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Effect of cultvars and potassium levels on content and uptake of nutrients, yield and quality of Bt. cotton

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Abstract
A field experiment was conducted at the Instrucional Farm, College of Agriculture, Junagadh Agricultural University, Junagadh on "Effect of cultvars and potassium levels on content and uptake of nutrients, yield and and quality of Bt. Cotton". The experiment consisting of 15 treatment combinations with five Bt cotton cultivars *viz*., Ankur-165, Vikram-5, Shakti-7, Rashi-2 and Mico-162 and three levels of K_2O(0, 80 and 120 kg ha^{-1}). The results revealed that the cultivar V_4(Rashi-2) recorded significantly the highest dry matter yield, lint yield, seed cotton yield, total cotton yield, higher balls per plant, ball weight, as well as the higher value of micronair, stepple length and 2.5% span length. The application of potash @ 120 kg ha^{-1} gave significantly higher dry matter, lint yield, seed cotton yield, stalk yield and total cotton yield. The quality parameters *viz*., micronair, stepple length, span length, oil content and ginning percentage were also recorded higher with cultivar Vikram-5. The concentration and uptake of K were recorded higher with dry matter, stalk and seed cotton were recorded higher under application of K_2O @ 120 kg $ha^{-1.}$ Similarly, the application of K_2O @ 120 kg ha^{-1} registered significantly higher uptake of N, P and K by seed cotton.

Keywords: Cotton cultivars, potassium levels, quality parameter, yield, concentration and uptake of nutrients

Introduction
Knowledge regarding the relation between the rate of absorption by plant root and the concentration of ion external to the root is important for doing plant nutrient study for investing ion absorption mechanism and for evaluating mechanism of nutrient supply to plant root to the root growing in soil. It is truism that our interest is production of a yield within a given time. The uptake of nutrient is an essential part of growth process and if the uptake rates does not keep place with the growth rate.

The concentration of nutrient in the plant tissue may decrease and plant may become deficient resulting into poor yield. Root and shoot from the absorbing surfaces of plants below and above ground, respectively and the activity of such surfaces can be measured as a mean uptake rate per unit surface of flux. This approach arises from a consideration of the function of roots in soil. This suggest that in soil fertility studies, one should not ask whether there are sufficient available nutrients in the soils, but rather ask whether the root system of crop in that soil is able to take nutrients at the rate necessary for maximum growth. Most of this work is formulated in term of uptake of nutrient per unit surface area or flux. However, it follows from the equation for diffusion to a cylinder that roots is in fact, mainly determined by the uptake rate per unit length or the root influx (Nye and Tinker, 1969 and Brewster and Tinker, 1970). In the above context, a well planned field experiment was conducted to study the root influx of nutrients in the Bt cotton cultivars as influenced by different levels of potassium during kharif season.

Materials and Methods: A field experiment was conducted in soil having characteristics Vertic Haplustepts, clayey in texture, calcareous in nature and slightly alkaline in reaction with three levels of potassium (0, 80 and 120 kg K_2O ha^{-1}) and five cultivars of cotton *viz:* (V_1:Ankur – 165, V_2:Vikram – 5, V_3:Shakti – 7, V_4:Rashi – 2, and V_5:Mico-162 using four replications in a Factorial Randomized Block design. The experimental soil had pH 7.99, EC 0.44 dSm^{-1}, O.C. 5.9% and CEC 39.8 cmol (P^+) kg^{-1}. The soil contain 301, 34 and 278 N, P_2O_5 and K_2O $kgha^{-1}$ respectively.

Cotton crop was fertilized with nitrogen and potassium in the form of urea and murate of potash. The sowing was done in previously prepared furrows by keeping 120 cm inter and 45 cm intra raw spaing. The crop was irrigated with five irrigations.

