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Research Article

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Effect of Land Configurations and Sulphur Levels on Yield and Economics of Sesamum (*Sesamum indicum* L.)

Shaikh S. N., Narkhede W. N. and Shaikh M. F.*

Department of Agronomy, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani - 431 402, Maharashtra, India

*Corresponding Author E-mail: mudassirshaikh00@gmail.com

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ABSTRACT

The experiment was conducted during Kharif 2017 at Experimental farm, Department of Agronomy, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. The soil was clayey in texture, low in nitrogen, low in phosphorus, rich in potash and alkaline in reaction. The experiment was laid out in split plot design with 3 replication and 12 treatments combinations. The broad bed furrow recorded higher seed yield, straw yield, biological yield, harvest index, gross monetary return, net monetary return and B:C ratio than flat bed but found statistically at par with ridges and furrow; Application of RDF (50:25 NP kg ha^{-1}) with 30 kg sulphur ha^{-1} recorded higher seed yield, straw yield, biological yield, harvest index, gross monetary return, net monetary return and B:C ratio than rest of sulphur levels but found at par with 20 kg sulphur ha^{-1}. The broad bed furrow (BBF) and application of RDF (50:25 NP kg ha^{-1}) with 30 kg sulphur ha^{-1} was found beneficial for increasing productivity and profitability.

Keywords: *Broad Bed Furrow, Economics, Sesamum, Sulphur, Yield.*

INTRODUCTION

Sesamum indicum L. (Syn. *Sesamum orientale* L.) , which is known variously as Sesamum, til, gingelly, gergelim etc. is one of the most important oil seed crop grown extensively in India. Sesamum is the oldest indigenous oil plant with longest history of its cultivation in India. It is an excellent health food and contains 40-42 % quality protein, 23 % carbohydrates and 20% cholesterol free oil sesamum is called as 'the Queen of oils' because of extra ordinary cosmetic and skin care qualities of its oil. It is grown in all season of the year and being a short duration crop, fit well into various cropping sequence or systems. In India, Sesamum is an important edible oil seed crop, stand next to Groundnut It is mainly grown in Gujarat, Uttar Pradesh, Madhya Pradesh, Karnataka, Orissa, Bihar, Jharkhand, Andhra Pradesh, Kerala and Tamilnadu. Land configuration is the combination of soil management and the potential to improve the productivity of Alfisols and Vertisols in the semi-arid tropics.

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The land configuration treatment were FB (flat bed-traditional practices), Ridges & Furrow and BBF (Broad bed furrow) are applied to field for better water conservation, increase soil fertility and productivity of cropping systems. Proper land configuration is known for increasing moisture intake, it's storage and resultant yield. The broad bed and furrow help in providing more opportunity for in *situ* soil water conservation in rainfed Agriculture.

A suitable combination of major and micro element affects growth, yield and quality of Sesamum. Sulphur application has many advantages for sesamum regarding growth parameters, yield and quality. Sulphur application significantly improves the quality of sesamum oil in terms of free fatty acids, like linoleic acids and oleic acid. Sulphur as a plant nutrient can play a key role in augmenting the production and productivity of oilseeds in the country as it has a significant influence on quality and development of oilseeds. Sulphur is one of the 16 essential nutrients required by all plants for oilseed production, as one unit of sulphur produce 3-5 units of edible oil (Tandon, 1991). Sulphur perform many important role in the synthesis of protein, oil and vitamins. It is constituent of 3 amino acid (cystine, cystien and methionine) and thus play vital role for protein production (Takkar, 1987). The focus on modern agriculture on high yielding varieties, greater use of high analysis fertilizer, intensive cropping and decrease in the use of farm yard manure. Thus, now a days the deficiency of sulphur is becoming more evident. Taking note of the fact highlighted above, an experiment enltitled "Effect of land configurations and sulphur levels on growth and yield of Sesamum (*Sesamum indicum* L)'' under rainfed condition was undertaken during the *Kharif* season of 2017.

MATERIALS AND METHODS

The experiment was conducted during *Kharif* 2017 at Experimental farm, Department of Agronomy, College of Agriculture, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani. The soil was clayey in texture, low in nitrogen, low in phosphorus, rich in potash and alkaline in reaction. The experiment was laid out in split plot design with twelve treatment combination; in Main plot, Land configurations L_1 - broad bed furrow, L_2 - ridges and furrow and L_3 –flat bed and in sub plot, sulphur level S_1 - Control (RDF), S_2 - RDF + 10 kg sulphur, S_3 - RDF + 20 kg sulphur, S_4 - RDF + 30 kg sulphur in replications.

Sowing of sesamum was done on 29th June 2017 by dibbling the seeds at two spacing *viz.* BBF is 30 cm ×10 cm and R&F/Flatbed is 45cm × 15cm. The recommended cultural practices and plant protection measures were taken. Fertilizer *viz.*, nitrogen, phosphorus and sulphur were applied to respective plots by using Urea, SSP and Bensulf uniformly in the lines opened for sowing as per the treatments. The crop was harvested on 26th Sep 2017.

