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## Growth, yield attributes, yield and economics of hirsutum cotton as influenced by foliar application of KNO<sub>3</sub>

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### Abstract

A field experiment was conducted during *Kharif* season from 2009 to 2012 at Cotton improvement Project, MPKV, Rahuri (Maharashtra), India, to study the effect of foliar application of KNO<sub>3</sub> on growth yield and economics in hirsutum cotton. Data indicate that application of KNO<sub>3</sub> and MOP improved significantly all the growth and yield attributing characters over control. Four foliar sprays of 3% KNO<sub>3</sub>, produced significantly more seed cotton yield (36.28 kg/ha) than control by 20.5 percent. Significantly higher seed cotton yield (35.71 kg/ha) were also obtained with application of four foliar sprays of 2% KNO<sub>3</sub> than control. Higher gross return (Rs.133596/ha) were recorded by application of Four foliar sprays of 3% KNO<sub>3</sub>. However, the higher net return (Rs.71431/ha) and B:C ratio (2.20) were achieved with the application of Four foliar sprays of 3% KNO<sub>3</sub>.

**Keywords:** Economics, foliar application of KNO<sub>3</sub>, MOP and seed cotton 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 1st 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). Therefore, present study was carried out to study the effect of foliar application of KNO<sub>3</sub> on growth yield and economics in *hirsutum* cotton.

### Material and Methods

The field experiment was conducted during *kharif* seasons from 2009 to 2012 at Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri (Maharashtra), India. To study the effect of foliar application of KNO<sub>3</sub> on growth yield attributes and economics of *hirsutum* cotton. In all 9 treatments viz., T1: Control, T2: Two spray of 2% KNO<sub>3</sub>, T3: Three spray of 2% KNO<sub>3</sub>, T4: Four spray of 2% KNO<sub>3</sub>, T5: Two spray of 3% KNO<sub>3</sub>, T6: Three spray of 3% KNO<sub>3</sub>, T7: Four spray of 3% KNO<sub>3</sub>, T8: MOP in four split dose (soil treat.) and T9: Full dose of MOP. as basal were tested in randomized block design with three replication on *hirsutum* cotton hybrid (RHH-688). The soil of experimental field was medium deep black having pH of 8.0, low in available OC% (0.37), medium in available P<sub>2</sub>O<sub>5</sub> (17 kg/ha) and high in available K<sub>2</sub>O (270 kg/ha). Cotton planting was done at spacing of 90 x 90 cm on 25.05.2009, 30.05.2010 and 16.05.2011 during 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years, respectively. Foliar application of KNO<sub>3</sub> 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 100 : 50 : 50 kg NPK/ha whenever, K was applied @ 20 kg/ha as a form of MOP with the treatment of T<sub>8</sub> and T<sub>9</sub>. All the agronomic and plant protection measures were followed during crop season. Picking of the crop was done on 18.11.2009, 11.12.2010 and 30.10.2011 during 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> years of study, respectively.

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## Results and Discussion

### Effect on growth and yield

The pooled data presented in Table 1, revealed that the treatment T<sub>7</sub> (Four spray of 3% KNO<sub>3</sub>) recorded maximum plant height (111.90 c.m.), number of bolls per plant(67.50), average boll weight (4.49 g), yield per plant (311.88 g). The treatment T<sub>1</sub>(control) recorded lowest values in all yield attributing characters.

Application of four foliar spray of 3% KNO<sub>3</sub> (T<sub>7</sub>), recorded higher number of bolls per plant (67.50), average boll weight (4.49 g), yield per plant (311.88 g) and seed cotton yield (36.28 q ha<sup>-1</sup>) than rest of treatments. This treatment was at par with (T<sub>8</sub>). four foliar spray of 2% KNO<sub>3</sub>. However, no significant difference was observed in plant height, but numerically four foliar spray of 2% KNO<sub>3</sub> recorded maximum plant height (111.90 cm). The lowest plant height (103.04cm),

number of bolls per plant (59.60), average boll weight (4.33 g), yield per plant (252.97g) and seed cotton yield (29.17 q ha<sup>-1</sup>) was recorded by control treatment (T<sub>1</sub>). These results are in conformity with the finding of Barar and Barar (2001), Singh et al. (2004) and Kumar et al. (2010).

