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# Yield and Quality Parameters of Summer Fodder Sorghum as Influenced by Time of Sowing and Varieties

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**ABSTRACT**

A field experiment was conducted at S.V. Agricultural College Farm, Tirupati, Acharya N. G. Ranga Agricultural University, Andhra Pradesh, India during summer season of 2018 to analyze the quality parameters of fodder sorghum varieties under different times of sowing. The results indicated that fodder sorghum sown during I FN and II FN of January recorded higher green and dry fodder yield compared to the crop sown at later dates. Significantly higher crude protein and ash contents were observed with the crop sown during I fortnight of January. Late sowing of the crop during II fortnight of February recorded higher crude fibre. Among various varieties tested, higher green and dry fodder yields were recorded with CSV 32 F than rest of varieties.CSV 32 F has recorded highest crude protein and ash content, while the higher crude fibre content was recorded with CSV 21 F. The interaction effect of different times of sowing and varieties on yield and quality parameters was found non-significant.

**Key Words:** *Fodder sorghum, Fort night, Quality, Time of sowing.*

Forage quality is an important selection criterion in fodders especially in fodder sorghum because the performance of dairy animals not only depends on availability of fodder alone but also on the continuous availability of quality fodder in adequate amount. The productivity of animals in India, especially milch animals is very low as compared to developed countries primarily due to insufficient availability of quality forage especially during summer (Patel *et al.* 2017).

Sorghum [*Sorghum bicolor* (L.) Moench] belonging to family Poaceae, is an important forage crop which is widely grown to meet the green as well as dry fodder requirement of the livestock. It is fast growing, quick in recovery after cutting, palatable, nutritious and utilized as silage and hay, besides for fresh feeding. Sorghum plant is unique in stature, which can be grown even in adverse environment with its wide adaption to changing climatic conditions. The average green fodder productivity of sorghum is 35-70 t $ha^{-1}$ with nutrient rich profile of 8 per cent protein, 2.5 per cent fat and 45 per cent nitrogen-free extract and other vital minerals (Wheeler, 1950).

Several research findings reported that quality and productivity of forages are improved with optimum time of sowing. Chandrika *et al.* (2012) reported that high crude protein yield of fodder pearl millet was noticed with 1st Fortnight of February over other dates of sowing. Identification of suitable nutritive fodder sorghum cultivars and optimum time of sowing during summer is important criterion to meet immediate need of quality fodder. Hence, the present investigation was carried out with an objective to evaluate different varieties of single cut fodder sorghum under different times of sowing during summer for their nutrition value and fodder potential to meet the immediate requirement of nutrient rich fodder which is need of the hour.

## MATERIAL AND METHODS

The field experiment was conducted at S.V. Agricultural College Dryland farm, Tirupati, Acharya N.G.Ranga Agricultural University, Andhra Pradesh, India (13.5°N latitude and 79.5°E longitude, 182.9 m above mean sea level) during summer season of 2018. The experimental field was sandy loam in texture which is low organic carbon (0.45 %).The soil is neutral in reaction (pH 7.1), low in available N (175 kg $ha^{-1}$) and medium in available phosphorus (28 kg $ha^{-1}$) and potassium (204 kg $ha^{-1}$). Total rainfall received during the crop growth period was 127.6 mm in 6 rainy days. The experiment was laidout in a split plot design with three replications. The main treatments consisted of four times of sowings *viz.,*I FN of January ($S_1$),II FN of January ($S_2$), I FN of February ($S_3$) and II FN of February($S_4$). The sub treatments consisted of three fodder sorghum varieties*viz.,*CSV 21 F ($V_1$), CSV 30 F ($V_2$) and CSV 32 F ($V_3$). A uniform recommended dose of 80-40-30 kg N, $P_2O_5$ and $K_2O$ $ha^{-1}$ was applied to fodder sorghum. The nutrients were applied in the form of urea, single super phosphate and muriate of potash. One light irrigation was given 5 days after sowing for better establishment of seedlings and there after field was irrigated at 10 days intervals during the crop growth period. The crop was harvested for green fodder