Five plants from each net plot were randomly selected and labeled for taking biometric observations at different growth stages. The same plants were harvested separately for post harvest studies. The plants from each net plot were threshed and seeds were cleaned. The cleaned seeds obtained from each net plot were weighted in kg. After separation of seeds from biological yield, remaining material (stem+ bhoosa) was considered as straw yield and its final weights were recorded in kg per net plot, which were then converted into straw yield (Kg ha^{-1}) by multiplying hectare factor. Harvest index indicates the efficiency of plant material to convert the photosynthate into the economic yield and it was worked out as the gross monetary returns (ha^{-1}) obtained due to different treatments in the present study were worked out by considering market prices of economic product, by product and crop residues during the experimental year. The cost of cultivation (ha^{-1}) of each treatment was worked out by considering the price of inputs, charges for cultivation, labour, land and other wages. The net monetary returns (ha^{-1}) of each treatment were worked out by deducting the mean cost of cultivation (ha^{-1}) of each treatment from the gross monetary returns (ha^{-1}) gained from the respective treatments. The benefit: cost ratio of each treatment was calculated by dividing the gross monetary returns by the cost of cultivation of the respective treatments. The data obtained on various observations were tabulated and subjected to their analysis by using analysis of variance and the treatments were tested by F test (Panse & Sukhatme, 1967).

RESULTS AND DISCUSSION

Yield attributes and yield

Significant differences in number of capsules per plant and seed weight per plant were observed due to various land configurations. Land configuration L_1- broad bed furrow recorded higher number of capsules (31.82) and seed weight per plant (2.97 g). Similar finding are also reported by Muthamilselvan et al. (2006). Different sulphur levels could not influenced the seed yield per plant and 1000 seed weight (g) of sesamum. Significant differences in number of capsules per plant and seed weight per plant were observed due to various sulphur levels. Treatment S_4- RDF + 30 kg sulphur recorded higher number of capsules (32.41) and seed weight per plant (3.06 g). Similar finding are also reported by Tiwari et al. (2000).

Due to good management practices, plants got favourable environment for growth and development which ultimately reflected in accomplishing higher levels of yield and yield attributing characters.

The land configuration of L_1 - broad bed furrow in sesamum recorded significantly higher seed yield (590 kg ha^{-1}), straw yield (1552 kg ha^{-1}), biological yield (2142 kg ha^{-1}) and harvest index (27.54) followed by L_3 - flat bed which was at par with L_2 - ridges and furrow. Similar finding are also reported by Muthamilselvan et al. (2006).

The sulphur level S_4 - RDF + 30 kg sulphur recorded significantly higher yield attributes, growth attributes, seed yield (629 kg ha^{-1}), straw yield (1652 kg ha^{-1}), biological yield (2281 kg ha^{-1}) and harvest index (27.54) followed by rest of the all treatments which was at par S_3 - RDF + 20 kg sulphur. Similar finding are also reported by Tripathi et al. (2007).

Economics

The land configuration of L_1 - broad bed furrow in sesamum recorded significantly higher GMR (31052 (₹ ha^{-1}), NMR (15094 (₹ ha^{-1}) and benefit: cost ratio (1.94 %) followed by L_3 - flat bed and which was at par with L_2 - ridges and furrow. Similar finding are also reported by Bharade (2015) and Dikey et al. (2013).

The sulphur level S_4 - RDF + 30 kg sulphur recorded significantly higher GMR (32824 (₹ ha^{-1}), NMR (16346 (₹ ha^{-1}) and benefit : cost ratio (2.00) followed by rest of the all treatments which was at par with S_3 - RDF + 20 kg sulphur). Similar finding are also reported by Singh & Mann (2014) and Thentu et al. (2014).

Table 1: Yield attributing character of sesamum as influenced by different treatments

Treatments	Weight of capsule plant^{-1} (g)	Number of seed capsule^{-1}	Weight of seed plant^{-1} (g)	Number of seed plant^{-1}	Test weight (g)
Main plot **Land Configurations (L)**					
L_1 : Broad Bed Furrow	7.31	35.71	2.97	1082.50	2.73
L_2 : Ridges and Furrow	7.11	35.41	2.82	1035.50	2.71
L_3 : Flat Bed	6.44	34.90	2.50	927.50	2.68
S.E. m ±	0.14	0.55	0.06	22.51	0.02
C.D. at 5 %	0.53	NS	0.22	88.38	NS
Sub Plot **Sulphur Levels (S)**					
S_1 : Control (RDF)	6.47	34.74	2.32	928.70	2.50