The chemical studies carried out by taking representative samples of plant and seed from each net plot in all the replications at 60 DAS and harvest. All samples were powdered by mechanical mill grinder. Finally, the powdered samples were utilized for estimation of nitrogen, phosphorus and potassium. The known quantities of powdered samples was digested in a diacid mixture as per method described by Jhonson and Ulrich (1969). This acid extract was used for the determination of phosphorus, potassium, iron, manganese, zinc and copper. The nitrogen from plant samples were estimated separately by micro Kjeldahls method as described by Kanwar and Chopra (1976) [6]. The phosphorus determined by Vanadomolybdo phosphoric yellow colour method as described by Jackson (1973) [4]. The potassium determine by flame photometer as described by Jackson (1973) [4].

Result and Discussion

The results obtained from the present investigation are summarized and discussed as below:

Yield of Bt. Cotton

The data of individual and combined effect of cultivar, potassium and interaction effect on yield of Bt. cotton at harvest are presented in table-1.

The dry matter yield at 60 DAS and lint, seed cotton stalk and total cotton yield were significantly influenced by tested cultivars of Bt. cotton (Table-1). The dry matter yield (2623 kg ha^{-1}) at 60 DAS and lint yield (906 kg ha^{-1}), seed cotton yield (2626 kg ha^{-1}), stalk yield (3793 kg ha^{-1}) and total cotton yield (6419 kg ha^{-1}) at harvest recorded significantly higher with cultivar V_4 (Rashi-2) over that of remaining cultivars. It was also found at par with V_5 (Mico-162) in respect of dry matter yield, lint yield, seed cotton yield and total yield and V_2 (Vikram-5) and V_5 (Mico-162) for seed cotton yield. Among these cultivars, the variety V_4 (Rashi-2) showed the higher value of dry matter yield, lint yield, seed cotton yield and total yield. The results are close in agreement with those reported by Pervez (2004).

The data presented in table-1 indicated that dry matter, lint, seed cotton, stalk and total cotton yield were significantly affected under varying levels of potassium application. The stalk and total cotton yield were increased with levels of potassium application. The application of K_2O @ 120 kg ha^{-1} gave higher dry matter (2534 kg ha^{-1}) at 60 DAS and lint (908 kg ha^{-1}), seed cotton (2597 kg ha^{-1}), stalk (3728 kg ha^{-1}) and total cotton (6325 kg ha^{-1}) yield by per cent of 10.96, 11.00, 8.79, 12.96 and 11.24, respectively over that of 0 kg K_2O ha^{-1}, which was also found at par with 80 kg K_2O ha^{-1}. Overall, it is discussed that significantly higher values of dry matter yield at 60 days and lint yield, stalk yield and total cotton yield were obtained at 120 kg K_2O ha^{-1}. The results are close in agreement with those reported by Parmar (2006) [8] and Reddy and Kumar (2010) [11].

The combined effect of cultivar and potassium rates was found non-significant on dry matter yield at 60 days and lint yield, seed cotton yield, stalk yield and total cotton yield at harvest (Table-1).

Yield attributes

The data presented in table-2 indicated the effect of cultivar and potassium and their interaction on yield attributes at 60 days growth period and at harvest of crop.

The yield attributes viz., plant height and squares per plant at 60 days growth stage and plant height, monopodial branches per plants, sympodial branches per plants, bolls per plant and boll weight were significantly influenced by different cultivars of Bt. cotton but there was no consistency trend of yield attributes with cultivar.

The plant height (65.08) was recorded higher with cultivar V_3 (Shaki-2) and it remain at par with V_5 (Mico-162) at 60 days growth stage, while plant height at harvest stage was recorded higher with V_2 (Vikram-5) and it remain at par with V_3 (Shaki-2) and V_5(Mico-162).

In respect of square per plant, significantly higher value was observed with cultivar V_5 (Mico-162), it was remain at par with V_4 (Rashi-2). The monopodia branches per plant and sympodia branches per plant were recorded higher with V_2 (Vikram-5) in a value of 4.36 and 24.58, respectively over than that of remaining cultivars. It was also found at par with V_1 (Ankur-165) and V_5 (Mico-162) for monopodial branches and V_1 (Ankur-165) and V_4 (Rashi-2) for sympodial branches per plant. Among the different cultivars, the cultivar V_4 (Rashi-2) showed significantly higher value of bolls per plant (37.00) and boll weight (6.38 g) and it also found at par with cultivar V_5 (Mico-162) for boll weight. The significant differences between cultivars were also observed in respect to dry matter yield at 60 days and lint and total cotton yield of Bt. cotton. The results are close in agreement with those reported by Comberato and Jones (2005) and Rekha and Dhura (2010) [12] for cotton crop.

