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Response of Forage Sorghum (*Sorghum bicolor* L. Moench) to Nutrient Management during Kharif Season

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ABSTRACT: A field experiment entitled "Response of forage sorghum (*Sorghum bicolor* L. Moench) to nutrient management during kharif season" was undertaken during Kharif, 2022 at Post Graduate Instructional Farm, Mahatma Phule Krishi Vidyapeeth, Rahuri, Dist. Ahmednagar (Maharashtra). The experiment was laid out in randomised block design with three replications. The experiment consists of ten treatments involving T_1 –Absolute control, T_2 – GRDF (5 t ha^{-1} FYM + 100:50:40 kg ha^{-1} N, P_2O_5 , K_2O), T_3 – GRDF + Water spray, T_4 – GRDF + Urea @ 2%, T_5 – GRDF + DAP @ 2%, T_6 – GRDF + WSF 19:19:19 @ 1%, T_7 – GRDF + WSF 17:44:00 @ 1%, T_8 – GRDF + WSF 13:00:45 @ 1%, T_9 – GRDF + WSF 00:52:34 @ 1%, T_{10} – GRDF + WSF 00:00:50 @ 1%. The yield contributing attributes such as green forage yield (60.70 t ha^{-1}) and dry forage yield (12.3t ha^{-1}) were significantly higher under application of GRDF along with foliar application of 19:19:19 @ 1% at 30 and 45 days after sowing. The economics of forage sorghum production was significantly influenced by the foliar nutrition. The application of GRDF along with foliar application of 19:19:19 @ 1% at 30 and 45 days after sowing recorded significantly higher gross returns (₹ 121400 ha^{-1}) and net returns (₹ 81028 ha^{-1}). Based on results obtained, it could be concluded that, application of GRDF (5 tonne ha^{-1} FYM + 100:50:40 kg ha^{-1} N, P_2O_5 & K_2O) along with foliar application of 19:19:19 @ 1% at 30 and 45 days after sowing was found beneficial for increasing productivity and forage quality of forage sorghum cv. Phule Godhan.

Keywords: Yield, quality, economics, dry matter, Phule Godhan, forage.

INTRODUCTION

Indian economy is primarily agriculture based where animal health is very important. Livestock sector contributes 25.6% of the agricultural GDP contributes 25.6% of the agricultural GDP and 4.11% of total GDP. This contribution is derived from a livestock population of about 192.49 million cattle, 109.85 million buffaloes, 74.26 million sheep, 148.88 million goats and 0.25 million camels. The total livestock population is 535.78 million. India ranked first in milk production accounting for 209 million tonnes milk production (Anonymous, 2019). Although India have huge livestock population, the milk productivity is very low as compared to world average and much below than the developed countries. One of major limitations to efficient livestock population in country is lack of adequate level of quality and quantity of forage. At present, the country is facing a net deficit of 35.6% green fodder, 10.95% dry fodderand 44% concentrated feeds. Present availability of green fodder is 462 million tonnes and dry fodder availability is 394 million tonnes (Biotech Articles, 2022). Feeds and fodders are the most important components of animal output. Fodders are one of the cheapest source of nutrients as they not only meet the requirement of bulk to be fed to the cattle, but also supply desired amount of protein, energy, minerals as well as vitamins to a large extent. Main green forage cereal crops are maize, pearl millet, sorghum, oat, hybrid napier etc. Out of which sorghum is the more widely grown type of millet. It is an important crop of tropical and sub-tropical region. Sorghum is a popular cereal fodder crop due to its excellent growing habit, high potential, better nutritive value and quick regrowth (Bhoya *et al.,* 2013).

