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RESEARCH NOTE

Economics of fodder sorghum (*Sorghum biocolour*) as influenced by nitrogen levels and its methods of application

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Abstract : A field investigation was conducted during the *Rabi* season of 2012-13 to study economics of fodder sorghum as influenced by nitrogen levels (0, 40, 80, 120 and 160 kg N ha^{-1}) and its methods of application (Broadcasting, side dressing and band placement). The maximum gross realization (Rs. 33233 ha^{-1}), net realization (Rs. 23577 ha^{-1}) and benefit: cost ratio (2.44) was obtained with the application of 160 kg N ha^{-1} applied through band placement method followed by the gross realization (Rs.32457 ha^{-1}), net realization (Rs. 22951 ha^{-1}) and benefit: cost ratio (2.41) with the application of 160 kg N ha^{-1} applied through broadcasting method.

Key Words : Sorghum, Fodder, Nitrogen, Broadcasting, Side dressing, Band placement, Economics

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Fodder scarcity is considered as a major limiting factor for a prosperous of livestock industry. Most often, livestock is the only source of cash income for subsistence farms and also serves as insurance in the event of crop failure. India has the largest population of animals which accounts for about 17 per cent of the world's livestock population (Kumar *et al*., 2010). Among the fodder crops, sorghum (*Sorghum bicolor*) is one of the ideal fodder for milch and draft cattle. The area, production and productivity of fodder sorghum in India was 7.69 million ha, 7.29 million tonnes and 948 kg/ha, respectively (Anonymous, 2010). Its luxurious vegetative growth favours its production as fodder. It has quick growth high yielding ability, high dry matter content, better quality and its suitability for various forms of utilization, like silage and hay. Nitrogen is one of the essential plant nutrient in Indian soil. The key function of nitrogen is to increase the vegetative growth and boost up the re-growth after cutting in forage production. The major portion of nitrogen taken up by the plant is used in synthesizing protein. Sorghum plant responds to nitrogenous fertilizers. The application of nitrogen not only affects the yield but also improve quality from view point of its protein contents (Mohammed and Hamed, 1988). It increases the vegetative growth of the plant, which is highly desirable for the forage point of view (Sheoran *et al*., 2002). The forage quality of sorghum is improved with proper dose of nitrogen application.

The method of nitrogen application plays important role along with the level of nitrogen. Concerns about best management practices are increasing because mismanagement of nitrogenous fertilizer can lead to contamination of ground and surface water sources as well as soil degradation and can cause health problems (Anonymous, 1990). Use of optimum amount of fertilizer through a suitable application method at a time when it is most efficiently and effectively utilized is imperative.

The field experiment was conducted at Research cum Instructional farm, Indira Gandhi Krishi Vishwavidhyala, Raipur (C.G.) during the *Rabi* season of the year 2012-13. Soil of the experimental field was low, medium and high in nitrogen,

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phosphorus and potassium content, respectively. The experiment was laid out in split plot design with three replications. The treatments allotted to main plots were broadcasting (M_1) side dressing (M_2) and band placement (M_3) methods of nitrogen application and the treatments allotted to sub plots were control plot (0 kg N ha^{-1}) (N_0), 40 kg N ha^{-1} (N_1), 80 kg N ha^{-1} (N_2), 120 kg N ha^{-1} (N_3) and 160 kg N ha^{-1} (N_4). Sorghum variety M.P. chari was taken as test crop with a seed rate of 30 kg ha^{-1}. The nitrogen was applied through urea in three splits *i.e.* basal, 30 and 60 DAS. The crop was sown on October 23, 2012 apart from 30 cm row spacing. Harvesting of fodder sorghum was done on January 06, 2013. The irrigation and other intercultural operation were done as and when required.

N application methodology :

Broadcast :

Nitrogen fertilizer was applied as urea on the surface of soil.

Side dressing :

The urea was applied along the side of plants, about 0-3 inches away from the plants.

Band placement :

The urea was placed by hand in a hand-drown furrow, about 5 cm on one side of the row, about 5 cm deep, after which the furrow was closed again.

Application of nitrogen through different N application methods significantly increased physiological and agronomic traits of sorghum. The results in respect of gross realization, net realization and benefit: cost ratio were found maximum with 160 kg N ha^{-1} through band placement method (Table 1). In a fodder crop, total dry matter production in a plant is its potentiality for its biomass production which is directly related to its economic value. The highest gross and net realization is due to higher fodder yield. Because of the possibilities of increased immobilization of broadcast and side dressed nitrogen, the banding of fertilizer below the surface is beneficial.