The data (Table-2) indicated that the application of potassium was produced significant effect on yield attributes at 60 days growth stage and at harvest except bolls per plant at harvest. The application of potassium @ 120 kg ha^{-1} gave the significantly higher value of plant height (60.55 cm) at 60 days and plant height (96.23 cm), monopodia branches per plant (4.27), sympodia branches per plant (24.24) and boll weight (6.26 g) at harvest over that of control i.e. 0 kg. These were also remains at par with application of K_2O @ 80 kg ha^{-1}, whereas, square per plant was recorded higher with application of K_2O @ 80 kg ha^{-1}. Thus it is found that fertilization of cotton with 120 kg K_2O ha^{-1} produced significant effect on plant height at 60 days, and plant height, monopodia branches per plant, sympodia branches per plant and boll weight at harvest. The results are close in agreement with those reported by Parmar (2006) [8] and Reddy and Kumar (2010) [11].

The combined effect of cultivar and potassium levels and their combination did not produced any significant effect on yield attributing parameters viz., plant height and square per plant at 60 days growth period and plant height, monopodia branches per plant, sympodia branches per plant, bolls per plant and boll weight at harvest of crop.

Quality parameters of seed cotton

The data in table-3 pertaining to the effect of cultivar, potassium levels and their interaction effect on quality parameters viz., micronair, stepple length, 2.5% span length, oil content and ginning percentage of seed cotton.

The result revealed that the significant differences observed among cultivars of Bt. cotton in terms of micronair, stepple length, 2.5% span length, oil content and ginning percentage. The cultivar V_4 (Rashi-2) gave higher value of micronair (4.752), stepple length (2.839 cm) and 2.5% span length (2.917) as compared to remaining verities, whereas, the oil

content was recorded higher with cultivar V_5 (mico-162) in value of 18.49 percent followed by V_4 (Rashi-2). The ginning percentage was recorded higher with cultivar V_2 (Vikram-5) over that of remaining cultivars. Thus it was found that the variety V_4 (Rashi-2) showed high values of micronair, stepple length and 2.5% span length, while oil content and ginning percentage were recorded higher with V_5 (Micro-162) and V_2 (Vikram-5), respectively. The quality parameters were influenced significantly by cultivars which are in line with the finding of Cassman *et al.*, (1990) [3] in respect of micronair and fiber elongation.

The application of potassium at varying levels produced significant effect on quality parameters viz., micronair, stepple length, 2.5% span length, oil content and ginning percentage. Significantly higher value of micronair (4.119), stepple length (2.81 cm), 2.5% span length (2.879), oil content (18.12%) and ginning percentage (34.96%) obtained with application of K_2O @ 120 kg ha^{-1} over that of no K fertilization. It was also found at par with 80 kg K_2O ha^{-1} in respect of stepple length, 2.5% span length, oil content and ginning percentage. Thus results clealy indictaed that the fertilization of Bt. cotton with potassium levels, significantly improved micronair, stepple length, 2.5 span length, oil conten and ginning percentage and those were recorde higher under application of K_2O @ 120 kg ha^{-1}. The finding of the present investigation also supports the work reported by Petigrew *et al.*, (1995) and Parmar (2006) [8].

The interaction effect of cultivar and potassium was found significant on micronair and stepple length whereas, the 2.5% span length, oil content and ginning percentage were remain unaffected (Table-3).

The data (Table-3) indicated that the value of micronair of lint was recorded significantly higher under combination of cultivar V_4 (Rashi-2) and 120 kg K_2O ha^{-1} followed by cultivar V_4 (Rashi-2) and 80 kg K_2O ha^{-1}.

The stepple length was recorded higher under combination of cultivar V_3 (Shakti-2) and K_3 (120 kg K_2O ha^{-1}) and V_4 (Rashi-2) and K_2(80 kg K_2O ha^{-1}).