Sorghum is also one of the gifted grass genera of the tropics. It provides food, feed, stover and fuel to millions of poor farm families and their livestock in arid and semi arid regions of the world. The genus includes two economically important species-bicolor and sudanese, sudanese is specially used for forage purpose. Sorghum occupies 6.18 million ha area in India comprising of grain, forage and other sorghums. In the states of Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana, Madhya Pradesh, Gujarat, Rajasthan sorghum is grown primarily for grain purpose while in Punjab, Haryana, Utter Pradesh, Uttarakhand, it is exclusively grown for fodder production. Area under forage sorghum is 2.1 million ha during 2013. Sorghum (*Sorghum bicolor* L. Moench) is the king of millets. In India, it is most popularly known as "Jowar". It is an important food, feed, fodder and ration for human being, cattle and poultry. Its grains have about 10-12 % protein, 3% fat and 70% carbohydrate. On an average, it contains 12.42% CP, 70.13- 82.19% NDF, 47.87-78.86% ADF, 13.85-45.57% cellulose and 0.34-28.38% hemi cellulose. It can be fed as a green or dry forage to livestock. Livestock is the backbone of agricultural economy and its importance for Maharashtra can-notbe over emphasized. Inadequate and poor quality feed and fodder supplied to the milch animalsis the main cause of low milk production. There is an urgent need to boost the production of good quality fodder for improving the health of the vast livestock population of the state. Among fodder crops, sorghum (*Sorghum bicolor* L. Moench) is one of the most important one, which is largely cultivated in the country during different seasons to produce green and dry fodder. In India, the area under sorghum is approximately 8.52 million hectares with an annual production of about 8.71 million tonnes and an average productivity of 1200 kgha^{-1} (Anonymous, 2022). The main sorghum growing states in India are Maharashtra, Karnataka, Andhra Pradesh, Telanagana, Madhya Pradesh, Gujarat, Tamilnadu, Rajasthan and Uttar Pradesh. Forage sorghum is characterized by quick grow, high quality biomass accumulation andhigher dry matter content. It has wide adaptability in different agro-climates besides drought withstanding ability. It is also suitable for silage and hay making.

For better efficiency of livestock, both the quantitative production of fodder and their quality play significant role. Being a exhaustive crop, quality of sorghum fodder suffers heavily if proper amount of fertilizers is not applied. Fertilizer is single most important input for securing higher production. Sorghum variety- Phule Godhan respond positively to application of fertilizers. Nitrogen plays a pivoted role in quantitative as well as qualitative improvement in forage crops. Nitrogen is most important nutrient for plant growth and is the most limiting nutrient in our soils. It helps in increasing green forage and dry matter yield with higher crude protein and crude fibre content. It also increases chlorophyll content, succulent and vigorous growth, better palatability, improving leaf : stem ratio (Yadvendra *et al.,* 2003). Phosphorus is the key element in forage establishment and continued productivity. Forage needs phosphorus for photosynthesis, cell division, synthesis of glucose *i.e.* sugar (carbohydrate production), protein synthesis, root development, early growth winter hardinessand nitrogen fixation in case of legume (Dongarwar, 2014). Potassium is second to nitrogen in plant tissue levels with ranges of 1-3% by weight. Potassium is important for translocation of sugar from source to sink. It can also transport water and nutrients throughout the plant in the xylem. It plays important role in protein and starch synthesis. High levels of available potassium improve the physical quality, disease resistance and feeding value of grain and forage crops. It also aids in drought and lodging resistance. Photosynthesis, stomatal activity and enzyme activation processes are also regulated by potassium (Prajapati and Modi 2012).

