

Effect of different levels and sources of fertilizers on yield, economics and quality parameters of cotton (*Gossypium hirsutum*)

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ABSTRACT

A field experiment was conducted in deep vertisol at Post Graduate Farm, MPKV, Rahuri to evaluate suitable level and source of fertilizers and their interaction effect in respect of yield and economics of cotton under irrigated conditions. Yield characters like seed cotton yield, stalk yield and cotton economy through cost of cultivation, gross monetary return, net monetary return and benefit cost ratio increased significantly with every successive increase in the levels of fertilizer upto 120:60:60 Kg N, P₂O₅ and K₂O ha⁻¹. Yield and economics of cotton were not found significant due to different sources of fertilizers.

Key words : Cotton, Fertilizer levels, Fertilizer sources, Yield and economics

INTRODUCTION

Cotton (*Gossypium* spp.) is the most extensively cultivated commercial crop and most important of all the fiber crop of the world. Some of the major reasons for lower benefit cost ratio in case of cotton under irrigated condition is poor water management and fertilizer application. In order to increase the yield of cotton and maximum net return per hectare farmer should adopt above practices critically with improved technology including use of fertilizers and also use of complex fertilizers play important role in higher cotton yield and net return.

MATERIALS AND METHODS

A field experiment was conducted on different fertilizer levels and sources during *kharif* season at post graduate farm, Mahatma Phule Krishi Vidyapeeth, Rahuri. Soil was medium black clay in texture and alkaline in reaction, and was low in available nitrogen, medium in available phosphorus and high in available potassium with a pH of 8.30. Cotton was sown with the spacing of 90 x 60 cm² with different levels and sources of fertilizer. The experiment was laid out in split plot design with three replications and fertilizer levels (NPK kg ha⁻¹) as main plot treatments with five levels : F₁- 120:60:60 ; F₂- 100:50:50 ; F₃- 80:40:40 ; F₄- (60 + 20): 40: 40 ; F₅- 60:30:30 and fertilizer sources as sub plot treatments with five levels : S₁- straight fertilizer; S₂- 19:19:0 (RCF); S₃- 27:9:0 (RCF); S₄- 20:20:0 (Zuari); S₅- 23:23:0 (Deepak).

Cotton (cv. JLH-168) was sown in first week of May. All the recommended cultural operations were followed. Picking of cotton was started from second week of September to last week of October. Seed cotton yield and stalk yield from net plot was recorded.

RESULTS AND DISCUSSION

Results obtained are summarized in Table 1 and 2. Analysis of variance revealed that different level of fertilizers had significant effect on yield contributing attributes and quality parameter.

Effect of fertilizer levels:

The seed cotton yield and stalk yield showed significant response to increasing levels of nitrogen, phosphorus and potassium. The yield of seed cotton increased significantly with every successive increase in the level of fertilizer up to 120:60:60 Kg N, P₂O₅ and K₂O ha⁻¹ than those obtained in other levels except F₂ (100:50:50) which was at par with F₁. Similar results are also reported by Patel *et al.* (1983) and Pol *et al.* (1991) and Wankhede *et al.* (1994). The mean seed cotton yield and stalk yield due to 120:60:60 Kg N, P₂O₅ and K₂O ha⁻¹ fertilizer level were 16.69 and 54.19 q ha⁻¹, respectively and which were significantly superior to the reduced levels tried (Table 1). Considering the cost of fertilizers gross monetary return, net monetary return, and benefit cost ratio, the application of fertilizer level 120:60:60 Kg N, P₂O₅ and K₂O ha⁻¹ was found to be significant than other levels except F₂ (100:50:50). Results are similar with Bhaskar *et al.* (1993) and Giri *et al.* (1994). The various fertilizer levels did not affect the quality characters of cotton. All the levels of fertilizers were found at par with each other (Subramanyam *et al.*, 1992 and Malik *et al.*, 1992)

Effect of fertilizer sources :

The variation in the mean values of seed cotton yield, stalk yield, gross monetary return, net monetary return, benefit cost ratio and quality parameters like span length, strength of fiber and micronaire value (Table 2) were not influenced significantly due to various sources of fertilizers

Table 1 : Effect of different levels and sources of fertilizers on yield and economics of cotton