Nutrients content

The data on the effect of cultivar, potassium and their interaction effect on NPK content in dry matter at 60 DAS, in stalk at harvest and in seed cotton are presented in table-4.

The concentration of potassium in dry matter at 60 days growth stage and in stalk at harvest were significantly influenced by different cultivars of Bt. cotton but the nitrogen, phosphorus and potassium content in seed cotton and nitrogen and phosphorus content in dry matter and stalk of Bt cotton did not showed any significant effect. Significantly higher value of K content in dry matter (1.088%) and in stalk (1.045%) was recorded with cultivar V_2 (Vikram-5) over that of remaining cultivars. It was also remaining at par with cultivar V_3 (Shakti-2) for K content in dry matter and V_5 (Mico-162) for K content in stalk at harvest. The concentration of potassium in dry matter at 60 days growth stage and stalk of cotton at harvest was influenced by cultivars of Bt. cotton whereas, NP content in dry matter at 60 days and stalk at harvest and NPK content in seed were remain unaffected. Pervez (2004) reported cultivar differences in K uptake efficiency in utilizing nature transport nutrients.

The potassium levels showed significant effect only on concentration of K in dry matter, in stalk and in seed cotton, whereas the concentration of N and P in dry matter, in stalk and in seed cotton remain unaffected under varying levels of potassium application (Table-4).

The application of K_2O @ 120 kgha^{-1} gave significantly higher value of K content in dry matter (1.097%), in stalk (1.04%) and in seed cotton (0.982%) which remains at par with 80 kg K_2O ha^{-1} in seed cotton only. From above result it can be concluded that the concentration of K in dry matter at 60 days, stalk and seed cotton at harvest was significantly influenced by potassium rates. These parameters were recorded higher under application of K_2O @ 120 kg ha^{-1}. Parmar (2006) [8] reported that application of K did not show any significant effect on content of NP in stalk and seed cotton of hybrid cotton at harvest.

The interaction between cultivar and potassium levels not influenced the NPK content in dry matter at 60 days growth, in stalk at harvest and in seed cotton (Table-4).

Nutrients (NPK) uptake

The data on the effect of cultivar and potassium and their interaction on uptake of nutrients (NPK) by dry matter, stalk, seed cotton and total uptake are given in table-5.

The results revealed that the uptake of NPK were significantly influenced by different cultivars of Bt. cotton (Table-5). The uptake of nitrogen by dry matter a 60 DAS (47.38 kg ha^{-1}), stalk (61.01 kg ha^{-1}), seed cotton (41.84 kgha^{-1}) and total uptake (102.27 kg ha^{-1}) were obtain with cultivar V_4 (Rashi-2), but uptake of nitrogen by dry matter with cultivar V_4 (Rashi-2) remain at par with cultivars V_2 (Vikram-5) and V_5 (Mico-162). The higher uptake of phosphorus was found significantly the highest in dry matter at 60 DAS (6.69 kg ha^{-1}) and in stalk (6.54 kg ha^{-1}) with cultivar V_4(Rashi-2) and in seed cotton (8.39 kg ha^{-1}) and total uptake (17.79 kg ha^{-1}) with cultivar V_5 (Mico-162). The uptake of potassium by dry matter with cultivar V_4 (Rashi-2) remain at par with cultivar V_5(Mico-162). The uptake of potassium by dry matter at 60 DAS (27.41 kg ha^{-1}), stalk (37.20 kg ha^{-1}) and total uptake (61.42 kg ha^{-1}) were recorded with cultivar V_5 (Mico-162) in seed cotton (24.45 kg ha^{-1}) with cultivar V_4 (Rashi-2). The uptake of potassium by dry matter and total uptake with cultivar V_5 (Mico-162) remain at par with cultivar V_2 (Vikram-5) and V_4 (Rashi-2), whereas uptake by stalk with cultivar V_5(Mico-162) remain at par with cultivar V_2 (Vikram-5). Thus, the uptake of NPK by dry matter at 60 days, K uptake by stalk and total uptake were significantly influenced by different tested cultivars of Bt. cotton. While NP uptake by stalk, NPK uptake by seed cotton and total NP uptake by cotton were remain unaffected. The findings of the present investigation was also supported the work reported by Pervez (2004).

