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SHORT COMMUNICATION

PERFORMANCE OF MULTI-CUT FORAGE SORGHUM GENOTYPES TO FERTILITY LEVELS

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SUMMARY

A field experiment was conducted during *zaid* season of 2013 at Udaipur, Rajasthan on clay loam soil to assess the effect of fertility levels on muti-cut genotypes of forage sorghum. Among multi-cut forage genotypes, SPH 1697 proved most efficient as it gave significantly higher green (72.54 t/ha), dry (21.02 t/ha) fodder yield on the basis of total of three cuts, net monetary returns of Rs. 58832/ha and B : C ratio of 3.11 with lesser HCN content. The crop fertilized with 100 per cent RDF recorded significantly higher green and dry fodder yield on the basis of total of three cuts over control, application of 50 and 75 per cent RDF. The magnitudes of increases were 67.1, 39.9 and 12.5 per cent in green fodder, and 64.6, 32.5 and 9.3 per cent in dry fodder yield, respectively. Application of 100 per cent RDF also fetched highest net returns (Rs. 59445/ ha) and B : C ratio (2.93) as compared to lower fertility levels.

Key words : Multi-cut sorghum genotypes, fertility levels, fodder yield, net returns

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 and warm weather annual which provides palatable, nutritious fodder during lean period and utilizes as silage and hay besides fresh fodder. Genetic factor plays vital role in increasing the fodder production and multi-cut ability reduces the cost of establishing new crops. During last few years, a number of high yielding multi-cut forage sorghum genotypes have been developed. The new multi-cut genotypes are heavy feeder of nutrients and remove large amount of nutrients from the soil (Sumeriya and Singh, 2014). These genotypes are responding well to high dose 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 multi-cut genotype of sorghum for higher fodder production and its nutrient requirement and to assess economic viability.

A field experiment was conducted during *zaid* season of 2013 at Instructional Farm, Rajasthan College of Agriculture, Udaipur (Rajasthan) situated at 24º34' N latitude, 73º42' E longitude and altitude of 579.5 m above mean sea level. The soil of the experimental field was clay loam in texture, slightly alkaline in reaction (pH 8.0), medium in available nitrogen (295.3 kg/ha) and phosphorus (16.6 kg/ha), while high in available potassium (270.7 kg/ha). The experiment consisted of 20 treatment combinations comprising five multi-cut forage sorghum genotypes (SPH 1697, SPH 1698, CSH 20MF, CSH 24MF and SSG 59-3) and four fertility levels viz., control, 50 per cent recommended dose of fertilizer (RDF), 75 per cent RDF and 100 per cent RDF (80 kg N+40 kg P_2O_5+40 kg K_2O/ha). These treatments were tested in factorial randomized block design with three replications. As per treatment, full dose of phosphorus and potassium and one-third dose of nitrogen was applied at the time of sowing. Remaining nitrogen dose was splitted into two equal parts, first half was applied at knee high stage, while second half at 30 days after first cutting. The sorghum genotypes as per treatment were sown on 25 April 2013 in opened furrows at 30 cm apart using seed rate of 40 kg/ha. A plant to plant distance of 10 cm was maintained by thinning and gap filling operation at 15 DAS. The crop was irrigated at 10-15 days interval as per need during summer. Other agronomic and plant protection measures were adopted as and when crop needed. The 1st, 2nd and 3rd cuttings

for green fodder were taken at 55 days after sowing, 40 days after 1st and 2nd cuttings, respectively. Plant samples collected at harvest were analyzed for HCN content by standard procedure.

Effect of Genotypes

Data presented in Table 1 reveal that green and dry fodder yield of multi-cut sorghum genotypes was significantly influenced by genotypes. The highest green and dry fodder yield at the time of first cutting was recorded in genotype SPH 1697 which was at par with genotype CSH 20MF; however, both these genotypes significantly enhanced green and dry fodder yield over genotypes SPH 1698, CSH 24MF and SSG-59-3. While at 2nd and 3rd cuttings, SPH 1697 recorded higher green and dry fodder yield which was significantly higher than rest of the genotypes under test. Further genotype SPH 1697 produced highest total green (72.54 t/ha) and dry (21.02 t/ha) fodder yield registering significant increases of 5.3, 17.9, 29.3 and 77.8 per cent in total green fodder yield and 4.0, 16.0, 27.4 and 72.7 per cent in total dry fodder yield as compared to genotypes CSH 20 MF, SPH 1698, CSH 24 MF and SSG 59-3, respectively. The highest fodder yield of genotype SPH 1697 could mainly be attributed to comparatively higher plant height and stem girth of genotype. Several workers have also noticed the variation among the genotypes of sorghum for fodder yield and growth (Rana *et al*., 2012 and Meena *et al*., 2012). Genotype SPH 1697 recorded significantly lesser HCN content during 1st (69.9 ppm) and 2nd (71.6 ppm) cuts over rest of the genotypes tested. Further genotype SPH 1697 fetched higher net returns (Rs. 58832/ha) and B : C ratio (3.11) registering significant increase of net returns by Rs. 3974, 11849, 17876 and 34720/ha and additional rupee increment by Rs. 0.22, 0.64, 0.97 and 1.86 over genotypes CSH 20 MF, SPH 1698, CSH 24MF and SSG 59-3, respectively.

