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INFLUENCE OF GENOTYPES AND NITROGEN LEVELS ON YIELD AND QUALITY OF FODDER JOWAR (*Sorghum bicolor* L.)

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ABSTRACT

A field experiment was carried out during *kharif*, 2019 on sandy loam soils of wetland farm of S.V. Agricultural College, Tirupati, Acharya N.G. Ranga Agricultural University. The experiment was laid out in randomized block design with factorial concept and replicated thrice. The treatments consisted of four fodder jowar genotypes *viz.,* CSV 32F, CSV 33MF, Pant chari 6 and SSG-59-3 and three nitrogen levels *viz.,* 60, 80 and 100 kg N ha^{-1}. Among the four genotypes evaluated, Pant chari 6 recorded higher green fodder and dry fodder yield, higher crude protein content, crude protein yield, crude fibre yield, total ash content and ash yield. Whereas the genotype SSG-59-3 recorded the higher crude fibre content, while lower crude fibre content was recorded with the genotype Pant chari 6. Application of 100 kg N ha^{-1} recorded higher green fodder and dry fodder yield, higher crude protein content, crude protein yield, crude fibre yield, total ash content and ash yield, whereas all these were the lowest with application of 60 kg N ha^{-1}. Application of 60 kg N ha^{-1} recorded the higher crude fiber content.

KEYWORDS: Crude protein, crude fibre, genotypes, nitrogen levels and total ash

INTRODUCTION

Jowar is an important crop grown for food and fodder for human and livestock population, respectively. It is an important component of agricultural and animal husbandry dominated rural economy of dryland areas of India. It is a fast growing short duration crop which has high biomass production potential. It is grown in arid and semi-arid regions where moisture is the limiting factor for crop growth. It is an ideal crop with high tillering ability, high dry matter production, high protein content (10-12 %) with excellent growth habit coupled with high palatability and better nutritive value. The green fodder of jowar is leafy, palatable and very nutritious feedstock for cattle ensuring good milk yield. Now-a-days, many new improved cultivars of fodder jowar are coming up. Therefore, it is necessary to study the response of these cultivars to fertilizers especially for nitrogen to harvest potential yield. Nitrogen is one of the basic plant nutrients essential for profuse growth. It increases vegetative growth of plant and herbage quality which is highly desirable for the forage yield and dry matter accumulation. Keeping these points in view, the present study was proposed to find out a suitable fodder jowar genotype and optimum nitrogen level for higher green fodder yield and quality.

MATERIAL AND METHODS

A field experiment was carried out during *kharif*, 2019 on sandy loam soils of wetland farm of S.V. Agricultural College, Tirupati, Acharya N.G. Ranga Agricultural University. The experiment was laid out in a randomized block design with factorial concept and replicated thrice. The treatments consisted of four fodder jowar genotypes *viz.,* CSV 32F, CSV 33MF, Pant chari 6 and SSG-59-3 and three nitrogen levels *viz.,* 60, 80 and 100 kg N ha^{-1}. Crop was harvested for green fodder purpose at 50% flowering in all the genotypes. The analysis of proximate principles in forage was done by the method recommended by Association of Official Analytical Chemists (A.O.A.C., 1990). Data pertaining yield and quality parameters was recorded at harvest was statistically analyzed following the analysis of variance for randomized block design with factorial concept as suggested by Panse and Sukhatme (1985).

RESULTS AND DISCUSSION

Different fodder jowar genotypes and nitrogen levels significantly influenced the yield and quality parameters. However, interaction effects between genotypes and nitrogen levels were not significant. Pant chari 6 genotype recorded higher green and dry fodder yield, while the lower green and dry fodder yield (Table 1) was obtained with SSG-59-3. This might be due to the superiority of

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the genotype to produce more values of growth characteristics like plant height, leaf area index, leaf to stem ratio and number of tillers plant^{-1}. Similar results were also reported by Kumar and Chaplot (2015) and Singh *et al*. (2017). There was an increase in green fodder and dry fodder yield with increasing nitrogen levels from 60 to 100 kg N ha^{-1} (Table 1) and the maximum green and dry fodder yield was noticed with the application of 100 kg N ha^{-1} followed by 80 kg N ha^{-1}. The lowest dry fodder yield was recorded with application of 60 kg N ha^{-1}. This might be due to the vegetative growth of the crop which was positively correlated for higher green and dry fodder yields. Similar results were also obtained by Midha *et al.* (2014) and Duhan *et al.* (2016).

Among the genotypes tested, significantly higher crude protein content and crude protein yield (Table 1) were recorded with Pant chari 6 and the lowest values were noticed with SSG-59-3. With regard to the nitrogen levels, the highest crude protein content and crude protein yield were obtained with 100 kg N ha^{-1}. The lower crude protein content and crude protein yield (Table 1) were recorded with 60 kg N ha^{-1}. This might be due to application of nitrogen resulted in increased availability of nitrogen status in the soil, which inturn leads to significant improvement in nitrogen content in fodder and ultimately the crude protein content also increased. Increased crude protein yield may be due to increased crude protein content and fodder yield. These results were in cognizance with the findings of Kumar and Chaplot (2015) and Singh *et al.* (2017).

