International Journal of Forestry and Crop Improvement
Volume 3 | Issue 2 | December, 2012 | 124-126

Research Article

Effect of integrated nutrient management and land configuration on growth and yield of *Kharif* sorghum

B.A. SHINDE, J.P. DESHMUKH, R.R. NIMBALKAR AND M.M. CHANDANKAR

ABSTRACT : An experiment was conducted (2007-08) at **S**orghum Research Unit Farm of Dr. Panjabrao Deshmukh Agriculture University Akola (Maharashtra), to evaluat the effect of integrated nutrient management and land configuration studies in *Kharif* sorghum [*Sorghum bicolor*.(L.)Moench] comprised of 100 per cent RDF, FYM @5.0tha^{-1}+*Azotobacter* + PSB and 50 per cent RDF + 2.5 t FYM t ha^{-1} + *Azotobacter* + PSB. Land configuration comprised of flat bed sowing, sowing at 45 cm and opening furrows(3WAS), paired planting at 30-60cm and opening furrow (3WAS) and paired planting at 30-60cm with one row of green gram, in Factorial Randomized Block Design with three replications. The total rainfall received during *Kharif* season of 2007 was 786.8mm. Application of 50 per cent RDF+2.5t FYM t ha^{-1} + *Azotobacter* + PSB gave at par results in case of plant growth and grain of sorghum and sowing at 45cm and opening furrow (3WAS) gave significantly higher growth and yield.

KEY WORDS : Nitrogen, Phosphorus, Potassium, *Azotobacter*, PSB, Sorghum

How to cite this Article : Shinde, B.A., Deshmukh, J.P., Nimbalkar, R.R. and Chandankar, M.M. (2012).Effect of integrated nutrient management and land configuration on growth and yield of *Kharif* sorghum, *Internat. J. Forestry & Crop Improv.*, **3** (2) : 124-126.

Article Chronical : Received : *07.08.2012;* Revised : *25.09.2012;* Accepted : *25.10.2012*

INTRODUCTION

Sorghum [*Sorghum bicolor* (L). Moench] is the fourth major cereal food crop of the world and main staple food crop of Maharashtra. To meet out demand of food grains of ever increasing population of our country it is necessary to improve the production and productivity of food crops in the country. In order to increase production further there is no other option except to increase grain productivity by using available resources most effectively. Therefore, the judicious use of land, labour, capital and the natural resources like temperature, radiant energy, soil moisture and nutrients by employing suitable techniques most effective way (Bhalerao, 1999).

Fertilizer use continued to play a key role in augmenting higher crop productivity. To ensure higher fertilizer use efficiency integrated nutrient management plays a vital role. Therefore, balanced combination of organic manures and chemical fertilizers are required to stimulate sustainability in production of food grains. The experiment was laid out to know the effect of nutrient management and land configuration on growth and yield of *Kharif* sorghum (Das *et al.*, 1997).

MEMBERS OF RESEARCH FORUM

Address of the Correspondence :
B.A. SHINDE, Department of Agronomy, Ratnai College of Agriculture, AKLUJ (M.S.) INDIA

Address of the Coopted Authors :
J.P. DESHMUKH, Dr. Panjabrao Deshmukh Agriculture University, AKOLA (M.S.) INDIA

R.R. NIMBALKAR AND M.M. CHANDANKAR, Department of Agronomy, Ratnai College of Agriculture, AKLUJ (M.S.) INDIA

