield. Rana *et al*. (2012) also reported that application of 150 per cent RDF produced significantly higher plant height, number of tillers, green fodder yield and dry matter yield of sorghum over lower levels of fertilizer.

The crude protein content was not influenced significantly by different fertility dose, whereas maximum crude protein yield (20.61 q/ha) was obtained at 150 per cent RDF which was significantly superior over lower

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 1622	7.93	7.17	7.55	8.01	7.06	15.07	52.78	41.85	47.31	50.58	34.40	84.97
V_2–CSH 20MF	7.99	6.95	7.47	10.38	7.10	17.48	55.30	42.05	48.61	46.59	28.68	75.26
V_3–CSH 24 MF	7.82	7.17	7.49	8.86	6.37	15.23	54.45	41.25	47.85	61.85	32.77	94.63
S. Em±	0.16	0.24	-	0.22	0.19		0.40	0.44	-	0.89	0.67	
C. D. (P=0.05)	NS	NS	-	0.68	NS	-	1.25	NS	-	2.78	NS	-
B. Fertility levels												
Control	7.95	7.22	7.59	6.66	4.52	11.18	50.37	43.27	46.82	36.76	24.53	61.30
50% RDF	8.10	6.93	7.51	8.19	5.97	14.16	52.67	40.87	46.77	50.71	27.70	78.42
100% RDF	7.80	7.00	7.40	9.69	8.08	17.77	57.67	40.93	49.30	59.20	34.84	94.04
150% RDF	7.80	7.22	7.51	11.80	8.81	20.61	56.00	41.80	48.90	65.35	40.71	106.06
S. Em±	0.18	0.28	-	0.25	0.22		0.46	0.51	-	1.03	0.77	
C. D. (P=0.05)	NS	NS	-	0.78	0.68	-	1.44	NS	-	3.22	2.41	-

NS–Not Significant.

levels of fertility in both the cuts. The highest IVDMD per cent was recorded at 100 per cent RDF, whereas the maximum DDM was obtained at application of 150 per cent RDF. Higher crude protein yield and DDM at 150 per cent RDF might be due to higher dry matter yield at 150 per cent RDF (Table 2).

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