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EFFECT OF NUTRIENT MANAGEMENT ON GROWTH AND YIELD OF SORGHUM (*SORGHUM BICOLOR*) AT DEHRADUN INDIA

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ABSTRACT

A field experiment was conducted during Kharif season of 2021 at research farm, Department of Agriculture Dev Bhoomi institute of management studies, Dehradun, Uttarakhand, India. In order to investigate the effect of nutrient management on growth and yield of sorghum crop. The layout of experiment was randomized block design (RBD) with 8 treatments and 3 replications. Consisting of T1(Control), T2 (RDF @ 100%), T3 (RDF @75%), T4 (NPK @10%), T5 (NPK@20%), T6 (RDF @100%+ ZnSo4 @25kg/ha), T7 (NPK@ 20%+ ZnSo4 @25kg/ha), T8 (FYM @10t). The results indicated that among all the treatments, T6 (RDF @100%+ ZnSo4 @25kg/ha) overall was found best for farmer point of view with respect to plant height (251.39cm), gain weight/panicle (128.36 g), seed yield (21.40q/ha), dry fodder yield(136.81 q/ha).

Based on present investigation, it can be concluded that the combination of both RDF @100%+ ZnSo4 @25kg/ha are applied that improved growth and yield of sorghum crop under present agro-climatic conditions.

Keywords: RDF, ZnSo4, Nutrient Management, FYM, NPK

INTRODUCTION

In India, the area under sorghum is approximately 7.38 million ha with an annual production of about 7.0 million tonnes and an average productivity of 949 kg/ha (DAC, 2012). Since the possibility of horizontal expansion or putting more area under cultivation is difficult, future augmentation in yield should have to be harnessed vertically through increase in productivity by judicious management of all input especially nutrients. There is a need to develop more efficient, economic and integrated system of nutrient management. Although the balanced use of N, P and K fertilizers could maintain productivity, in practices it has shown a declining trend, which has been attributed to the continuous and intensive use of chemical fertilizers. The deteriorating productivity was found to be associated with deterioration of soil physical and biological qualities besides imbalance in micronutrients. In Zone IVA (Sub-humid Southern Plain and Aravali Hills) of Rajasthan, a fertilizer dose of 80 kg N +40 kg P₂O₅ + 40 kg K₂O/ha has been recommended for the cultivation of sorghum but the efficiency and productivity is low. The INM, however, helps in maintaining the productivity of soil and improves fertilizer-use efficiency. Thus, it economizes the use of chemical fertilizers by influencing the yield of *kharif* crop (Bejbaruha *et al.*, 2009). Besides nutrients availability, FYM also improves soil physical characteristics such as structures, porosity and water-holding capacity through increased organic matter content of soil. FYM when applied in conjunction with bio fertilizers, supplies energy to beneficial microorganisms including *Azotobacter* and PSB. Integrated plant nutrition involving judicious and integrated use of

chemical/synthetic sources of nutrients along with bio fertilizers in addition to nutrient recycling through use of organic manures, green manuring and biodegradable wastes, etc. Biofertilizers offer a low cost, low capital intensive and ecofriendly route to boost the farm productivity depending upon their activity of mobilizing different nutrients.

MATERIAL AND METHODS

The present investigation was carried out during Kharif season of 2021 in the research farm, Department of Agriculture Dev Bhoomi Group of Institutions, Dehradun, Uttarakhand. It is located in the north western region of Uttarakhand at an altitude of 450m above mean sea level (MSL) and 3088 square kilometers in size. Geographically, the location of Dehradun is in between 29°58' and 31°2'30" North latitude and 77°34'45" and 78°18'30" east longitudes.

The climate of Dehradun is humid subtropical. Summer temperatures can reach up to 44°C for a few days and a hot wind called Loo blows over North India. Winter temperatures are usually between 1 and 20°C and fog is quite common in winters like plains. Although the temperature in Dehradun can reach below freezing during severe cold snaps, this is not common. During the monsoon season, there is often heavy and protracted rainfall.

The soil of experimental site is classified as 'sandy loam' with characteristics as deep, well drained, coarse loamy cover over fragmental soils and of medium fertility. Total five soil samples were taken from upper (0-15cm) layer of the soil and mixed properly from different sites of the field. After proper mixing of the soil, a representative

sample was taken for its physico-chemical process. A composite soil sample was prepared and analyzed separately for different physico-chemical characteristics of the soil. The analysis revealed that the soil of the experimental site was Sandy loam in texture poor in organic matter, low in available nitrogen, medium in available phosphorus and Potassium contents with neutral in reaction and normal in electrical conductivity.

The experimental site having neutral pH and experiment was laid out in completely Randomized block design (RBD). The experiment was replicated thrice with 8 treatments viz., T1(Control), T2(RDF @ 100%), T3(RDF @75%), T4(NPK @10%), T5(NPK@20%), T6(RDF @100%+ ZnSo4 @25kg/ha), T7(NPK@20%+ ZnSo4 @25kg/ha), T8(FYM @10t).Gross plot size was 9.2m (4m x 2.3m)and net plot size was 6m (3mx2m).Total number of plots were 24.

