

RESEARCH NOTES

Effect of Nitrogen and Potash Levels on Yield of Biomass and Seed Cotton of Two Cotton Hybrids

Nitrogen and potash being primary nutrients play an important role in the growth and development of cotton. Rabey ('1980) noticed that at higher N rates, desired K level was more than 100 Kg ha⁻¹. With a view to understand the response of improved cotton hybrid to the application of potash in combination with N, this study was undertaken.

The experiment was conducted at Agronomy Field Unit, GKVK, Bangalore during late Kharif of 1991-92 under irrigated condition. The soil of the experimental plot was sandy loam in texture having available N, P₂O₅ and K₂O of 189, 18.3 and 224 Kg ha⁻¹ with pH of 5.6. Treatments consisted of two cotton hybrids viz., DCH-32 and HB-224 tried at three levels of N (75, 150 and 225 kg ha⁻¹) and two levels of K₂O (0 and 100 Kg ha⁻¹) and a recommended dose (150 Kg N + 75 Kg K₂O ha⁻¹). Recommended dose of P₂O₅ @ 75 Kg ha⁻¹ was applied to all the treatments. The crop was sown on 20th of August. Total rainfall received during cropping period was 981 mm. About 16 irrigations were given to the crop. Gross and net plot size were 6m X 6 m and 3.6 X 4.8 m. respectively spacing adopted was 120 cm x 60 cm. Harvesting of seed cotton was done in 5 pickings viz., Jan 20th, Feb 20th, March 5th and March 20th.

The LAI of HB-224 (1.56) was significantly higher than that of DCH-32 (1.40). Total dry weight (193.36 g/plant) was also high in HB-224 as compared to DCH-32 (191.27 g/plant). The higher dry matter accumulation in the early stages and subsequent partitioning into reproductive parts is essential to achieve the higher seed cotton yield. The number of opened bolls and mean boll weight was high in HB-224 (Table 1). Higher fruiting coefficient and production rate index also contributed to higher yield of HB-224 (1178.05 kg ha⁻¹) as compared to DCH-32 (1163.28 Kg ha⁻¹) (Table 2).

Combined application of N and K₂O helped to increase boll growth and yield parameters like LAI, TDM, number of opened bolls, mean boll weight (Table 1). Production rate index and fruiting coefficient (Table 2) were significant when compared to only N application of N and K @ 225 Kg & 100 Kg per ha, respectively increased total dry matter (199.43 g/plant.), number of opened bolls (39.43), mean boll weight (3.27) and production rate index (7.71 Kg ha⁻¹) and LAI (2.02) significantly compared to other treatments. A dominant effect of N and K was seen in dry matter production. Higher dry matter produced is a reflection of increased growth and physiological

Table 1. Effect of cotton hybrids and NK levels on LAI, total weight, number of opened bolls and mean boll weight.

Nitrogen + potash (Kg ha ⁻¹)	LAI at 150 DAS			Total dry weight at 150 DAS (g/plant)			Number of opened bolls at 150 DAS			Mean boll weight (g) at 150 DAS		
	HB-224		Mean	HB-224		Mean	HB-224		Mean	HB-224		Mean
	DCH-32	DCH-32		DCH-32	DCH-32		DCH-32	DCH-32		DCH-32	DCH-32	
75+0	1.18	0.99	1.07	186.60	184.80	185.70	22.33	20.60	21.47	2.48	2.41	2.44
75+100	1.17	1.02	1.09	188.87	187.33	188.10	24.87	23.80	24.33	2.55	2.45	2.50
150+0	1.44	1.41	1.42	101.07	189.03	190.05	28.60	26.27	27.43	2.57	2.49	2.53
*150+75	1.48	1.43	1.45	193.17	191.07	192.12	31.60	29.60	30.60	2.89	2.73	2.81
150+100	1.52	1.46	1.49	195.63	192.87	194.25	36.40	34.73	35.57	3.05	2.82	2.93
225+0	2.03	1.64	1.84	197.87	195.20	196.53	38.20	36.20	37.20	3.10	3.00	3.05
225+100	2.16	1.87	2.02	200.30	198.57	199.43	40.53	38.33	39.43	3.39	3.14	3.27
Mean	1.56	1.40		193.36	191.27		31.79	29.93		2.86	2.72	
Varieties	0.017	0.105		0.18	0.63		0.04	0.26		0.007	0.040	
NK Levels	0.025	0.073		0.13	0.39		0.08	0.24		0.011	0.031	
Varieties x NK Levels	0.035	0.104		0.19	0.55		0.12	0.34		0.015	0.044	

* = Recommended dose

Table - 2. Effect of cotton hybrids and NK levels on fruiting coefficient, production rate index seed and cotton yield.

Nitrogen + potash (Kg ha ⁻¹)	Fruiting coefficient			Production rate index (Kg ha ⁻¹ day ⁻¹)			Seed cotton yield (Kg ha ⁻¹)		
	HB-224	DCH-32	Mean	HB-224	DCH-32	Mean	HB-224	DCH-32	Mean
75+0	0.285	0.262	0.273	5.62	5.52	5.57	976.71	970.75	973.73
75+100	0.292	0.274	0.283	5.94	5.82	5.88	1038.02	1026.51	1032.26
150+0	0.313	0.292	0.302	6.42	6.34	6.38	1119.42	1113.98	1116.69
*150+75	0.334	0.310	0.325	6.83	6.76	6.79	1196.73	1187.41	1192.07
150+100	0.355	0.337	0.346	7.33	7.09	7.16	1260.48	1240.68	1250.58
225+0	0.386	0.369	0.377	7.44	7.35	7.39	1298.93	1281.56	1290.24
225+100	0.402	0.385	0.392	7.76	7.67	7.71	1356.06	1322.11	1339.09
Mean	0.338	0.319		6.75	6.65		1178.05	1163.28	

Varieties NK Levels Varieties x NK Levels	CD at 5%		CD at 5%		CD at 5%	
	S Em	0.006	S Em	0.007	S Em	0.92
	0.007	NS	0.047	0.030	0.88	5.57
	0.010	0.014	0.137	0.097	1.24	2.56
		NS		NS		3.62

* = Recommended dose

NS = Non - Significant

parameters. It is worth noting that NK level of 225 Kg N + 100 Kg K₂O ha⁻¹ had given higher seed cotton yield (1339.09 Kg ha⁻¹) over the recommended dose of N and K@ 150 and 75 Kg per ha, respectively (1192.07 Kg ha⁻¹). These results are in agreement with those obtained by Helkiah *et al.* (1981) and Tomar *et al.* (1986).

The present study revealed the superiority of HB-224 over DCH-32 with application of 225 Kg N + 100 KG K₂O ha⁻¹ with recommended dose of P.

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References :

- HELKIAH. J., MUTHUSWAMY., CHANDRA MOHAN. O.J., RAMANTHAN. K.M. AND KRISHNAMOORTHY. K.K., 1981, Response of cotton to potash application in combination with N under irrigated condition. *Madras Agricultural Journal*, **68** (2) : 82-85.
- RABEY.G.G., 1980, Cotton nitrogen and potash top dressing trial. *Annual Report, Cotton Research Institute, Zimbabwe*.
- TOMAR. K. N., SHARMA. J.C. AND CHAHAL R.S., 1986. Evaluation of fertilizer needs of cotton. *Journal of Indian Society of Cotton Improvement*, **11** (1) = 21-25.