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# Performance of Sweet Sorghum Genotypes to Varying Levels of Nitrogen and Phosphorus*

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## ABSTRACT

**A field experiment carried out during *kharif* 1996 to find out good sweet sorghum genotypes for fodder purpose and optimum level of N and P to maximise yield. The treatments consisted of two genotypes (SSV-84 and SSV-12611), three levels of N (75, 100 and 125 kg/ha), two levels of P (50 and 60 kg/ha) and one control DFJ-1, a presently ruling variety. SSV-84 produced significantly higher green fodder (49.26 t/ha) than SSV-12611 (47.32 t/ha) and both were superior over local check DFJ-1. Both the sweet sorghum genotypes responded positively to N up to 125 kg per ha but not to P over 50 kg per ha.**

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## INTRODUCTION

Despite the fact that India is having the highest livestock herd (> 400 million), it stands second in milk production on global basis. This is due to many reasons viz., low milk yielding breeds, extreme climatic conditions and lack of availability of nutritious green and dry fodder. Total fodder requirement to feed our cattle population during 1995-96 was around 850 and 1064 million tons dry and green fodder respectively and has reached to 950 and 1400 million tons respectively during 2000-01 resulting in a short fall of dry fodder, green fodder and concentrated feed to an extent of 33.5, 23 and 47 per cent respectively. This demands two fold approach on agronomists, first to screen good fodder yielding genotypes and second to adopt suitable nutrition management to increase productivity of selected genotypes. Keeping these two objectives in mind the present field experiment was carried out to findout good sweet sorghum genotypes and optimum level of N and P to maximise yield.

## MATERIALS AND METHODS

A field experiment conducted during *kharif* 1996 at Agriculture College Farm, University of Agricultural Sciences, Dharwad. The location of ths site was situated at 15° 26' N latitude and 75°7' E longitude with an altitude of 678 m above the mean sea level. Soil of the site was deep black with clay loam texture and was found to have 149.80, 41.00 and 329.00 kg of N, $P_2O_5$ and $K_2O$

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per ha, respectively. The pH of the soil was 7.5. The rainfall received during the year 1996 was 791.80 mm which was 9.80 mm lesser than average of past 50 years. During the period of field experimentation (September 8th to October 10th 1995) rainfall of 413.90 mm was recorded.

The treatments consisted of two combination of two genotypes (G1=SSV-84 and G2=SSV-12611), three N levels (N1=75, N2=100 and N3=125 kg/ha) and two P levels (P1=50 and P2=60 kg/ha) and one control having DFJ-1, a presently existing variety released for this region. Totally 13 treatments were laidout in randomised complete block design and were replicated thrice. Nutrients were supplied in the form of urea, super phosphate and muriate of potash. Nitrogen was applied in two equal splits, 50 per cent at sowing and remaining 50 per cent at 30 days after sowing (DAS) whereas, P and K nutrients applied as basal dose while sowing. Crop spacing of 30 cm x 5 cm was followed using 30 kg seeds per ha. Crop was harvested at 50 per cent flowering stage for fodder purpose and data recorded on growth, green fodder yield and quality parameters.

## RESULTS AND DISCUSSION

Use of appropriate situation or season, specific variety and proper crop management practices are most important to achieve targeted yields. The presently existing variety DFJ-1 though gives high biomass yield but cattle do not very much relish because of its fibrous stem. Therefore, sweet sorghum varieties having juicy stem with less fibre considered in the study.

Sweet sorghum varieties (SSV-84 and SSV-12611) yielded 14.26 t per ha (41%) more green fodder than DFJ-1 (check 34.08 t/ha.). This increased green yield with sweet sorghum varieties was due to higher plant height (284.42 cm), LAI (5.30), inter nodal length and stem girth. Similar findings were reported by Desai and Deore, 1980 and Kudasomannavar, 1980.

