

EFFECT OF NUTRIENT MANAGEMENT ON PRODUCTIVITY OF DIFFERENT VARIETIES OF SORGHUM UNDER SOUTH GUJARAT CONDITIONS

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ABSTRACT

A field experiment was conducted on clay soil during summer 2018 at College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari. The result revealed that higher growth parameters, yield attributes and yield of summer sorghum can be achieved by sowing the variety GNJ-1 fertilized with 100% RDF (80+ 40+ 00 NPK kg/ha) and biocompost @ 5 t/ha under south Gujarat conditions.

KEY WORDS: Biocompost, Growth parameter, Variety, Yield attributes, Yield

INTRODUCTION

Sorghum [*Sorghum bicolor* (L.) Moench] is an important drought resistant cereal crop and fifth largest produced cereal in the world after wheat, maize, rice and barley. Sorghum is termed as “nature-care crop”, as it possesses strong adaptance and resistance to harsh environments such as dry weather and high temperature compared to other crops. It is usually grown as a low level application of chemical fertilizer crop with limited use of pesticides and it has a potential to adapt itself to the given natural environment. Looking to the order of importance, fertilizer is one of the most important inputs for securing potential yield, because majority of Indian soils are deficient in nitrogen. It is well known that sorghum is heavy feeder crop requiring 90 kg N/ha and 30 kg P/ha in Gujarat (Ramachandrappa and

Mudalagiriappa, 2011). In presence of organic manures, there is a better utilization of chemical fertilizers and plant is fed more steadily and continuously because of slow release of nutrients after decomposition. Organic manures have favourable influence on soil physico-chemical and biological properties which enhance crop growth and yield (Ghuman and Sur, 2006). However, meagre work has been done on effect of integrated nutrient management on sorghum, hence above experiment was conducted.

MATERIALS AND METHODS

The present study was conducted on the College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari during summer 2018. The experimental field was fairly levelled and uniform in fertility. The soil of south Gujarat is locally known as “Deep black

soil". The experimental field was clayed in texture and showed low, medium and very high rating for available nitrogen (171.59 kg/ha), phosphorus (29.50 kg/ha), potassium (307.81 kg/ha), respectively. The soil was slightly alkaline (pH 7.7) with normal electric conductivity (0.33 dS/m). Total eight treatment combinations consisting two varieties (GJ-42 and GNJ-1), two levels of fertilizer (75% RDF (60:30:00 NPK kg/ha and 100% RDF (80:40:00 NPK kg/ha) and two levels of biocompost (2.5 t/ha and 5 t/ha). These treatments were replicated four times in a Randomized Block Design (Factorial). Before sowing field ploughed and levelled properly and Bio-compost and NPK through chemical fertilizer was applied as per treatment. 100 per cent phosphorus and 50 per cent nitrogen was applied basal and remaining 50 per cent nitrogen was applied as top dressing after 30 DAS as per treatments. Sowing of sorghum varieties was done with 45 × 15 cm spacing. Growth parameters and yield attributes were recorded from five selected plants randomly from each net plot of all replications and seed and straw yield is recorded from net plot area.

RESULTS AND DISCUSSION

Significantly the tallest plants were observed of variety GNJ-1, whereas shortest plant was recorded of variety GJ-42 during 60 DAS, 90 DAS and at harvest. Significantly higher number of internodes per plant (12.69) and weight of earhead (97.11 g) were recorded with variety GNJ-1. Significantly higher grain yield (2301 kg/ha) and straw yield (6042 kg/ha) were observed with variety GNJ-1 as compared to GJ-42. These results agree with the findings of Shinde *et al.* (2003), Patil and Basappa (2004) and Biradar *et al.* (2008).

Fertilizer had a profound influence on plant height at all the growth stages i.e. 60 DAS, 90 DAS and at harvest of sorghum. Application of 100 per cent RDF recorded

significantly the highest plant height compared to 75 per cent RDF. Application of 100 per cent of recommended dose recorded the highest number of internodes per plant (12.60), earhead weight (93.05 g) as compared to 75 per cent of recommended dose. Significantly highest grain yield (2427 kg/ha) and straw yield (6025 kg/ ha) were recorded with application of 100 per cent RDF as compared to application of 75 per cent RDF. The present findings are in close confirmation with those of Abdullah *et al.* (2000) and Patel *et al.* (2016).

Data pertaining to plant height of sorghum at 60 DAS, 90 DAS and at harvest were differed significantly due to different levels of biocompost. Significantly the tallest plants were observed at 60 DAS, 90 DAS and at harvest with application of biocompost @ 5 t/ha as compared to the application of biocompost @ 2.5 t/ha. Significantly the maximum number of internodes (12.55) per plant and weight of earhead (98.53 g) were recorded with application of biocompost @5 t/ha as compared to application of biocompost @ 2.5 t/ha. An appraisal of data presented in Table 1 revealed that the highest grain yield (2410 kg/ha) and straw yield (5931 kg /ha) were recorded with application of biocompost @ 5 t/ha as compared to application of biocompost @ 2.5 t/ha. The results obtained are in close agreement with the findings of Khan *et al.*(2014).

CONCLUSION

Based on the results of the field experimentation, it seems quite logical to conclude that that higher growth parameters, yield attributes and yield of summer sorghum can be achieved by sowing the variety GNJ-1 and fertilized with 100 per cent RDF (80 + 40 + 00 NPK kg/ha) and biocompost @ 5 t/ha under south Gujarat conditions.

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Table 1: Effect of nutrient management on growth parameters, yield attributes and yield of sorghum

Treatment	Plant Height (cm)			Number of Internodes	Weigh of Earhead (g)	Grain Yield (kg/ha)	Straw Yield (kg/ha)
	60 DAS	90 DAS	Harvest				
Variety (V)							
V ₁ - GJ-42	100.57	152.99	205.95	11.67	79.86	2104	5146
V ₂ - GNJ-1	112.02	173.66	222.39	12.69	97.11	2301	6042
S.Em. ±	2.66	3.80	4.86	0.27	2.79	57.09	132.22
C.D.(P=0.05)	7.83	11.18	14.31	0.81	8.21	167.92	388.86
Fertilizer (F)							
F ₁ - 75% RDF (60:30:00)	101.96	154.50	206.45	11.77	83.92	1979	5163
F ₂ - 100%RDF (80:40:00)	110.63	172.15	221.89	12.60	93.05	2427	6025
S.Em. ±	2.66	3.80	4.86	0.27	2.79	57.09	132.22
C.D.(P=0.05)	7.83	11.18	14.31	0.81	8.21	167.92	388.86
Biocompost (B)							
B ₁ - 2.5 t/ha	102.31	153.74	206.84	11.60	78.45	1996	5257
B ₂ - 5 t/ha	110.29	172.92	221.50	12.77	98.53	2401	5931
S.Em. ±	2.66	3.80	4.86	0.27	2.79	57.09	132.22
C.D.(P=0.05)	7.83	11.18	14.31	0.81	8.21	167.92	388.86
Interactions	NS	NS	NS	NS	NS	NS	NS
CV (%)	10.02	9.31	9.08	9.11	12.63	10.36	9.45

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