S_2 : RDF + 10 kg Sulphur	6.74	35.27	2.70	980.70	2.63
S_3 : RDF + 20 kg Sulphur	7.16	35.61	2.96	1055.00	2.79
S_4: RDF + 30 kg Sulphur	7.45	35.73	3.06	1096.30	2.90
S.E. m ±	0.15	0.62	0.10	25.73	0.03
C.D. at 5 %	0.46	NS	0.28	76.46	NS
Interaction (L x S)					
S.E. m ±	0.27	1.08	0.16	44.57	0.05
C.D. at 5 %	NS	NS	NS	NS	NS
General Mean	**6.95**	**35.30**	**0.76**	**1015.20**	**2.70**

Table 2: Yield (kg ha^{1}) and H.I. (%) of sesamum as influenced by different treatments

Treatments	Seed Yield (kg ha^{-1})	Straw Yield (kg ha^{-1})	Biological Yield (kg ha^{-1})	Harvest index (%)
Main plot **Land Configurations (L)**				
L_1 : Broad Bed Furrow	590	1552	2142	27.54
L_2 : Ridges and Furrow	575	1530	2105	27.31
L_3 : Flat Bed	542	1471	2014	26.91
S.E. m ±	11.15	17.79	27.77	-
C.D. at 5 %	41.74	59.61	105.85	-
Sub Plot **Sulphur Levels (S)**				
S_1 : Control (RDF)	478	1296	1775	26.92
S_2 : RDF + 10 kg Sulphur	557	1497	2054	27.11
S_3 : RDF + 20 kg Sulphur	612	1625	2237	27.49
S_4: RDF + 30 kg Sulphur	629	1652	2281	27.54
S.E. m ±	19.13	49.40	83.54	-
C.D. at 5 %	57.28	147.93	250.14	-
Interaction (L x S)				
S.E. m ±	30.10	75.38	127.55	-
C.D. at 5 %	NS	NS	NS	-
General Mean	**569**	**1518**	**2087**	**27.26**

Table 3: Economics (₹ ha^{-1}) of sesamum as influenced by different treatments

Treatments	Cost of cultivation (₹ ha^{-1})	Gross monetary returns (₹ ha^{-1})	Net monetary return (₹ ha^{-1})	Benefit cost ratio (B:C)
Main plot **Land Configurations (L)**				
L_1 : Broad Bed Furrow	15958	31052	15094	1.94
L_2 : Ridges and Furrow	15958	30280	14322	1.90
L_3 : Flat Bed	15358	28571	13213	1.86
S.E. m ±	-	701	342	-
C.D. at 5 %	-	2168	1065	-
Sub Plot **Sulphur Levels (S)**				
S_1 : Control (RDF)	15038	24918	9880	1.65

S_2 : RDF + 10 kg Sulphur	15518	30183	14665	1.94
S_3 : RDF + 20 kg Sulphur	15998	31947	15949	1.99
S_4: RDF + 30 kg Sulphur	16478	32824	16346	2.00
S.E. m ±	-	771	563	-
C.D. at 5 %	-	2397	1728	-
Interaction (L x S)				
S.E. m ±	-	1339	814	-
C.D. at 5 %	-	NS	NS	-
General Mean	**15758**	**29968**	**14210**	**1.90**

REFERENCES

Bharade, S.S. (2015). Studies on land configurations and varieties in summer groundnut. M.Sc Thesis. VNMKV Parbhani.

Dikey, H.H., Wankhade, R.S., Patil S.P., & Patil, C.U. (2013). Management of water stress through furrow opening technique in soybean for yield enhancement. *Journal of Food Legumes.26*(1 & 2), 106-108.

Muthamilselvan, Manian, R., & Kathirvel, K. (2006). *Insitu* moisture conservation te chniques in dry farming a review *Agric. Rev ., 27*(1), 67-72.

Panse, V.G., & Sukhatme, P.V. (1967). Statistical method for Agricultural Workers, ICAR Publication, New Delhi.

Singh, Y. P., & Mann, J. S. (2007) interaction effect of sulphur and zink in groundnut *(Arachis hypogaea)* and their availability in Tonk district of Rajasthan. *Indian journal of Agronomy, 52*(1), 70-73.

Takkar, N. (1987). Economics of sulphur fertilizer use in India. Proc. FADINAP-FAO-TSI-ACIAR Symposium, 123-124.

Tandon, H.L.S. (1991). Fertilizer Management in Dry land Agriculture. FDCO, New Delhi.

Thentu, T.L., Nawlakhe, S.M., Mankar, D.D., Shrinivasrao, M., & Gauri, V. Bhonde. (2014). Effect on nitrogen, phosphorus and sulphur levels on *summer* sesame yield, economic and residual fertility status of soil. *J. Soil and Crops, 24*(2), 306-309.

Tiwari, R.K., Namdeo, & Girish Jha, (2000). Effect of Nitrogen and sulphur on growth, yield and quality of Sesamum varieties.*Res. on Crops*., *1*(2), 163-167.

Tripathi, M.L., Rajput, R.L., & Chaurasia, S.K. (2007). Effect of sources and levels of sulphur on yield attributes, yield and economics of Sesamum. *Advances-in-Plant-Sciences*., *20*(2), 501-502.