Between two genotypes, SSV-84 produced significantly higher green fodder yield (49.26 t/ha) than SSV-12611 (47.32 t/ha.). The higher yield with SSV-84 was primarily due to taller plants (291.95 cm) and higher total dry matter per plant (75.85 g/plant). Channa Naik and Jayakumar (1994) and Ashwathama (1996) also found higher yield with SSV-84 in their studies. Nitrogen levels had significant effect on green fodder yield of sweet sorghum genotypes. The highest fodder yield of 55.66 t per ha was recorded with SSV-84 at 125 kg per ha followed by SSV-12611 at same level of N (53.53 t/ha).

Irrespective of genotypes, there was a significant increase in green fodder yield with increase in N level upto 125 kg per ha. However, sweet sorghum genotypes did not respond to higher P level over and above 50 kg $P_2O_5$ per ha. Similar was the observation made by Patel *et al.*, (1994) and these results confirm the findings of Rai *et al.*, (1989) also.

*TABLE 1*

**Plant height, LAI and total dry matter production (at harvest) and green fodder yield of fodder sorghum varieties as influenced by fertilizer levels.**

| Treatment | Plant height (cm) | | | TDMP (g/plant) | | | Green fodder yield (t/ha) | | | LAI | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | $G_1$ | $G_2$ | Mean | $G_1$ | $G_2$ | Mean | $G_1$ | $G_2$ | Mean | $G_1$ | $G_2$ | Mean |
| **Nitrogen (kg/ha)** | | | | | | | | | | | | |
| 75 (N1) | 270.53 | 252.38 | 261.46 | 70.32 | 66.72 | 68.52 | 42.51 | 40.41 | 41.46 | 5.17 | 5.03 | 5.10 |
| 100 (N2) | 290.48 | 274.87 | 282.68 | 75.04 | 71.35 | 73.20 | 48.60 | 48.01 | 48.81 | 5.37 | 5.44 | 5.41 |
| 125 (N3) | 314.82 | 303.45 | 309.13 | 82.21 | 75.40 | 78.80 | 55.66 | 53.53 | 54.60 | 5.55 | 5.46 | 5.51 |
| **Phosphorus (kg/ha)** | | | | | | | | | | | | |
| 50 (P1) | 294.22 | 277.07 | 285.64 | 75.43 | 70.23 | 82.86 | 49.15 | 47.17 | 48.16 | 5.31 | 5.24 | 5.28 |
| 75 (P2) | 289.68 | 276.73 | 283.21 | 76.23 | 72.08 | 74.15 | 49.36 | 47.46 | 48.41 | 5.41 | 5.22 | 5.31 |
| Mean | 291.95 | 276.90 | 284.43 | 75.86 | 71.16 | 73.51 | 49.26 | 47.32 | 48.29 | 5.36 | 5.23 | 5.30 |
| Check | | | 259.93 | | | 62.69 | | | 34.04 | | | 4.90 |
| Rest | | | 284.42 | | | 73.51 | | | 48.29 | | | 5.30 |
| | S.Em± | C.D. at 5% | | S.Em.± | C.D. at 5% | | S.Em.± | C.D. at 5% | | S.Em.± | C.D. at 5% | |
| Check Vs. Rest | 7.53 | 15.56 | | 3.80 | 7.85 | | 1.39 | 2.87 | | 0.10 | 0.20 | |
| N | 3.79 | 11.07 | | 1.76 | 5.16 | | 0.64 | 1.89 | | 0.04 | 0.13 | |
| P | 3.09 | NS | | 1.43 | NS | | 0.52 | NS | | 0.03 | NS | |
| G | 3.09 | 9.03 | | 1.43 | 4.22 | | 0.52 | 1.54 | | 0.03 | 0.11 | |
| NXG | 5.36 | NS | | 2.49 | NS | | 0.91 | NS | | 0.06 | NS | |
| PXG | – | – | | 2.03 | NS | | 0.74 | NS | | 0.05 | NS | |
| NXP | 3.09 | NS | | 2.49 | NS | | 0.91 | NS | | 0.06 | NS | |
| NXPXG | 3.09 | NS | | 2.85 | NS | | 1.29 | NS | | 0.09 | NS | |

G1=SSV-84, G2=SSV-12611, Check=DFJ-1, rest = Mean of both sweet sorghum genotypes.

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