Effect of Fertility Levels

Data (Table 1) further reflect that fertility levels had significant effect on green and dry fodder yield during 1st, 2nd and 3rd cuttings. The crop fertilized with 100 per cent RDF produced higher green and dry fodder yield which was significantly higher than lower dose of fertilizer and control during 1st, 2nd and 3rd cuttings. A significant increase of 67.1, 39.9 and 12.5 per cent in total green fodder and 64.6, 32.5 and 9.3 per cent in total dry fodder yield was recorded with the application of 100 per cent RDF over control, 50 and 75 per cent RDF, respectively. The significant increase in fodder yield with increase in fertility levels was due to fact that all these nutrients were involved in increasing protoplasmic constituents, root, shoot growth and accelerating the process of cell division, enlargement

TABLE 1
Effect of multi-cut forage sorghum genotypes and fertility levels on green and dry fodder yield, HCN content and economics

Treatment	Green fodder yield (t/ha)				Dry fodder yield (t/ha)				HCN content (ppm)		Net returns (Rs./ha)	B : C ratio
	1st cut	2nd cut	3rd cut	Total	1st cut	2nd cut	3rd cut	Total	1st cut	2nd cut		
Genotypes												
SPH 1697	45.56	25.00	1.98	72.54	13.19	7.24	0.59	21.02	69.9	71.6	58832	3.11
SPH 1698	37.07	22.73	1.74	61.53	10.91	6.68	0.53	18.12	73.3	74.8	46983	2.47
CSH 20 MF	44.36	22.59	1.95	68.90	13.00	6.63	0.59	20.22	75.3	76.7	54858	2.89
CSH 24 MF	31.31	23.00	1.81	56.12	9.18	6.77	0.55	16.50	76.7	78.0	40956	2.14
SSG 59-3 (C)	21.21	17.79	1.80	40.80	6.33	5.30	0.55	12.17	74.5	76.0	24112	1.25
S. Em±	0.48	0.59	0.03	0.79	0.26	0.15	0.01	0.24	1.22	1.16	881	0.05
C. D. (P=0.05)	1.37	1.68	0.09	2.28	0.73	0.42	0.03	0.70	3.51	3.31	2521	0.13
Fertility levels												
Control	26.85	16.71	1.29	44.85	7.79	4.89	0.41	13.09	67.2	69.0	31075	1.85
50% RDF	31.27	20.58	1.70	53.55	9.67	6.07	0.52	16.26	74.2	75.7	38465	2.07
75% RDF	39.93	24.66	2.00	66.59	11.82	7.28	0.61	19.71	76.4	77.8	51609	2.65
100% RDF	45.57	26.93	2.43	74.93	12.80	7.86	0.70	21.55	78.0	79.2	59445	2.93
S. Em±	0.43	0.53	0.03	0.71	0.23	0.13	0.01	0.22	1.09	1.03	788	0.04
C.D. (P=0.05)	1.22	1.50	0.08	2.02	0.65	0.37	0.03	0.62	3.12	2.95	2242	0.12

and elongation which in turn showed luxuriant vegetative growth and resulted in higher green and dry fodder yield. Similar results were also obtained by Duhan (2013) and Sumeriya and Singh (2014). Application of 100 per cent RDF recorded highest HCN content during 1st (78.0 ppm) and 2nd (79.2 ppm) cuts which was significantly higher over 50 per cent RDF and control but at par with 75 per cent RDF. Thus, when compared to control, 50 and 75 per cent RDF, the crop under the influence of 100 per cent RDF fetched highest net returns of Rs. 59445/ha and B : C ratio of 2.93 registering significant increase of Rs. 28310, 20980 and 7838/ha in net returns and 1.08, 0.86 and 0.28 in B : C ratio, respectively.

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