### Effect on Economics

The pooled data presented in Table 2. It revealed that, no significant difference was observed due to different foliar spray application. Numerically the application of four foliar spray of 2% KNO<sub>3</sub> (T<sub>4</sub>) recorded maximum net returns (Rs. 71431 ha<sup>-1</sup>) and B:C ratio (2.20 ) respectively than other treatments. The percentage increase in net returned over control is (29.50%). However, the lowest net returns (Rs. 55158 ha<sup>-1</sup>) and B:C ratio (2.09 ) was recorded under control treatment (T<sub>1</sub>).

**Table 1:** Pooled mean of growth, yield attributes and seed cotton yield as influenced by various treatments.

Treatments	Plant height (cm)	No of Bolls per plant	Av. boll Weight (g)	Yield per plant (g)	Seed cotton yield (q/ha)			
					2009-10	2010-11	2011-12	Pooled mean (3years)
T <sub>1</sub> – Control	103.04	59.60	4.33	252.97	31.38	30.38	25.76	29.17
T <sub>2</sub> – Two spray of 2% KNO <sub>3</sub>	107.27	62.88	4.38	272.66	32.51	32.85	29.49	31.62
T <sub>3</sub> – Three spray of 2% KNO <sub>3</sub>	108.89	64.05	4.42	284.6	33.61	34.23	33.09	33.64
T <sub>4</sub> – Four spray of 2% KNO <sub>3</sub>	108.67	66.80	4.47	308.18	35.29	37.14	34.69	35.71
T <sub>5</sub> – Two spray of 3% KNO <sub>3</sub>	108.96	63.99	4.34	277.58	32.99	33.33	29.66	31.99
T <sub>6</sub> – Three spray of 3% KNO <sub>3</sub>	107.76	63.49	4.40	283.48	33.02	34.09	31.23	32.78
T <sub>7</sub> – Four spray of 3% KNO <sub>3</sub>	111.90	67.50	4.49	311.88	34.54	37.59	36.71	36.28
T <sub>8</sub> – MOP in four split dose (soil treatment)	103.98	62.16	4.40	264.77	31.96	31.86	28.40	30.74
T <sub>9</sub> – Full dose of MOP	99.98	60.44	4.39	262.74	31.76	31.55	27.66	30.32
S.E.±	4.25	2.23	4.38	1.88	2.17	2.05	2.45	2.23
C.D. at 5%	N.S.	N.S.	0.12	5.51	N.S.	N.S.	6.95	N.S.

**Table 2:** Seed cotton yield, net monetary returns and B:C ratio as influenced by various treatments

Treatment	Gross monetary returns (Rs./ha)				Net monetary returns (Rs./ha)				B:C Ratio			
	2009-10	2010-11	2011-12	Pooled Mean	2009-10	2010-11	2011-12	Pooled Mean	2009-10	2010-11	2011-12	Pooled Mean
T <sub>1</sub> : Control	94135	121536	103017	106229	52385	68435	44653	55158	2.25	2.29	1.74	2.09
T <sub>2</sub> : Two spray of 2% KNO <sub>3</sub>	97530	131412	117965	115636	52080	74612	54186	60292	2.15	2.36	1.84	2.11
T <sub>3</sub> : Three spray of 2% KNO <sub>3</sub>	100822	136899	132377	123366	53522	78248	64884	65551	2.13	2.33	1.95	2.09
T <sub>4</sub> : Four spray of 2% KNO <sub>3</sub>	105864	148559	138767	131063	57113	88458	68723	71431	2.17	2.47	1.97	2.20
T <sub>5</sub> : Two spray of 3% KNO <sub>3</sub>	98971	133332	118655	116986	52070	75082	53500	60217	2.10	2.29	1.81	2.06
T <sub>6</sub> : Three spray of 3% KNO <sub>3</sub>	99073	136350	124909	120111	49598	75525	56237	60453	2.00	2.24	1.81	2.01
T <sub>7</sub> : Four spray of 3% KNO <sub>3</sub>	103600	150342	146846	133596	51550	86942	73079	70523	1.99	2.37	1.98	2.11
T <sub>8</sub> : MOP in four split dose (soil treatment)	95884	127434	113591	112303	53548	73767	52332	59882	2.27	2.37	1.84	2.16
T <sub>9</sub> : Full dose of MOP	95267	126199	110655	110707	52931	72533	50170	58544	2.25	2.53	1.80	2.19
S.E.±	--	--	--	--	6540	8210	8390	7758	--	--	--	--
C.D. at 5%	--	--	--	--	N.S.	N.S.	N.S.	N.S.	--	--	--	--

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