Ram and Singh (2001) reported that the application of 80 kg N ha^{-1} significantly increased the net income compared with the control and 40 kg N ha^{-1}. Gautam *et al.* (2003) found that the application of N @ 60 kg ha^{-1} gave the highest gross returns (Rs.34273 ha^{-1}).

Singh *et al.* (2005) reported that the highest gross and net monetary returns of fodder sorghum were obtained with 100 kg N ha^{-1}. The benefit : cost ratio was highest due to the sustainability in increased yield and decreased cost of cultivation. Our findings are similar to Meena and Meena (2012) who reported that benefit: cost ratio was accrued highest with the application of 120 kg N ha^{-1} (2.61) as compared to other levels. Conventional methods of N application *viz.*, broadcast and side dressing could not prove their efficiency and were ranked at 2nd and 3rd place.

In this study, the traditional method of broadcast or side dress recorded lower values of all agronomic and physiological traits compared to band placement method. Lower recovery of N has been attributed to immobilization of N with surface application of nitrogenous fertilizer (Fredrickson *et al*., 1982).

Conclusion :

Overall results of the present investigation conclude that application of 160 kg N ha^{-1} applied through band placement method maximized gross realization, net realization and benefit:

Table 1 : Economics of fodder sorghum as influenced by nitrogen levels and its methods of application

Treatments	Gross realization (Rs ha^{-1})	Net realization (Rs ha^{-1})	B:C ratio
M_1N_0	15022	6476	0.76
M_1N_1	26655	17869	2.03
M_1N_2	28704	19678	2.18
M_1N_3	30964	21698	2.34
M_1N_4	32457	22951	2.41
M_2N_0	15594	7048	0.82
M_2N_1	19329	10543	1.20
M_2N_2	24335	15309	1.70
M_2N_3	26259	16993	1.83
M_2N_4	32138	22632	2.38
M_3N_0	15734	6978	0.80
M_3N_1	27622	18686	2.09
M_3N_2	30123	20947	2.28
M_3N_3	31567	22150	2.35
M_3N_4	33233	23577	2.44

cost ratio.

REFERENCES

Anonymous (1990). National ground water quality survey. Environmental Protection Agency. *Office of Drinking Water*, Washington, D.C., U.S.A.

Fredrickson, J.K., Koehlar, F.E. and Cheng, H.H. (1982). Availability of 15N labeled N in fertilizer and in wheat straw to wheat in tilled and no tilled soil. *Soil Sci. Soc. Amer. J.,* **46** : 1218-1222.

Gautam, V. S., Nayak, S. and Kushwaha, B.B. (2003). Studies on response of sorghum to nitrogen levels and bio-fertilizers. *Adv. Plant Sci.,* **16**(1) : 337-338.

Kumar, R., Singh, P. and Sumeriya, H.K. (2010). Effect of integrated nutrient management on growth and productivity of forage sorghum [*Sorghum bicolor* (L.) Moench]. *Forage Res.,* **36**(1): 19-21.

Meena, L.R. and Meena, S.L. (2012). Production potential, nutrient uptake, economics and soil properties as influenced by fodder sorghum (*Sorghum bicolor*) cultivars, nitrogen levels and FYM under semiarid condition of Rajasthan. *Range Mgmt. & Agroforestry,* **33**(2): 171-176.

Mohammed, A.A.H. and Hamed, Y.N. (1988). The effect of cutting stage, nitrogen fertilization and seeding rate on yield and quality of hybrid forage sorghum. *Iraqi J. Agric. Sci. Zanco,* **6** : 125-138.

Ram, S.N. and Singh, B. (2001). Productivity and economics of forage sorghum (*Sorghum bicolor*) in association with legumes under different harvesting times and nitrogen levels. *Indian J. Agron.*, **46**(4) : 611-615.

Sheoran, R.S., Rana, D.S. and Grewal, R.P.S. (2002). Influence of *Azotobacter* inoculation in conjunction with graded doses of nitrogen on forage yield of oat (*Avena sativa* L.). *Forage Res.,* **28** (1) : 8-12.

Singh, M.M., Maurya, M.L., Singh, S.P. and Mishra, C.H. (2005). Effect of nitrogen level and bio-fertilizer inoculation on productivity of forage sorghum (*Sorghum bicolour*). *Indian J. agric. Sci.,* **75**(3) : 167-168.

WEBLOGRAPHY

Anonymous (2010). *www. icrisat. org.*