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GROWTH AND YIELD ATTRIBUTES, YIELD, FIBRE QUALITY AND ECONOMICS OF *HIRSUTUM* COTTON AS INFLUENCED BY FOLIAR APPLICATION OF KNO_3

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Abstract

A field experiment was conducted during *Kharif* season from 2007 to 2009 at C.S. Azad University of Agricultural and Technology, Kanpur (U.P.), India; to study the effect of foliar application of KNO_3 on yield, fibre quality and economics of *hirsutum* cotton. Data indicated that application of KNO_3 and MOP improved significantly all the growth and yield attributing characters over control. Four foliar sprays of 2% KNO_3 produced significantly more seed cotton yield (1621 kg/ha) and lint yield (549 kg/ha) than control by 22.6 and 18.7 per cent, respectively. Significantly higher seed cotton yield (1565 kg/ha) and lint yield (519 kg/ha) were also obtained with 2 foliar application of 3% KNO_3 than control. All the fibre quality parameters were found to be non-significant. Higher gross return (Rs. 48411/ha), net return (Rs. 25169 /ha) and B: C ratio (2.08) were achieved with the application of MOP in four split dose (soil treatment) followed by full dose of MOP as basal (Rs. 46198/ha), (Rs. 22956/ha) and (1.99), respectively, as compared to all the rest treatments.

Key words : Economics, fibre quality, foliar application of KNO_3, Lint yield, MOP, seed cotton yield and seed yield.

Introduction

Cotton is an important commercial fiber crop of India and plays a significant role in Indian economy by providing 30 per cent of total export earnings. In India, it was grown on a area of about 12.65 mha with the production of 400 lakh bales and productivity of 537 kg/ha during 2014-15. India has Ist rank in production of cotton in the world after China (Anonymous, 2014-15). Among the various ways of supplying nutrient to the crops, the efficient utilization of nutrient by the plants is made through foliar application of nutrient at appropriate stage of crops. Foliar spray of nutrient is one such phenomenon, which regulates the biochemical change in seed and lead to higher productivity by modifying the phenotypic growth characters (Shashtri *et al*., 2000). Squaring blooming and boll development are the stages when cotton requires highest demand of nutrient. Augment of nutrient supply through foliar application at such critical stages may increase the yield (Bhatt and Nathu, 1986). Threfore, present study was carried out to study the effect of foliar application of KNO_3 on yield, fibre quality parameters and economics in *hirsutum* cotton.

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Materials and Methods

The field experiment was conducted during *kharif* seasons from 2007 to 2009 at Oil Seed Farm, Kalyanpur of C.S. Azad University of Agriculture and Technology, Kanpur (U.P.), India; to study the effect of foliar application of 2% KNO_3 on growth and yield attributes, yield, fiber quality and economics of *hirsutum* cotton. In all 9 treatments *viz*., T_1- Control, T_2- Two spray of KNO_3, T_3- Three spray of 2% KNO_3, T_4- Four spray of 2% KNO_3, T_5- Two spray of 3% KNO_3, T_6- Three spray of 3% KNO_3, T_7- Four spray of 3% KNO_3, T_8- Four split dose of MOP (soil treatment) and T_9- full dose of MOP as basal were tested in randomized block design with three replication on *hirsutum* cotton variety (Rs. 2013). The soil of experimental field was sandy loam in texture having pH of 8.0, low in available OC% (0.37), medium in available P_2O_5 (17 kg/ha) and high in available K_2O (270 kg/ha). Cotton planting was done at spacing of 67.5x30 cm on 25.05.07, 30.05.08 and 16-05-09 during 1st, 2nd and 3rd years, respectively. Foliar application of KNO_3 was made at 15 days interval starting with flower initiation during all the years of study. Recommended dose of fertilizer was applied at the rate of 60:30:00 kg NPK/ha whenever, K was applied @ 20 kg/ha as a form of

Table 1: Effect of foliar application of KNO_3 on growth and yield attributes, yield, fibre quality and economics in *hirsutum* cotton (pooled of 3years).