EXPERIMENTAL METHODS

A field experiment was conducted during the rainy (*Kharif* season of 2007-08) at Sorghum Research Unit of Dr. Panjabrao Deshmukh Agriculture University Akola, (M.S.). Treatment comprised of integrated nutrient management (100% RDF, FYM @5.0 tha^{-1}+ *Azotobacter* + PSB and 50% RDF + 2.5t FYM t ha^{-1} + *Azotobacter* +PSB). Land configuration comprised of flat

bed sowing (45cm), sowing at 45 cm and opening furrows (3WAS), paired planting at 30-60cm and opening furrow (3WAS) and paired planting at 30-60cm with one row of green gram were allotted in Factorial Randomized Block Design, with three replications. The Sorghum CSH-14 was sown in spacing 45x10 cm^2 using a seed rate 10kg ha^{-1}. The fertilizer dose was applied as per treatments and sowing by drilling . The soil had pH 7.5, medium in organic carbon (1.12), available nitrogen (154.6kg ha^{-1}), phosphorus (23.14kg ha^{-1}) and high available potassium (345.13kg ha^{-1}).

Treatment details:

Land configuration:

L_1: Flat bed (45cm)

L_2: sowing at 45cm and opening furrows (3 WAS)

L_3: paired planting at 30-60 cm and opening furrow (3WAS)

L_4: paired planting at 30-60 cm with one row of green gram

Nutrient management:

N_1: 100%RDF (80:40:40 NPK ha^{-1})

N_2: 5 t FYM t ha^{-1}+ *Azotobacter* +PSB

N_3: 50% RDF+2.5 t FYM t ha^{-1}+ *Azotobacter* +PSB

EXPERIMENTAL RESULTS AND ANALYSIS

The results obtained from the present study have been discussed in detail under following heads :

Effect on plant growth:

The sorghum plant attended the maximum plant height (173.94) due to the application of 100 per cent RDF and 50 per cent RDF+2.5 t FYM ha^{-1}+ *Azotobacter* +PSB, during experimental year, which were at par with the treatment except in 5t FYM t ha^{-1} + *Azotobacter* + PSB as similar result observed in case of number of leaves leaf area and dry matter 11.27 cm, 43.66 cm, 155.88 cm (Table 1) values, respectively (Tripati and Bhan 1995; Kolekar *et al.*, 1998)

The higher moisture percentage was recorded in the treatment of sowing at 45cm and opening furrow lowest moisture content was recorded in flat bed sowing (45) , so land configuration significantly influenced the growth characters like plant height, number of functional leaves, leaf area and dry matter. The sowing of 45cm and opening furrow (3 WAS) and paired planting at 30-60 cm and opening furrow (3WAS) increased the growth parameters as compared to flat bed and paired planting at 30-60 cm with one row of green gram (Table 1).

Effect on crop yield:

Application of 100 per cent RDF and 50 per cent RDF+2.5 t FYM t ha^{-1}+ *Azotobacter* + PSB increased significantly the yield attributes *viz.*, test weight (31.45g and 30.26g, respectively) and grain yield per ear head (20.37g and19.84g, respectively). Grain and fodder yield of sorghum were increased significantly due to applications of 100 per cent RDF and 50 per cent RDF+2.5t FYM t ha^{-1}+ *Azotobacter* + PSB than 5 t FYM t ha^{-1}+ *Azotobacter* +PSB. Where grain yield increased 20.49 and 18.50 per cent, respectively (Sood and Sharma, 1992) (Table 2).

The grain yield was increased significantly with sowing at 45 cm and opening furrows(3 WAS) (43.01qha^{-1}) and paired

Table 1 : Effect of integrated nutrient management and land configuration on growth of *Kharif* sorghum

Sr. No.	Treatments	Plant height (cm)	No. of leaves	Leaf area (dm^2)	Dry matter (g)
1.	**Land configuration**				
	L_1	166.25	8.67	39.63	118.64
	L_2	172.23	1036	42.85	141.48
	L_3	169.23	9.39	41.08	122.29
	L_4	164.21	10.07	40.06	122.18
	S.E.(m)±	1.97	0.44	0.647	1.38
	C.D. (P=0.05)	5.78	NS	1.898	4.05
2.	**Nutrient management**				
	N_1	173.94	11.27	43.66	155.18
	N_2	158.77	7.00	37.55	67.71
	N_3	171.66	10.61	40.51	155.16
	S.E.(m)±	1.70	0.38	0.560	1.19
	C.D. (P=0.05)	5.01	1.13	1.64	3.50
3.	**Interaction**				
	S.E.(m)±	3.40	0.77	1.120	2.39
	C.D. (P=0.05)	NS	NS	NS	NS
	GM	168.12	9.62	40.91	126.15