Under varying levels of potassium, the application of K_2O @ 120 kg ha^{-1} showed significantly higher uptake of N in dry matter at 60 DAS by stalk (62.05 kg ha^{-1}) and total uptake (103.82 kg ha^{-1}) which were remain at par with application of K_2O @ 80 kg ha^{-1}. Whereas, the highest nitrogen uptake in seed cotton (41.58 kg ha^{-1}) was found with K_2O application @ 120 kg ha^{-1}. The uptake of phosphorus by dry matter at 60 DAS (6.52 kg ha^{-1}), in stalk (6.63 kg ha^{-1}), in seed cotton (8.35 kg ha^{-1}) and total uptake (15.08 kg ha^{-1}) were recorded with application of potassium @ 120 kg ha^{-1}, which were remain at par with application of K_2O @ 80 kg ha^{-1}. The uptake of potassium by dry matter at 60 DAS (27.73 kg ha^{-1}), stalk (38.74 kg ha^{-1}), seed cotton (25.51 kg ha^{-1}) and total uptake (64.25 kg ha^{-1}) were found significantly the highest with application of K_2O @ 120 kg ha^{-1}) and application of K_2O @ 80 kg ha^{-1}) in seed cotton only. Overall it is concluded that the application of potassium was produced significant effect on uptake of NPK by dry matter at 60 days in stalk and

seed cotton and their toal uptake by Bt. cotton. Similar finding was also reported by Parmar (2006) [8].

The effect of cultivar and potassium on the uptake of nitrogen, phosphorus and potassium were found non-significant (Table-5).

Conclusion

From the ongoing result, it can be concluded that the cultivar V_4(Rashi-2) gave significantly higher dry mater yield, lint yield, seed cotton yield, stalk yield and total cotton yield. The cultivar V_4(Rashi-2) excerted superiority in dry weight of shoot, root and total plant. Similarly, the quality parameters viz., micronair, stepple length, span length and oil content were observed higher with cultivar Rashi-2. Fertilization of potassium at higher dose 120 kg K_2O ha^{-1} resulted significantly higher value of yield, yield attributes, quality parameters, nutrient content and uptake of nutrients as well as availability of potassium at 60 days growth stages and at harvest.

Table 1: Influence of cultivars and potassium on yield of Bt. Cotton

Treatments	Dry matter yield of 60DAS	Lint yield (kgha^{-1})	Seed cotton yield (kgha^{-1})	Stalk yield (kgha^{-1})	Total cotton yield (kgha^{-1})
V_1	2266	838	2412	3390	5802
V_2	2369	888	2519	3367	5886
V_3	2357	856	2460	3494	5954
V_4	2633	906	2626	3793	6419
V_5	2542	893	2602	3669	6271
S.Em.±	47.0	17	49.11	95.1	91.6
C.D. at 5%	134	49	140	NS	331
K_1	2281	818	2387	3300	5686
K_2	2486	903	2588	3601	6189
K_3	2534	908	2597	3728	6325
S.Em.±	36	13	38	74	90
C.D. at 5%	104	38	109	210	256
VxK Int.					
S.Em.±	81	30	85.06	165	201
C.D. at 5%	NS	NS	NS	NS	NS
C.V.%	6.66	6.73	6.74	9.30	6.61