**Table 1. Yield and quality of fodder sorghum varieties as influenced by times of sowing**

| Treatments | Green fodder yield (t $ha^{-1}$) | Dry fodder yield (t $ha^{-1}$) | Crude protein content (%), | Crude fibre content (%) | Ash content (%) |
|---|---|---|---|---|---|
| Times of sowing | | | | | |
| I FN of January | 34.60 | 13.90 | 8.58 | 30.76 | 8.75 |
| II FN of January | 32.70 | 13.10 | 8.31 | 32.49 | 8.40 |
| I FN of February | 28.90 | 11.60 | 7.93 | 34.45 | 8.07 |
| II FN of February | 24.50 | 9.80 | 7.65 | 35.63 | 7.89 |
| SEm± | 1.30 | 0.40 | 0.05 | 0.52 | 0.07 |
| CD (p= 0.05) | 4.50 | 1.40 | 0.16 | 1.79 | 0.24 |
| Varieties | | | | | |
| CSV 21 F | 24.50 | 9.80 | 7.61 | 34.44 | 7.79 |
| CSV 30 F | 29.80 | 11.90 | 8.02 | 33.42 | 8.27 |
| CSV 32 F | 36.30 | 14.50 | 8.72 | 32.14 | 8.78 |
| SEm± | 0.90 | 0.30 | 0.04 | 0.45 | 0.06 |
| CD (p= 0.05) | 2.80 | 0.80 | 0.11 | 1.36 | 0.18 |
| Times of sowing x Varieties | | | | | |
| S at M | | | | | |
| SEm± | 1.88 | 0.53 | 0.07 | 0.91 | 0.12 |
| CD (p= 0.05) | NS | NS | NS | NS | NS |
| M at S | | | | | |
| SEm± | 2.01 | 0.58 | 0.08 | 0.9 | 0.12 |
| CD (p= 0.05) | NS | NS | NS | NS | NS |

purpose at 50 percent flowering in all the varieties. After harvesting, the crop was sun-dried in the same plot till the constant weight was observed for dry fodder yield. The proximate analysis for crude protein, crude fat, crude fibre, total ash in fodder sorghum was determined by standard methods (AOAC, 1970). The Crude protein content was determined by micro-Kjeldahl method and expressed as Nitrogen content in plant sample x 6.25. Crude fibre was estimated by acid-alkali digestion method, treating the sample with 1.25% $H_2SO_4$ and 1.25% NaOH and the residue left was ashed in the muffle furnace at 550-600°C. The loss due to ashing was considered as crude fibre and expressed in percentage. Ash is the inorganic component of the sample left after complete ignition of the sample at 600°C in muffle furnace and was calculated as percent of dry matter.

## RESULTS AND DISCUSSION

### Forage yield

The data on green and dry fodder yield presented in Table.1 indicated that crop sown during I fortnight of January recorded the highest green and dry fodder yield which was comparable with II fortnight of January. Sowing of the crop at later dates recorded the lower green fodder yields. The higher green fodder productivity with I fortnight of January sowing is attributed to prevalence of maximum and minimum temperatures within the favorable limits of the crop. Reduction in the yield of green and dry fodders with late sown crop (II fortnight of February) may be attributed to less production of forage owing to exposure of the crop to higher temperatures of maximum and minimum at all growth stages elevated by 4.3 and 5.8°Crespectively. Similar findings were reported from the studies of Deshmukh *et al*. (2009).

CSV 32 F recorded significantly higher green and dry fodder owing to its superior performance of growth and yield parameters which might be due to it high genetic potential to higher resource conversion efficiency. Similar results were obtained by Satpal *et al*. (2015).

### Quality parameters

The data on quality parameters presented in Table.1 revealed that significantly higher crude protein content was recorded with the crop sown during I FN of January. This might be due to congenial weather conditions prevailed during the crop growth period which helped in higher growth and metabolism as supported by growth contributing characters which increased the protein content. These results are in

conformity with Patel *et al.* (2017). Among varieties tested, CSV 32 F recorded the highest crude protein content. It might be due to its genetic potential for rapid synthesis of carbohydrates and their conversion to protein and protoplasm leaving relatively smaller portion for cell wall synthesis along with more dry matter production, which corroborate with the results of Bhoya *et al*. (2013), Meena *et al.* (2017).

The results also indicated that the crop sown during II fortnight of February recorded the highest crude fibre content. The lowest crude fibre content recorded by the early sowing of the crop during I fortnight of January might be attributed to uptake of nitrogen at higher rates by the crop under congenial weather conditions (Table 1). Favourable temperature, relative humidity and low evaporation rates that resulted in more vegetative growth and higher crude protein which inturn decreased the fibre content in the fodder. Significantly the higher crude fibre content was noticed with CSV 21 F. The lowest crude fibre content observed in CSV 32 F might be due to the genetic character of variety maintain of higher proportion of stem to leaf ratio. Similar findings were reported by Senthilkumar *et al.* (2009).

The crop sown during I FN of January recorded significantly higher ash content compared to all other times of sowing. The higher ash content of fodder sorghum sown during I FN of January might be due to the fact that higher biomass and dry matter production which inturn improved mineral matter (Kumar *et al.* 2013). Among the different varieties tested, the highest ash content was observed in CSV 32 F The lowest ash content was recorded by CSV 21 F. This is in accordance with Meena *et al.* (2017).

## CONCLUSION

It can be concluded that higher green and dry fodder yield of summer fodder sorghum with higher nutritive value could be achieved by sowing the fodder sorghum during I fortnight of January to II fortnight of January with CSV 32 F variety under Southern agroclimatic conditions of Andhra Pradesh.

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