NS=Non-significant

Table 2 : Effect of integrated nutrient management and land configuration on growth of *Kharif* sorghum

Sr. No.	Treatments	Test weight	Grain weight /cob	Grain yield (q ha)	Fodder yield (q ha)
1.	**Land configuration**				
	L_1	29.17	18.13	40.67	81.03
	L_2	30.32	19.30	43.01	86.03
	L_3	30.02	19.06	42.78	85.57
	L_4	29.84	18.81	41.95	83.91
	S.E.(m)±	0.09	0.23	0.53	1.06
	C.D. (P=0.05)	0.28	0.69	1.55	3.11
2.	**Nutrient management**				
	N_1	31.45	20.37	45.59	91.19
	N_2	27.82	16.26	36.25	72.50
	N_3	30.26	19.84	44.48	88.96
	S.E.(m)±	0.08	0.20	0.459	0.91
	C.D. (P=0.05)	0.24	0.59	1.34	2.69
3.	**Interaction**				
	S.E.(m)±	0.16	0.40	0.91	1.83
	C.D. (P=0.05)	NS	NS	NS	NS
	GM	29.84	18.82	42.10	84.21

planting at 30-60 cm and opening furrow (3WAS) 42.78q ha^{-1} over flat bed (45cm) (40.67q ha^{-1})and paired planting at 30-60 cm with one row of green gram (41.95q ha^{-1}). Similar results were observed in fodder yield (Nagre *et al.,* 1990 and Algawadi and Gaur, 1992) (Table 2).

REFERENCES

Algawadi, A.R. and Gaur, A.C. (1992). Inoculation of *Azospirillum brasilense* and phosphate solubilizing bacteria on yield of sorghum in dryland. *Trop Agric.*, **9**(4):34.

Bhalerao, R.S. (1999). Integrated nutrient management in rainfed sorghum [*Sorghum bicolor* (L.) Moench]. M.Sc. Thesis, Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola, M.S. (INDIA).

Das, S.K. Sharma K.L., Saharan, Neelam and Shrinivas, K. (1997). Effect of cultivars, nitrogen sources and soil type on response of sorghum to *Azospirillum* inoculation. *Annl. Agric. Res.*, **18**(3):313-317.

Kolekar, D.T. Umrani, N.K., Indi, D.V. and Shinde, T.B. (1998). Response of *Rabi* sorghum to soil moisture conservation techniques and nitrogen levels. *J. Maharashtra Agric. Univ.*, **23**(1):88-89.

Kolekar, P.T., Umrani, U.K. and Indi, D.V. (1998). Effect of moisture conservation technique and nitrogen on growth and yield of rainfed *Rabi* sorghum. *J. Maharashtra agric. Univ.,* **23**(1):26-28.

Nagre, K.T. Kokate, R.P. and. Thorve, P.V (1990) .Effect of nitrogen and *Azotobacter* on dry matter production, concentration and uptake of nitrogen by sorghum. *PKV. Res. J.,* **14**(2):118-120.

Sood, B.P. and Sharma, V.K. (1992). Effect of nitrogen level on the yield and quality of forage sorghum (*Sorghum bicolor*) intercropped with legumes. *Indian J. Agron.,* **34**(4):642-644.

Tripathi R.Y. and Bhan, Suraj (1995). Effect of level of method of nitrogen application and moisture conservation practices on growth and yield of rainfed sorghum (*Sorghum bicolor*) under light textural eroded soils of Central Uttar Pradesh. *Indian J. Agron.,* **40**(1):47-50.

****