MATERIAL AND METHODS

The field experiment was conducted to study the "Response of forage sorghum (*Sorghum bicolor* L. Moench) to nutrient management during *kharif* season" at Post Graduate Instructional Farm, Department of Agronomy, Mahatma Phule Krishi Vidyapeeth, Rahuri. The soils of experimental area is grouped under inceptisol order and clay loam in texturewith more than 60 cm depth having the topography of experimental field as uniform and levelled. The representative initial soil samples were collected for assessing the initial soil fertility status. These soil samples were thoroughly mixed and the composite soil sample was prepared and analyzed for physical and chemical properties of soil. The soils of experimental field was clay loam in texture, low in available nitrogen (185.26 kg ha^{-1}), medium in available phosphorus (20.78 kg ha^{-1}) and very high in available potassium (452.28 kg ha^{-1}). It was Neutral to saline in reaction (pH 7.6). Electrical conductivity of soil was 0.36 dSm^{-1} with 0.52 per cent organic carbon. Geographically, the Central Campus Farm of Mahatma Phule Krishi Vidyapeeth, Rahuri is situated between 19°18' N and 19°57′N latitude and 74°35′E and 74°19′E longitude. Thealtitude varies from 495 to 556 m above mean sea level. This area falls in the semiarid tropics with an annual rainfall ranging from 307 to 619 mm. The average rainfall is 520 mm. The rainfall is erratic and distributed unevenly in 15 to 45 rainy days. The annual rainfall, about 80 per cent receive from South- West monsoon from June to September and rest of the rainfall receive from North-East monsoon during October and November and practically negligible rains receive during summer. Hence, assured irrigation facilities are needed for growing crops like forage sorghum. The mean annual maximum and minimum temperature was ranges from 33 to 49°C and 7 to 24.2°C, respectively. The mean relative humidity during morning and evening hours was 61and 35 per cent. The sunshine hours ranges from 6 to 9 hrs day^{-1}. Agroclimatically location is in drought prone area of Maharashtra state, characterized by low and erratic rainfall with less rainy days and long dry spell. The maximum open pan evaporation is 4.8 mm is recorded in 27 meterological week and minimum is 2.5 mm in 38 meterological week. The experiment was laid out in randomised block design with three replications. The experiment consists of ten treatments involving T_1 –Absolute control, T_2 – GRDF (5 t ha^{-1} FYM + 100:50:40 kg ha^{-1} N, P_2O_5 , K_2O), T_3 – GRDF +Water spray, T_4 – GRDF + Urea @ 2%, T_5 – GRDF + DAP @ 2%, T_6 – GRDF + WSF 19:19:19 @ 1%, T_7 – GRDF + WSF 17:44:00 @ 1%, T_8 – GRDF + WSF 13:00:45 @ 1%, T_9 – GRDF + WSF 00:52:34 @ 1%, T_{10} – GRDF + WSF 00:00:50 @ 1%. For sowing of Phule Godhan 40 kg ha^{-1} seed rate was used. The seeds were sown by line sowing with inter row spacing of 30 cm apart. Harvesting was done manually after 80 days of sowing.

RESULTS AND DISCUSSION

A.Yield Characters

(i) Green forage yield. Data in respect of green forage yield at harvest of forage sorghum as influenced by different foliar nutrient management treatment are presented in Table 1. The mean green forage yield was 51.31 t ha^{-1}.

It is quite clear from the data presented in Table 1 that the different foliar nutrient management treatment had significant influence on green forage yield. The application of GRDF + WSF 19:19:19 @ 1% shows significantly higher green forage yield (60.70 t ha^{-1}). Second superior treatment is the application of GRDF + WSF 17:44:00 @ 1% having yield 58.41 t ha^{-1} is at par with GRDF + DAP @ 2% is 58.37 t ha^{-1} Whereas, significantly lowest green forage yield (25.30 t ha^{-1}) was noticed under absolute control during the period of investigation. Treatment T_6 GRDF + WSF 19:19:19 @ 1% increased 139 % green forage yield over absolute control.

Among the different treatments, application of GRDF + WSF 19:19:19 @ 1% recorded significantly higher green forage yield as compared to other treatments. This may be mainly attributed to improved growth parameters *viz*., plant height, number of functional leaves, Leaf : stem ratio, leaf area and the beneficial effects of nitrogen on cell division and elongation, formation of nucleotides and co-enzymes which resulted in increased meristematic activity and photosynthetic area and hence more production and accumulation of photosynthates yielding higher green fodder. The findings of Bhilare *et al*. (2002); Pathan *et al*. (2006); Sheoran *et al*. (2008); Bhoya *et al*. (2013); Choudhary and Prabhu (2014) confirmed the results.

Table 1: Green forage yield of forage sorghum as influenced by different foliar sprayingof nutrients.