Table 2: Influence of cultivars and potassium on yield attributes of Bt. Cotton

Treatments	Yield attributes						
	60DAS		At harvest				
	Plant height (cm)	No. of square / plant	Plant height (cm)	No. of monopodial / plant	No. of sympodial/plant	No. of bolls	Boll weight (g)
V_1	55.08	13.42	92.07	4.22	24.11	30.25	5.97
V_2	55.00	12.92	97.92	4.36	24.58	30.00	5.72
V_3	65.08	13.75	93.31	3.87	22.01	32.17	5.82
V_4	55.42	14.50	87.94	3.88	23.72	37.00	6.38
V_5	63.92	14.67	95.74	4.27	21.69	33.42	6.21
S.Em.±	1.058	0.31	1.84	0.11	0.64	1.14	0.14
C.D. at 5%	3.02	0.89	5.24	0.32	1.82	3.24	0.40
K_1	56.75	12.50	89.60	3.90	22.41	30.80	5.69
K_2	58.40	13.70	94.36	4.20	23.02	33.25	6.10
K_3	60.55	13.35	96.23	4.27	24.24	33.65	6.26
S.Em.±	0.81	0.24	1.42	0.09	0.49	0.88	0.11
C.D. at 5%	2.33	0.69	4.06	0.25	1.41	NS	0.31
VxK Int.							
S.Em.±	1.83	0.53	3.17	0.24	1.10	1.97	0.24
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS
C.V.%	6.22	7.8	6.81	9.31	9.5	12.07	8.02

Table 3: Influence of cultivars and potassium on quality parametsrs of Bt. Cotton

Treatments	Micronair	Stepple length(cm)	2.5% span length	Oil content(%)	G.P.(%)
V_1	3.939	2.745	2.825	17.94	34.71
V_2	3.792	2.821	2.883	17.81	35.20
V_3	4.096	2.804	2.890	17.56	34.81
V_4	4.752	2.839	2.917	18.24	34.49
V_5	3.863	2.739	2.813	18.49	34.31
S.Em.±	0.004	0.004	0.005	0.09	0.14
C.D. at 5%	0.012	0.011	0.014	0.24	0.39
K_1	4.063	2.770	2.850	17.84	34.26
K_2	4.084	2.787	2.868	18.06	34.89
K_3	4.119	2.811	2.879	18.12	34.96
S.Em.±	0.003	0.002	0.003	0.07	0.11
C.D. at 5%	0.009	0.008	0.011	0.19	0.30
VxK Int.					

S.Em.±	0.007	0.007	0.008	0.15	0.24
C.D. at 5%	0.021	0.019	NS	NS	NS
C.V.%	0.36	0.47	0.58	1.64	1.37

Table 4: Influence of cultivars and potassium on NPK content (%) in dry matte, stalk and seed cotton of Bt. Cotton

Treatments	Dry Matter (At 60DAS)			Stalk (At harvest)			Seed cotton		
	N	P	K	N	P	K	N	P	K
V_1	1.830	0.251	0.998	1.610	0.175	0.908	1.619	0.315	0.925
V_2	1.875	0.526	1.088	1.627	0.177	1.045	1.598	0.327	0.933
V_3	1.820	0.253	1.043	1.613	0.176	0.867	1.606	0.315	0.939
V_4	1.798	0.542	0.948	1.651	0.177	0.887	1.592	0.311	0.931
V_5	1.861	0.525	1.077	1.614	0.175	1.008	1.560	0.322	0.924
S.Em.±	0.0478	0.005	0.025	0.041	0.036	0.025	0.033	0.0079	0.0246
C.D. at 5%	NS	NS	0.070	NS	NS	0.073	NS	NS	NS
K_1	1.837	0.249	0.979	1.576	0.173	0.832	1.582	0.313	0.856
K_2	1.818	0.254	1.016	1.616	0.175	0.956	1.604	0.320	0.955
K_3	1.866	0.257	1.097	1.677	0.180	1.041	1.599	0.321	0.982
S.Em.±	0.037	0.004	0.019	0.032	0.003	0.020	0.026	0.006	0.019
C.D. at 5%	NS	NS	0.055	NS	NS	0.056	NS	NS	0.055
VxK Int.									
S.Em.±	0.083	0.009	0.043	0.072	0.006	0.044	0.057	0.014	0.043
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS
C.V.%	9.01	6.93	8.28	8.83	7.08	9.32	7.2	8.66	9.16

Table 5: Influence of cultivars and potassium on NPK uptake by dry matter, stalk, seed cotton and total uptake by Bt. Cotton