Treatments	Seed cotton yield (q/ha)	Stalk yield (q/ha)	Cost of cultivation (Rs./ha)	Gross monetary return (Rs./ha)	Net monetary returns (Rs./ha)	B:C Ratio
Main plot treatments (fertilizer levels)						
F ₁ (120:60:60)	16.69	54.19	18002	41103	23101	2.28
F ₂ (100:50:50)	15.88	52.69	17620	39166	21559	2.22
F ₃ (80:40:40)	15.13	48.96	17234	37268	19015	2.16
F ₄ (60+20:40:40)	14.00	47.45	20769	34569	13786	1.68
F ₅ (60:30:30)	13.20	44.75	16847	32590	15743	1.93
S.E. ±	0.04	0.02	-	1065	1418	0.06
C.D. (P=0.05)	0.14	0.31	-	3476	4626	0.21
Sub-plot treatments (fertilizer sources)						
S ₁ (Straight fertilizer)	15.27	51.12	17986	37680	19621	2.11
S ₂ (19:19:0)	14.58	48.82	17942	35987	18105	2.02
S ₃ (27:9:0)	15.19	48.99	17971	37429	19459	2.10
S ₄ (20:20:0)	15.56	49.85	18273	38281	20022	2.11
S ₅ (23:23:0)	14.29	49.16	18300	35319	15999	1.94
S.E. ±	0.05	0.13	-	1256	1390	0.07
C.D. (P=0.05)	NS	NS	-	NS	NS	NS
Interaction (A x B)						
S.E. ±	0.11	0.31	-	2808	3109	0.15
C.D. (P=0.05)	NS	NS	-	NS	NS	NS

NS- Non significant

Table 2 : Effect of different levels and sources of fertilizers on quality parameters of cotton

Treatments	Span length 2.5 % (mm) of 3 picking			Strength of fiber (g/tex) of 3 picking			Micronaire value (ug/in) of 3 picking		
	I	II	III	I	II	III	I	II	III
Main plot treatments (fertilizer levels)									
F ₁ (120:60:60)	28.11	28.58	28.87	39.53	40.00	40.10	3.70	3.51	3.44
F ₂ (100:50:50)	27.67	28.11	29.21	38.70	40.49	40.59	3.75	3.51	3.37
F ₃ (80:40:40)	28.13	28.48	28.92	38.49	38.74	39.47	3.59	3.50	3.38
F ₄ (60+20:40:40)	27.63	27.93	28.44	37.65	39.93	39.83	3.75	3.56	3.39
F ₅ (60:30:30)	27.64	27.88	28.33	37.94	39.25	40.10	3.70	3.51	3.37
S.E. ±	0.15	0.31	0.33	0.46	0.68	0.79	0.13	0.06	0.09
C.D. at (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Sub-plot treatments (fertilizer sources)									
S ₁ (Straight fertilizer)	27.85	28.51	28.49	38.70	39.74	39.99	3.66	3.55	3.41
S ₂ (19:19:0)	27.77	28.32	28.78	38.34	40.33	40.55	3.73	3.56	3.39
S ₃ (27:9:0)	27.83	28.11	28.58	38.36	39.16	40.10	3.69	3.45	3.36
S ₄ (20:20:0)	27.86	27.96	29.10	38.71	39.18	40.04	3.69	3.57	3.39
S ₅ (23:23:0)	27.56	28.10	28.84	38.19	39.99	39.38	32.71	3.53	3.40
S.E. ±	0.13	0.18	0.19	0.38	0.58	0.79	0.04	0.05	0.05
C.D. at (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS
Interaction (A x B)									
S.E. ±	0.30	0.41	0.44	0.84	1.29	1.77	0.09	0.10	0.12
C.D. at (P=0.05)	NS	NS	NS	NS	NS	NS	NS	NS	NS

NS- Non significant

tried (Pole *et al.*, 1991 and Wankhede *et al.*, 1994).

Effect of interactions :

Interaction effects between levels and sources of

fertilizers in respect of any of the variable under study were not significant indicating the effect of individual factor on the growth and yield contributing characters and yield than in combination.

REFERENCES

- Bhaskar K.S., Gaikwad, S.T. and Ananthakumari, P. (1993).** Response of upland cotton (*Gossypium hirsutum*) to levels of fertilizers in shallow soils of saongi water shed near Nagpur. *Indian J. Agron.*, **38** (1) : 89-92.
- Giri A.N., Giri, D.G., Raikhelkar, S.V. and Shirale, S.T. (1994).** Performance of cotton genotype under different levels of nitrogen. *Indian J. Agron.*, **39** (3) : 432-436.
- Malik M.N., Makhdum, M.I. and Chaudhary, F.I. (1992).** Influence of phosphorus fertilization on crop growth, seed cotton yield and fiber quality. *Pakistan J. Sci. & Industrial Res.*, **35** (7/8) : 288-290.
- Patel, M.S., Sanandia, C.J., Mehta, N.P., Patel, M.N. and Patel, P.G. (1983).** Production potential of medium staple rainfed cotton under different levels of fertility and plant density. *J. ISCI*, **8** (2) : 124-126.
- Pole, P.S., Nikam, B.T. and Shinde, S.S. (1991).** Yield, quality parameters and nutrient removal of wheat as influenced by levels and sources of fertilizers. *J. Maharashtra agric. Univ.*, **16** (2) : 273-274.
- Subramanyam, Y., Vshi, R.G., Mehta, M.P., Mistri, G.G. and Munshi, V.G. (1992).** Effect of applied and native phosphorus on the yield and quality of hybrid-6 cotton. *J. ISCI*, **17**(1) : 57-61.
- Wankhede S.T., Deshpande, R.M. and Kene, H.K. (1994).** Effect of different forms of fertilizers on yield of cotton. *PKV Res. J.*, **18** (1) : 33-34.

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