Treatment	Treatment details	Green forage yield(t ha^{-1})	Percentage Increased over T_1
T_1	Absolute control	25.30	—
T_2	GRDF (100:50: 40 N: P_2O_5: K_2O kg ha^{-1}) + FYM 5 t ha^{-1}	47.59	88.10
T_3	GRDF + Water spray	47.97	89.60
T_4	GRDF + Urea @ 2%	54.50	115.41
T_5	GRDF + DAP @ 2%	58.37	130.71
T_6	GRDF + WSF 19:19:19 @ 1%	60.70	139.92
T_7	GRDF + WSF 17:44:00 @ 1%	58.41	130.86
T_8	GRDF + WSF 13:00:45 @ 1%	56.60	123.71
T_9	GRDF+ WSF 00:52:34 @ 1%	53.40	111.06
T_{10}	GRDF + WSF 00:00:50 @ 1%	50.29	98.77
	S.E m ±	0.20	0.22
	C.D. (P = 0.05)	0.62	—
	General mean	51.31	

(ii) Dry matter content and yield of forage sorghum. The dry matter content and dry forage yield of forage sorghum at harvest per hectare asinfluenced by different foliar nutrient management treatment are presented in Table 2. The mean dry matter yield was 10.25 t ha^{-1}.

The data presented in Table 2 revealed that the different foliar nutrient management treatment has non-significant influence on dry matter content however it found significant influence on dry matter yield. The application of GRDF + WSF 19:19:19 @ 1% shows significantly higher dry forage yield (12.31 t ha^{-1}). Second superior treatment is GRDF + WSF17:44:00 @ 1% having dry forage yield 11.81 t ha^{-1} is at par with GRDF + DAP @ 2% having dry forage yield 11.77 t ha^{-1}. Significantly lowest dry forage yield was exhibited under absolute control during the period of investigation.

Table 2: Dry matter content and dry forage yield of forage sorghum as influenced bydifferent foliar spraying of nutrients.

Treatment	Treatment details	Dry matter content(%)	Dry forage yield (t ha^{-1})
T_1	Absolute control	19.32	4.88
T_2	GRDF (100:50:40 N: P_2O_5: K_2O kg ha^{-1}) + FYM 5 t ha^{-1}	19.65	9.35
T_3	GRDF + Water spray	19.68	9.44
T_4	GRDF + Urea @ 2%	20.00	10.90
T_5	GRDF + DAP @ 2%	20.17	11.77
T_6	GRDF + WSF 19:19:19 @ 1%	20.28	12.31
T_7	GRDF + WSF 17:44:00 @ 1%	20.23	11.81
T_8	GRDF + WSF 13:00:45 @1%	20.16	11.41
T_9	GRDF+ WSF 00:52:34 @ 1%	19.99	10.56
T_{10}	GRDF + WSF 00:00:50 @1%	19.89	10.03
	S.E m±	0.28	0.10
	C.D. (P = 0.05)	NS	0.30
	General mean	19.93	10.25

The significant increase in dry matter accumulation with increase in nitrogenous foliar fertilizer might be due to the taller plants, higher number of leaves plant^{-1}, more leaf area plant^{-1} at higher levels of nitrogen, that provided larger photosynthetic surface to intercept more radiant energy which might have resulted in more dry matter accumulation. Further nitrogen isan integral part of protoplasm, amino acids, amides, nucleotides and nucleo-proteins and essential for cell division, expansion and thereby growth which ultimately increase dry matter yield. The result are in corroborate with the findings of Dudhat *et al*. (2004); Singh and Sumeria (2005); Gupta *et al*. (2008); Pathan and Bhilare (2010).

B. Economic studies

The gross monetary returns, net monetary returns and benefit: cost ratio of forage sorghum was significant influenced by different nutrient management treatments are presented in Table 3. The mean gross monetary return, cost of cultivation and net monetary return were ₹ 102625, ₹ 40922 and ₹ 63554 ha^{-1} respectively. The mean benefit : cost ratio was 2.73.

Table 3: Gross monetary returns, cost of cultivation, net monetary returns and B:Cratio of forage sorghum as influenced by different foliar spraying of nutrients.

