

Response of Cotton to Potash Application in Combination with Nitrogen Under Irrigated Condition

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In a field trial conducted with CBS, 156 hybrid cotton under eight levels of potash fertilization in combination with two levels of N under irrigated conditions, a positive response in increasing the kapas yield to the application of potash and nitrogen was observed. The combination of 60 kg/ha each of N and K had recorded the highest kapas yield. The bundle strength (tenacity) was also the highest at this level of N and K combination. The other technological properties such as ginning percentage, mean fibre length, micronaire value and maturity coefficient were not influenced by any of the treatments.

The three major nutrients nitrogen, phosphorus and potash have been well established as the major plant nutrients. The availability of these nutrients to plant growth largely depends upon the soil fertility. The response of crops to the application of fertilizer nutrient is also influenced by the soil fertility status. The balanced application of these fertilizer nutrients is an essential criteria in increasing the yield of agricultural crops. Mohamed Ghouse and Muthuswamy (1967) emphasized the usefulness and need for optimum amounts of P and K for the effective use of nitrogen. Krishnamoorthy and Pothiraj (1974) also reported that response of soils N was enhanced by the application of K in combination with nitrogen. Bruchholz (1977) had stressed the absolute necessity to pay due attention to the optimum nutrient balance, particularly the ratio between

nitrogen and potash to obtain maximum yields at high efficiency. So with a view to study the response of improved variety of cotton to the application of potash in combination with nitrogen, this study was conducted.

MATERIAL AND METHODS

A field study with the following eight treatments were conducted during 1976-77 season in the Regional Research Station, Paiyur, under irrigated condition.

Treatment No.	Fertilizer nutrients (kg/ha)		
	N	P ₂ O ₅	K ₂ O
1.	40	15	0
2.	40	15	13
3.	40	15	20
4.	40	15	40
5.	60	15	0
6.	60	15	20
7.	60	15	40
8.	60	15	60

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The variety cotton tested was CBS 156.

The entire quantity of P_2O_5 and fifty per cent of N and K_2O was applied at the time of sowing while the remaining half of N and K_2O was top dressed. Farmyard manure at the rate of 5 t/ha was applied uniformly to all plots. The kapas yield was recorded and the lint was subject to the analysis for technological properties.

RESULTS AND DISCUSSION

The Kapas yield and the technological properties are presented below along with the results of statistical analysis. The results of initial soil analysis indicated that it had loamy sand texture (Coarse sand 63 per cent fine sand 23 per cent; silt 2.5 per cent; and clay 4.5 per cent) with low in available N (231 kg/ha) and high in available P (26.6 kg/ha) and K (343 kg/ha) status. The EC and pH of the soil were 0.20 mmhos/cm and 7.8 respectively.

The yield of kapas was markedly influenced by mineral fertilization. The effect of increasing doses of potassium application to increase the kapas production was evident. The influence exerted by N application on kapas yield was also appreciable. Thus a combination of 60 kg/ha each of N and K_2O had produced kapas yield of 1509 kg/ha which was more than 51 per cent increased yield over no potash treatment in CBS. 156 cotton. However Muthuswamy *et al.*, (1970) reported a linear response to N fertilization upto 120 kg N/ha for Combodia

Cotton. They also found that potash had no effect on kapas yield. The cotton stalk yield was also significantly increased by N and K fertilization and the highest mean yield of 2417 kg/ha was recorded in 60 kg/ha each of N and K_2O application.

The influence exerted by the N and K mineral fertilizing was also studied on some of the fibre technological characteristics. The mean ginning percentage ranged from 31.98 to 35.45. It was not influenced by any of the fertilizer treatments. The mean fibre length among the treatments ranged from 30.0 to 31.6 mm. Even though there was an increasing trend in the fibre length at higher N level, it failed to reach the level of significance. Potash fertilization also seemed to have no noticeable effect on this character. The micronaire value and maturity coefficient of the fibre was affected neither by N nor K fertilization significantly. However Braud and Dubernard (1973) reported that potassium deficiency had reduced the maturity of fibres and the micronaire index. The bundle strength value (fibre tenacity) were found to be highly influenced both by N and K fertilization at higher levels. The bundle strength at 60 kg of N and K_2O treatment showed significant superiority over the others.

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TABLE 1 Mean Cotton yield and Technological properties

N	Treatments		Kapas yield kg/ha	Yield expressed as% of standard	Stalk yield (kg/ha)	Ginning per cent	Mean fibre length (mm)	Micro- maire - 6 10g/mm	Maturity coeffi- cient	Bundle strength tenacity 'O' gauge
	P	K								
40	15	0	999	100.00	1604	33.67	30.2	2.71	0.62	50.1
40	15	13	1206	120.8	2000	31.98	30.5	2.68	0.62	49.0
40	15	20	1126	112.7	1687	32.32	30.7	2.71	0.62	49.3
40	15	40	1103	110.5	1729	34.75	30.0	2.72	0.62	46.9
Mean			1108	...	1755	33.18	30.3	2.70	0.62	48.8
60	15	0	1218	121.9	2125	33.30	31.0	2.68	0.61	49.5
60	15	20	1233	123.4	1875	34.07	31.6	2.76	0.63	48.4
60	15	40	1250	125.2	1937	35.47	31.2	2.70	0.62	49.2
60	15	60	1509	151.1	2417	34.15	30.2	2.68	0.62	53.7
Mean			1302	...	2088	34.24	31.0	2.70	0.62	50.2
Bet. N level			Sig.		Sig.	N.S.	N.S.	N.S.	N.S.	Sig.
S. E.			27.67		84.42	...	...	...	...	0.31
C. D. at 5%			81.33		248.3	...	...	...	...	0.93
Bet. K at each N level			Sig.		Sig.	N.S.	N.S.	N.S.	N.S.	Sig.
S. E.			55.53		168.9	...	...	...	...	0.63
C. D. at 5%			162.75		496.8	...	...	...	...	1.85