Maximum crude fibre content was registered with the genotype SSG-59-3, which was significantly superior to the other genotypes tried, and lower crude fibre content was observed with Pant chari 6. Application of 60 kg N ha^{-1} resulted in higher crude fibre content, while the lower crude fibre content was noticed with application of 100 kg N ha^{-1}. This may be due to inherent genetic character of the genotypes and higher nitrogen content which is the major constituent of amino acids and protein and decreased the pectin, cellulose, hemicellulose and proportion of carbohydrates, hence decreased crude fibre content. These results were in agreement with the findings of Singh and Sumeriya (2012) and Singh *et al*. (2017).

The crude fibre yield of fodder jowar was not significantly influenced by genotypes and nitrogen levels. Among the genotypes, maximum crude fibre yield was recorded with genotype Pant chari 6 and it was minimum with genotype SSG-59-3. With regard to the nitrogen levels, the higher crude fibre yield was obtained with 100 kg N ha^{-1} while the lower crude fibre yield was recorded with 60 kg N ha^{-1}.

Among the genotypes, significantly higher ash content and ash yield were observed with genotype Pant chari 6 followed by CSV 33MF. The lower ash content was observed with genotype SSG-59-3. Among the varied nitrogen levels, application of 100 kg N ha^{-1} recorded higher ash content and ash yield and lower with the application of 60 kg N ha^{-1}. The increase in total ash content of fodder jowar with increase in fertilizer nitrogen dose might be attributed to the fact that the availability of the nitrogen along with other essential plant nutrients might have increased and accumulated in fodder jowar which inturn might have increased the total ash content. These findings corroborate with the results of Sher *et al*. (2016) and Gurjar *et al*. (2019).

The present experiment revealed that fodder jowar genotype, Pant chari 6 in combination with application of 100 kg N ha^{-1} is the best option for obtaining higher yield of green and dry fodder as well as quality of fodder jowar during *kharif* on sandy loam soils in Southern Agro-climatic Zone of Andhra Pradesh.

LITERATURE CITED

A.O.A.C. 1990. Association of Official Analytical Chemists: Changes in Official Methods of Analysis, 14th edition. Arlington, U.S.A. 71.

Duhan, B.S., Arya, S., Kumari, P and Devi, S. 2016. Performance of single cut forage sorghum genotypes to different fertility levels. *Forage Research*. 42(3): 184-188.

Gurjar, G.V., Choudhary, R.S., Jat, G and Choudhary, R. 2019. Impact evaluation of genotypes and fertility levels on quality traits, nutrient uptake, yield and economics of single-cut fodder sorghum (*Sorghum bicolor* (L.) Moench). *International Journal of Bio-resource and Stress Management.* 10(6): 587-592.

Kumar, D and Chaplot, P.C. 2015. Effect of fertility levels on quality of multicut forage sorghum genotypes. *Forage Research.* 40(4): 251-253.

Midha, L.K., Arya, S and Joshi, U.N. 2014. Response of forage sweet sorghum genotypes under different nitrogen levels. *Forage Research*. 40(2): 116-118.

Table 1. Effect of different genotypes and nitrogen levels on yield and quality of fodder jowar

Treatments	Green fodder yield (t ha^{-1})	Dry fodder yield (t ha^{-1})	Crude protein content (%)	Crude protein yield (t ha^{-1})	Crude fibre content (%)	Crude fibre yield (t ha^{-1})	Total ash content (%)	Ash yield (t ha^{-1})
Genotypes								
V_1 : CSV 32F	35	12	7.85	0.95	29.04	3.43	8.00	0.96
V_2 : CSV 33MF	37	13	8.44	1.08	27.58	3.49	8.84	1.13
V_3 : Pant chari 6	43	15	9.02	1.33	25.97	3.76	10.29	1.52
V_4 : SSG-59-3	31	11	7.05	0.75	30.90	3.26	7.58	0.81
SEm±	1.3	0.4	0.22	0.04	0.98	0.21	0.37	0.06
CD (P=0.05)	4	1	0.64	0.12	2.86	NS	1.07	0.19
Nitrogen levels (kg ha^{-1})								
N_1 : 60	32	11	7.03	0.77	30.89	3.33	7.80	0.86
N_2 : 80	36	12	8.09	1.00	28.57	3.50	8.78	1.09
N_3 : 100	42	14	9.15	1.31	25.65	3.61	9.46	1.36
SEm±	1.1	0.4	0.19	0.03	0.85	0.18	0.32	0.06
CD (P=0.05)	3	1	0.56	0.10	2.48	NS	0.93	0.16
Genotypes x Nitrogen levels								
SEm±	2.3	0.8	0.38	0.07	1.69	0.36	0.63	0.11
CD (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS

Panse, V.G and Sukhatme, P.V. 1985. *Statistical Methods for Agricultural Workers*. ICAR, New Delhi. 100-174.

Sher, A., Ansar, M., Ijaz, M and Sattar, A. 2016. Proximate analysis of forage sorghum cultivars with different doses of nitrogen and seed rate. *Turkish Journal of Field Crops*. 21(2): 276-285.

Singh, K.P., Chaplot, P.C., Choudhary, G.L., Jani, P.P., Kumar, R and Sumeriya, H.K. 2017. Effect of fertility levels on quality of single cut forage sorghum genotypes. *Forage Research.* 42(4): 279-281.

Singh, P and Sumeriya, H.K. 2012. Effect of nitrogen on yield, economics and quality of fodder sorghum genotypes. *Annals of Plant and Soil Research.* 14(2): 133-135.