Treatment	Treatment details	Gross monetary returns (₹ ha^{-1})	Cost of cultivation (₹ ha^{-1})	Net monetary returns (₹ ha^{-1})	B:C ratio
T_1	Absolute control	50600	28772	21828	1.75
T_2	GRDF (100:50:40 N: P_2O_5 : K_2O kg ha^{-1}) + FYM 5 t ha^{-1}	95180	39072	56108	2.43
T_3	GRDF + Water spray	95900	39772	56128	2.41
T_4	GRDF + Urea @ 2%	109000	39828	69172	2.73
T_5	GRDF + DAP @ 2%	116740	40046	76694	2.91
T_6	GRDF + WSF 19:19:19 @1%	121400	40372	81028	3.00
T_7	GRDF + WSF 17:44:00 @1%	116820	40492	76328	2.88
T_8	GRDF + WSF 13:00:45 @1%	113200	40922	72278	2.76
T_9	GRDF + WSF 00:52:34 @1%	106800	40872	65928	2.61
T_{10}	GRDF + WSF 00:00:50 @1%	100580	40522	60058	2.48
	S.E m ±	1814	—	1588	—
	C.D. (P = 0.05)	5389	—	4718	—
	General mean	102625	40922	63554	2.73

(ii) Gross monetary returns. The data in respect to gross monetary returns was statistically analyzed and presented in table revealed that the application of GRDF + WSF 19:19:19 @ 1% recorded significant highest gross monetary return (₹ 121400 ha^{-1}) followed by GRDF + WSF 17:44:00 @ 1% having gross monetary returns ₹ 116820 ha^{-1} is at par with GRDF + DAP @ 2% having gross monetary returns (₹ 116740 ha^{-1}) The treatment T_6 recorded significantly highest gross monetary returns might be due to highest green forage yield as well as minimum cost of cultivation as compared to next best treatment. These findings are in conformity with Singh and Sumeria (2005); Naveed *et al*. (2014); Kumawat *et al*. (2016).

(ii) Net monetary return. The data in respect to net monetary returns was statistically analysed and presented in table revealed that the application of GRDF + WSF 19:19:19 @ 1% recorded significant highest net monetary return (₹ 81028 ha^{-1}) followed by GRDF + DAP @ 2% having net monetary returns ₹ 76694 ha^{-1} is at par with GRDF + WSF 17:44:00 @ 1% (₹ 76328 ha^{-1}) The treatment T_6 recorded significantly highest net monetary return might be due to highest green forage yield as well as minimum cost of cultivation as compared to next best treatment. These findings are in conformity with Singh and Sumeria (2005); Naveed *et al*. (2014); Kumawat *et al*. (2016).

(iii) Cost of cultivation. The mean value of cost of cultivation was found to be ₹ 40922 ha^{-1} in case of forage sorghum foliar application slightly increases the cost of cultivation. The maximum cost of cultivation was recorded in the treatment allocated with application of GRDF + WSF 13:00:45 @ 1% (₹ 40922 ha^{-1}). The lowest cost of cultivation was recorded in absolute control ₹ 28772 ha^{-1} during the period of investigation.

(iv) Benefit : Cost ratio. The data regarding benefit : cost ratio presented in table revealed that the application of treatment GRDF + WSF 19:19:19 @ 1% recorded highest benefit : cost ratio (3.00). The highest B : C ratio observed in treatment T_6, it might be due to highest gross monetary return and lowest cost of cultivation of that treatment as compared to rest of all treatments under studies. These findings are in conformity with Singh and Sumeria (2005); Naveed *et al*. (2014); Kumawat *et al*. (2016).

CONCLUSIONS

Among all the treatments, the GRDF + WSF 19:19:19 @ 1% found significantly superior in terms of plant growth and yield of forage. Regarding the quality of forage sorghum produced from different treatment spraying of GRDF + WSF 19:19:19 @ 1% found superior in terms quality of forage sorghum. The cost of cultivation was low in absolute control followed by GRDF (100: 50:40 kg ha^{-1} N: P_2O_5: K_2O + FYM 5 t ha^{-1}) but the maximum net monetary return (81028 ₹ ha^{-1})

and B: C ratio (3.00) was observed in GRDF + WSF 19:19:19 @ 1%. It could be concluded that application of GRDF (100: 50: 40 kg ha^{-1} N: P_2O_5: K_2O + FYM 5 t ha^{-1}) along with two foliar sprays of 19:19:19 @ 1% is at par with GRDF + WSF 13:00:45 @1% and GRDF + DAP @ 2% at 30 and 45 DAS to forage sorghum found beneficial for increase of growth, yield, quality, economic returns and nutrients status in soil grown on medium deep black soil.