RESULT AND DISCUSSION

Plant height (cm)

Observations on the plant height were recorded at harvest and the data were statistically analyzed. The mean values have been presented in Table 1.1. At harvest stage, maximum height recorded under T6 (251.39 cm) i.e. RDF @100%+ ZnSo4 @25kg/ha, followed by T7(242.58cm), T2(231.28cm), and least height recorded on control plots i.e. T1 (191.38cm). Further, it was also observed that all the other treatments were significantly better in plant height than the control treatment.

Grain weight / panicle (g)

Observations on the grain weight / panicle were recorded at harvest and the data were statistically analyzed. The mean values have been presented in Table1.1. At harvest stage, maximum grain weight/panicle recorded under T6 (128.36) i.e.RDF @100%+ ZnSo4 @25kg/ha, followed by T7(121.36), T2 (116.08),and least grain weight/panicle recorded on control plots i.e. T1 (88.46). Further, it was also observed that all the other treatments were significantly better in grain weight/panicle than the control treatment.

Grain Yield (q/ha)

Observations on the grain yield were recorded at harvest and the data were statistically analyzed. The mean values have been presented inTable1.1. At harvest stage, maximum grain yield recorded under T6 (21.40) i.e.RDF @100%+ ZnSo4 @25kg/ha, followed by T7(18.57), T2 (15.40),and least grain yield recorded on control plots i.e. T1 (10.53). Further, it was also observed that all the other treatments were significantly better in grain yield than the control treatment.

Dry Fodder Yield (q/ha)

Observations on dry fodder yield were recorded at harvest and the data were statistically analyzed. The mean values have been presented in Table1.1. At harvest stage, maximum dry fodder yield recorded under T6 (136.81) i.e.RDF @100%+ ZnSo4 @25kg/ha, followed by T7(131.27), T2 (127.25),and least grain weight/panicle recorded on control plots i.e. T1(113.25). Further, it was also observed that all the other treatments were significantly better in dry fodder yield than the control treatment.

Table 1.1: Effect of different treatments on growth & yield of sorghum.

Treatments	Plant Height (cm)	Grain weight/panicle (g)	Grain Yield (q/ha)	Dry Fodder Yield (q/ha)
T1 Control	191.38	88.46	10.53	113.25
T2 RDF @ 100%	231.28	116.08	15.40	127.25
T3 RDF @75%	216.02	109.18	14.65	124.63
T4 NPK @10%	198.93	90.98	13.03	117.56
T5 NPK@20%	206.12	101.42	11.41	121.81
T6 RDF @100%+ ZnSO ₄ @25kg/ha	251.39	128.36	21.40	136.81
T7 NPK@20%+ ZnSo4 @25kg/ha	242.58	121.36	18.57	131.27
T8 FYM @10t	200.23	100.01	12.19	118.42
SEm ±	1.21	0.98	0.73	0.79
CD(P=0.05)	3.60	2.92	2.17	2.62

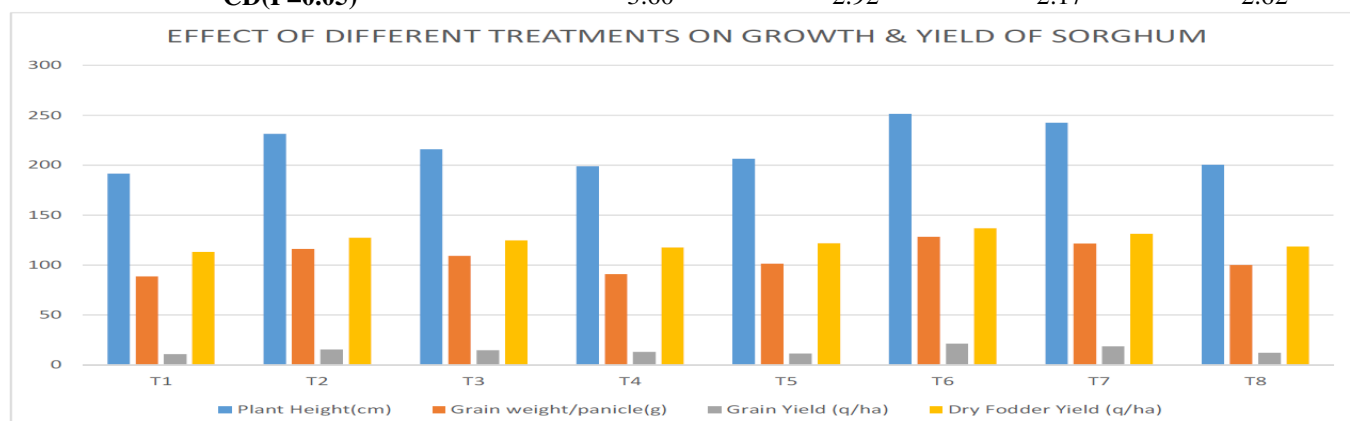


Fig.1 : Graphical presentation of effect of different treatments on growth & yield

CONCLUSION

On the basis of field experiment conducted on “Effect of Nutrient Management on Growth and Yield of Sorghum (*Sorghum bicolor*) at Dehradun” concluded that treatment T6 (RDF @100%+ ZnSo₄ @25kg/ha), was found superior among the other treatments on growth and yield of sorghum. Treatment 6 is the most recommended to the farmers.

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