Treatments	Plant height (cm)	No. of bolls / plant	Boll wt. (g)	Seed cotton yield (Kg/ha)	Seed yield (kg/ha)	Lint yield (kg/ha)	GOT %	Gross return (Rs/ha)	Net return /ha	B:C ratio	Quality parameters (2 years pooled data)			
											2.5 span length (mm)	Unit ratio (%)	MIC value	Strength (g/t)
T_1	129.9	25.8	2.70	1322	883	437	33.1	41294	18332	1.79	24.90	51.00	4.05	20.95
T_2	132.6	28.0	2.74	1525	1002	514	33.8	47015	22653	1.92	24.35	51.00	3.95	20.85
T_3	131.8	28.4	2.73	1534	1008	515	33.7	47658	22596	1.90	24.30	52.00	4.00	20.60
T_4	133.4	30.4	2.86	1621	1063	549	34.0	50354	24592	1.95	24.50	51.50	4.00	20.35
T_5	132.2	30.6	2.79	1565	1034	519	33.4	48949	23887	1.95	25.10	50.50	3.85	21.05
T_6	133.8	30.5	2.73	1520	987	512	33.7	47440	21328	1.89	25.08	50.50	3.80	21.45
T_7	132.2	30.0	2.74	1516	1001	508	33.5	47439	20277	1.74	24.05	51.00	3.80	20.25
T_8	132.9	30.6	2.80	1553	1024	521	33.6	48411	25169	2.08	24.85	52.00	3.85	21.45
T_9	134.0	29.4	2.77	1474	970	496	33.8	46198	22956	1.99	24.40	51.50	4.00	20.28
CD at 5%	3.89	2.42	.049	94.62	62.35	32.34	0.32	-	-	-	NS	NS	NS	NS

T_1- Control, T_2- Two spray of 2% KNO_3, T_3- Three spray of 2% KNO_3, T_4- Four spray of 2% KNO_3, T_5- Two spray of 3% KNO_3, T_6- Three spray of 3% KNO_3, T_7- Four spray of 3% KNO_3, T_8- Four split dose of MOP (soil treatment) and T_9- full dose of MOP as basal.

MOP with the treatment of $\mathbf{T_8}$ and $\mathbf{T_9}$. All the agronomic and plant protection measures were followed during crop season. Picking of the crop was done on 18.11.07, 11.12.08 and 30-10-2009 during 1st, 2ndand 3rd years of study, respectively.

Results and Discussion

Three years pooled data revealed (table 1) that foliar spray of KNO_3, application of MOP in four split dose and full dose of MOP as basal improved all the growth and attributing characters and yield during all the investigation years over control. Application of full dose of MOP as basal produced significantly higher plant height (134 cm) as compared to control (129.9 cm). Significantly more number of bolls/plant (30.4) and boll wt. (2.86g) were recorded with the 4 foliar spray of 2% than control (25.8) and (2.70 g), respectively. All the ancillary characters were found superior with the foliar application of KNO_3 than control (Barar and Barar, 2001; Singh *et al*., 2004; Kumar *et al*., 2010). Four foliar sprays of 2% KNO_3 produced significantly higher seed cotton yield (1621 kg/ha), seed yield (1063 kg/ha) and lint yield (549 kg/ha) than control (1322, 883 and 437 kg/ha), respectively. The increase in yield with the 4 spray of 2% KNO_3 was to the tune of 22.6 and 20.3and 18.7 per cent, respectively over control. Two foliar spray of 3% KNO_3 was found to be next best treatment for producing higher seed cotton yield and seed yield followed by four split dose of MOP (soil treatment) during investigation. The increase in the yield with the foliar of KNO_3 and four split dose of MOP (soil treatment) might be attributed to more number of boll/plant and boll wt. These results are in conformity with the finding of Barar and Barar (2001), Singh *et al*. (2004) and Kumar *et al*. (2010). Significant higher GOT (34%) was observed with the 4 foliar spray of 2% KNO_3 over control (33.1%). Application of KNO_3 containing both potassium and nitrate applied at the critical growth period helped in retention and development bolls on the plant, which significantly contributed to increase seed cotton yield have been reported by Barar and Barar (2001). Beneficial effects of potassium on yield of seed cotton have also been reported by Nehra *et al*. (2004). Foliar application of KNO_3 and MOP (four split dose in soil treatment and as basal) had no any impact on all the fibre quality parameters. These results are in conformity with the finding of Raj *et al*. (2009). Highest net return (Rs. 25169/ha) and B : C ratio (2.08) were fetched with the treatment of $\mathbf{T_8}$ followed by $\mathbf{T_9}$ (Rs. 22956/ha) and (1.99), respectively. The higher net return and B :

C ratio with $\mathbf{T_8}$ and $\mathbf{T_9}$ might be due to low cost of cultivation.

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