REFERENCES

Anonymous (2019). Ministry of Agriculture, Department of Animal Husbandry, Dairying and Fisheries, Krishi Bhavan, New Delhi. pp: 5-6.

Anonymous (2022). Agriculture statistics at a Glance, Department of Agriculture Research and Education, Ministry of Agriculture, Government of India. pp: 80-82.

Bhilare, R. L., Patil, V. S. and Hiray, A. G. (2002). Effect of N levels and time of N application on forage yield of sorghum. *Forage Research, 28*(1), 32-34.

Bhoya, M., Chaudhari, P. P., Raval, C. H. and Bhati, P. K. (2013). Effect of nitrogen and zinc on yield and quality of fodder sorghum (*Sorghum bicolor* L. Moench) varieties. *Forage Research, 39* (1), 24-26.

Biotech Articles (2022). Fodder production (Status, constraints, strategies) by Dr. Rakesh Kumar. pp:1-2.

Choudhary, M. and Prabhu, G. (2014). Quality fodder production and economics of dual- purposepearl millet (*Pennisetum glaucum*) under different fertility levels and nitrogen scheduling. *Indian Journal of Agronomy 59*(3), 410-414.

Dongarwar, S. M. (2014). Effect of foliar nutrient management on green forage yield of summer Giant bajra. M.Sc. *Thesis* submitted to Mahatma Phule Krishi Vidyapeeth, Rahuri, (Maharashtra), India. pp: 85.

Dudhat, M. S., Savalia, M. G. and Remdevputra, M. V. (2004). Response of forage maize to nitrogen and phosphorus levels. *Forage Research, 30*(1), 34-35.

Gupta, K., Rana, D. S. and Sheoran, R. S. (2008). Response of Nitrogen and Phosphorus levels on forage yield and quality of sorghum. *Forage Research, 34*(3), 156-159.

Kumawat, S. M., Mohd, A. Shekhawat, S. S. and Kantwa, S. R. (2016). Effect of nitrogen and cutting management on growth, yield and quality of fodder pearl millet (*Pennisetum glaucum* L.) cultivars. *Range management and Agroforestry, 37*(2), 207-213.

Naveed, A., Javed, I., Muhammad, A., Jahangeer, A. and Ahmad, Z. A. (2014). Effect of foliar application of urea on oat forage productivity. *Journal of Agriculture Research, 52*(1), 91-96.

Pathan, S. H., Gethe, R. M., Tupatkar, P. N. and Gaikwad, B. T. (2006). Effect of nitrogen levels on green forage yield of forage pearl millet varieties. *Journal of Maharashtra Agriculture University, 31* (3), 355-356.

Pathan, S. H. and Bhilare, R. L. (2010). Response of forage pearl millet (*Pennisetum glaucum* L.) varieties to nitrogen level. *Journal of Maharashtra Agriculture University, 35*(3), 475- 476.

Prajapati, K. and Modi, H. A. (2012). The importance of potassium in plant growth – A review. *Indian Journal of Plant Sciences, 1*(2-3), 177-186.

Sheoran, R. S., Tiwana, U.S., Yadav, N. S. and Joshi, U. N. (2008). Evaluation of promising forage pearl millet (*Pennisetum glaucum*) varieties for fodder and seed production with different nitrogen levels under varying environments. *Forage Research, 33*(4), 206-21.

Singh, P. and Sumeria, H. K. (2005). Response of forage sorghum cultivars to different nitrogen levels under Udaipur condition of Rajasthan. *Forage Research, 31*(1), 51-54.

Yadvendra, J. P., Patel, P. C., Sadhu, A.C., Parmar, H. P., Patel, C. C., Gangani, M. K., Patel, M. R. and Patel, N. N. (2003). “Forage Research in Gujarat” Bull. Pub. Main Forage Research Station, Gujarat Agriculture University, Anand.

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