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RESPONSE OF FORAGE SWEET SORGHUM GENOTYPES UNDER DIFFERENT NITROGEN LEVELS

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SUMMARY

A field experiment was conducted at main Forage Research Area, CCSHAU, Hisar during **kharif** 2011 with four single cut sweet sorghum genotypes (SSV 84, SSV 75, CSV 19 SS and HC 308) and two nitrogen levels (80 and 120 kg N/ha). The plant height, number of tillers per metre row length, green fodder and dry matter yield of sweet sorghum genotypes were significantly influenced by different fertility levels. The highest green fodder yield (428.8 q/ha) and dry matter yield (111.8 q/ha) were recorded in genotype CSV 19 SS followed by genotype HC 308. The maximum plant height, number of tillers, green fodder and dry matter yield were recorded at 120 kg N/ha, which were significantly higher than lower dose i. e. 80 kg N/ha.

Key words : Sweet sorghum, fodder yield, crude protein, digestible dry matter

In Indian agriculture, livestock plays a pivotal role in the development and progress of mankind with crop production programme as a complementary enterprise. India supports nearly 20 per cent of the world's livestock and 16.8 per cent human population with only 2.3 per cent of the world's geographical area. It is the leader in cattle and buffalo population and has the world's second largest goat and fourth largest sheep population. In India, there is a short supply of about 38 per cent green fodder, especially during summer season. Sorghum is an important crop widely grown for grain and forage. It is fast growing, palatable, nutritious and utilized as silage and hay besides fresh feeding. The total area under cultivated fodders is 8.3 million ha on individual crop basis. Among the rainy season (**kharif** crops), sorghum occupies 54 per cent of the total area under fodder cultivation. The area under sorghum is 26 lac ha and the productivity of green forage is 35-70 t/ha (Mal *et al.,* 2006). There is a great need to maintain regular well-balanced supply of more nutritious feed and fodder for stall feeding animals, productive milch herds can be maintained, which would accelerate the growth of milk production in the state. Amongst growth factors, adequate inorganic fertilizers specially, nitrogenous and phosphates are considered to be of prime importance due to their profound impact on various aspects of growth and development of the crop. Balanced use of fertilizer has played a key role in the modernization of Indian agriculture and in making the country sufficient in fodder production for animals. Information on the performance of newly evolved genotypes to fertility levels is scanty. Keeping this in view, the present investigation was conducted.

MATERIALS AND METHODS

The field experiment was conducted at Main Forage Research Area, CCSHAU, Hisar during **kharif** 2011. The experiment was laid out in factorial randomized block design with three replications. Treatments comprised of four single cut sweet sorghum genotypes (SSV-84, SSV-75, CSV-19 SS and HC-308) and two nitrogen levels i. e. 80 and 120 kg N/ha. The soil of experimental site was sandy 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 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

Yield and Contributing Traits

Data in Table 1 reveal that the green fodder yield (428.8 q/ha) and dry matter yield (111.8 q/ha) of the genotype CSV 19 SS was highest which was at par with HC 308. The lowest GFY (290.5 q/ha) and DMY (77.0 q/ha) was obtained in case of variety SSV 84. The plant height of sorghum variety HC 308 was significantly higher to SSV 84 and SSV 75. Tillers at harvest were maximum in SSV 19 SS which were at par with HC 308. The leaf : stem ratio was highest in CSV 19 SS and HC 308 and it was significantly superior over rest of the varieties. Plant height, tillers, leaf : stem ratio, green fodder yield and dry matter yield increased significantly with application of 120 kg N/ha over 80 kg N/ha. 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 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).

Quality Parameters

Crude protein content ranged from 7.55 to 8.97 per cent, it was highest in SSV 75 (8.97%) followed by CSV 19 SS (8.53%) and SSV 84 as well as HC 308 (7.55%). Crude protein yield (CPY) varied from 5.81 to 9.54 q/ha. Maximum CPY was observed in CSV 19 SS (9.54 q/ha) followed by HC 308 (8.40 q/ha) and SSV 75 (7.69 q/ha). IVDMD ranged from 45.3 to 53.9 per cent, it was highest in SSV 84 (53.9%) followed by CSV 19 SS (52.9%) and SSV 75 (52.7%). DDM varied from 41.5 to 59.14 q/ha. Genotypes CSV 19 SS, HC 308 and

TABLE 1
Evaluation of sweet sorghum genotypes for single cut fodder at different nitrogen levels

Treatment	Plant height (cm) at harvest	Tillers/m^2 at harvest	Leaf : stem ratio	Green fodder yield (q/ha)	Dry matter yield (q/ha)
Entries					
V_1–SSV 84	287.7	72.8	0.30	290.5	77.0
V_2–SSV 75	302.5	70.7	0.30	344.2	85.7
V_3–CSV 19 SS	331.5	90.3	0.33	428.8	111.8
V_4–HC 308	340.0	88.0	0.33	422.3	111.3
S. Em±	4.54	1.63	0.004	9.60	1.54
C. D. (P=0.05)	13.90	5.01	0.013	29.40	4.73
Nitrogen levels (kg/ha)					
N_1–80	308.5	78.0	0.31	352.3	88.8
N_2–120	322.3	82.9	0.32	390.7	104.1
S. Em±	3.21	1.16	0.003	6.79	1.09
C. D. (P=0.05)	9.83	3.54	0.009	20.79	3.34

TABLE 2
Effect of different levels of nitrogen on quality parameters in different genotypes of sorghum during **kharif** 2011

Treatment	CP (%)	Rank	CP yield (q/ha)	Rank	IVDMD (%)	Rank	DDM (q/ha)	Rank
Entries								
V_1–SSV 84	7.55	3	5.81	4	53.9	1	41.50	4
V_2–SSV 75	8.97	1	7.69	3	52.7	3	45.16	3
V_3–CSV 19 SS	8.53	2	9.54	1	52.9	2	59.14	1
V_4–HC 308	7.55	3	8.4	2	45.3	4	50.42	2
Nitrogen levels (kg/ha)								
N_1–80	7.93	2	7.04	2	50.7	2	45.02	2
N_2–120	8.37	1	8.71	1	51.7	1	53.82	1

SSV 75 ranked first, second and third for DDM and exhibited 59.14, 50.42 and 45.16 q/ha DDM, respectively. Increasing levels of nitrogen from 80 and 120 kg/ha resulted in increase in crude protein from 7.93 to 8.37 per cent and CPY from 7.04 to 8.71 q/ha, IVDMD from 50.7 to 51.7 per cent and DDM from 45.02 to 53.82 q/ha, respectively (Table 2). Similar results were also reported by Rana *et al.* (2013). The highest crude protein yield and digestible dry matter yield (DDM) were recorded under CSV 19 SS genotype. Similarly, significantly higher crude protein and DDM were recorded with 120 kg N/ha. Higher crude protein yield and DDM at 120 kg N/ha might be due to its higher dry matter yield. Similar results were also reported by Pankhaniya *et al.* (1997).

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