Treatments	Dry Matter (At 60 DAS) (kgha^{-1})			Stalk (kgha^{-1})			Seed cotton (kgha^{-1})			Total Uptake (kgha^{-1})		
	N	P	K	N	P	K	N	P	K	N	P	K
V_1	41.42	5.70	22.69	54.57	5.94	30.78	39.13	7.62	22.39	95.48	13.56	53.17
V_2	44.36	6.07	25.88	56.71	6.15	35.18	40.27	8.25	23.49	97.02	14.40	58.67
V_3	42.88	5.98	24.55	56.30	6.16	30.40	39.62	7.76	23.10	94.17	13.91	53.50
V_4	47.38	6.69	25.60	61.01	6.54	33.64	41.84	8.17	24.45	102.27	14.70	58.09
V_5	47.18	6.42	27.41	59.34	6.40	37.20	40.73	8.39	24.22	98.97	17.79	61.42
S.Em.±	1.27	0.17	0.68	2.12	0.22	1.18	1.24	0.30	0.80	2.44	0.40	1.50
C.D. at 5%	3.63	0.49	1.95	NS	NS	3.37	NS	NS	NS	NS	NS	4.27
K_1	41.85	5.66	22.34	52.07	5.69	27.40	37.88	7.47	20.36	88.70	13.16	47.75
K_2	45.13	6.33	25.25	58.24	6.29	34.42	41.58	8.28	24.72	99.98	14.58	59.14
K_3	46.95	6.52	27.73	62.05	6.63	38.74	41.49	8.35	25.51	103.82	15.08	64.25
S.Em.±	0.98	0.13	0.53	1.64	0.17	0.91	0.96	0.23	0.62	1.89	0.31	1.16
C.D. at 5%	2.81	0.38	1.51	4.70	0.49	2.61	2.72	0.67	1.76	5.39	0.88	3.31
VxK Int.												
S.Em.±	2.20	0.30	1.22	3.67	0.39	2.04	2.15	0.52	1.38	4.22	0.69	2.54
C.D. at 5%	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
C.V.%	9.86	9.69	9.41	12.7	12.4	12.2	10.6	13.0	11.7	8.66	9.64	9.07

References

1. Brewster JL, Tinker PB. Nutrient cation flows in soil around roots. Sci. Soc. Amre. Proc. 1970; 34:421-426.
2. Camberato JJ, Jones MA. Differences in potassium requirement and response by older and modern cotton cultivars. Better Crops with Plant Food. 2005; 89(1):18-20.
3. Cassman KG, Kerby TA, Roberts BA, Brouder SM. Reassessing potassium requirement of cotton for yield and fiber quality. In proceeding of the Belwide cotton Production Conference. 1990, 60-64.
4. Jackson ML. Soil Chemical Analysis. Prenstics Hall of India Pvt. Ltd., New Delhi. 1973, 327-350.
5. Johnson CM, Ulrich A. Analytical method for use in plant analysis. California Agr. Exp. St. Bill. 1969, pp.766.
6. Kanwar JS, Chopra SL. Anlaytical Agricultural Chemistry. Kalyani Publishers, Ludhiana, 1976.
7. Nye PH, Tinker PB. The concept of a root demand coefficient. J Appl. Ecol. 1969; 6:293-300.
8. Parmar KB. Nitrogen and potassium treatment for targeted Yield of cotton. Ph.D. Thesis. Deptt. of Agricultural Chemistry and Soil Science, Junagadh Agricultural University, Junagadh, 2006.
9. Pervez. Influence of potassium rates and sources on seed cotton yield and yield component of some elite cotton cultivars. J. Plant Nutriton, 2004; 27(7):1295-1317.
10. Pettigrew WT, Heitholt JJ, Meredith WR. Genotypic interaction with potassium and nitrogen in cotton of varied maturity. Agronomy J. 1995; 88:89-93.
11. Reddy PRR, Kumar BD. Fertilier response studies in Bt. cotton hybrid. J Cotton Res. Dev. 2010; 24(1):76-77.
12. Rekha MS, Dhurua S. Fertilizer management in cotton + soybean (1:2) inter cropping system under rainfed conditions. J Cotton Res. Dev. 2010; 24(1):67-70.