

## EFFECT OF POTASH ON COTTON\*

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In India experiments conducted in the cultivators' fields in the various States have shown that there is a necessity to apply potash to crops over and above the combined optimum doses of nitrogen and phosphorus in places where soil potash is very low (Raheja *et al.* 1958). According to Tisdale and Nelson (1956) it is necessary to make regular annual applications of potash even in the soils containing enough of it. But in the case of cotton, an important commercial crop of India workers like Panse (1945), Dastur (1946), Nanjundaya (1956) and Anonymus (1959) have reported that potash does not produce any favourable effect on the yield of the crop. The failure to give any response to this element in the previous studies is considered to be due to the addition of farm yard manure which contains potash (Raheja *et al.* 1958). In studies wherein farm yard manure has not been applied the treatment combinations have been such as to make it impossible to disentangle the effect due to potash alone (Panse, 1941). Therefore, a detailed investigation was undertaken to study the effect of different levels of potash in the absence of farm yard manure on growth, yield and quality of cotton.

### Materials and Methods

A field experiment including five levels of potash (0, 15, 30, 45 and 60 lb./acre) was conducted using P.216 F, a popular American variety of cotton during 1961 at the Agricultural College and Research Institute, Coimbatore. A randomised block design with five replications was adopted. A uniform dose of 40 pounds of nitrogen and 15 pounds of phosphorus per acre was applied to all the treatments. Ridges and furrows were taken at 2 feet apart and two seeds were sown at a distance of 6 inches on one side of the ridge. The soil of the experimental plot was of a black soil type with a clayey texture. This contained 0.0084 percent available nitrogen (very low), 0.0014 percent available phosphoric acid (fairly high) and 0.018 percent available potash (high). Results of the experiment were assessed by collecting the data on growth characters, yield attributes, yield and quality of the crop. The earliness was studied by the time taken for flowering and by Bartlett's index.

### Results and Discussion

The data on the growth, yield and quality of the crop as influenced by the different treatments are presented in Tables 1 to 3.

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**TABLE 1**

Effect of potash on growth and earliness of cotton

Potash levels (lb. / acre)	Plant height (cm.)	No. of days for first flowering	Bartlett's index
0	56	60	0.51
15	58	60	0.51
30	63	59	<b>0.53</b>
45	60	61	0.52
60	63	63	<b>0.52</b>
Significant or not	N.S.	N.S.	N.S.
	N.S.	Not significant	

From Table 1 it is seen that application of potash has not increased the plant height to any significant level. This may be because plant height is a vegetative character and potash plays only a relatively lesser roll in influencing this character than nitrogen (Christidis and Harrison, 1955). Earliness of the crop also is not significantly influenced by potash fertilization. However, a trend to delay the blooming and maturity of the crop by 45 and 60 pounds of potash is evident. This

delaying effect at higher levels of potash may be due to the antagonism between  $K^+$  and  $NH_4^+$  ions resulting in the hindrance of absorption of the ammonium ions by the plants (Bear 1958). Thus the nitrogen applied as ammonium sulphate appears to have been made available only after the excess potash has been leached away and this delay in nitrogen absorption has probably caused late blooming and late maturity of the crop. Similar results were reported earlier by Volk (1942).

**TABLE 2**

Effect of potash on yield attributes and yield of cotton

Potash levels (lb. / acre)	No. of flowers per plant	No. of bolls per plant	Shedding percentage	Ginning percentage	Yield of <i>Kapas</i> (lb. / acre)
0	14	7	49.0	35.0	843
15	16	8	49.4	34.8	910
	19	9	46.4	34.5	989
45	16	8	49.9	34.8	960
60	17	8	47.8	33.8	952
Significant or not	N.S.	N.S.	N.S.	N.S.	N.S.

**N.S.** = Not significant

Table 2 shows that potash application has not at all influenced the characters given to a significant extent. Moreover, it is also seen that higher levels of this nutrient produces a negative trend in the yield and all the other yield characters studied. This is probably due to a high content of available potash in the soil under study. Similar lack of response and negative responses were reported by

Nanjundaya (1956), Vandeva Veye and Williams (1957), Mariakulandai (1957) and Dastur (1959). On the other hand a favourable response to potash was reported in laterite soils of Kerala, Uttar Pradesh and Bihar which were poor in soil potash (Naik *et al.*: 1960). Thus it appears that the response to potash is determined by the extent of its availability in the soil.

TABLE 3

Effect of potash on Fibre characters of cotton

Potash levels (lb./acre)	Mean fibre length in inches	Mean fibre weight per inch $10^{-6}$	Maturity coefficient	Tensile strength (lb./mgm per tex)
0	0.94	0.147	0.769	7.22
15	0.96	0.146	0.770	7.25
30	0.96	0.153	0.785	7.18
45	0.95	0.154	0.784	7.09
60	0.95	0.140	0.782	7.26
Significant or not	N.S.	N.S.	N.S.	N.S.

N.S. = Not significant

The results presented in Table 3 show that there is no major change in the normal values of the characters given due to potash fertilization. Though these are purely varietal characters they are also known to be influenced by environmental conditions and manuring. The lack of response to added potash in this case also may be attributed to the presence of adequate quantities of available potash in the soil chosen for this investigation as has been shown by Dastur (1959).

### Summary

An experiment conducted to study the effect of different levels of potash on P.216 F cotton has shown that application of

potash does not significantly influence the growth, yield and qualitative characters of the crop. A depressing trend in these characters is noted at higher levels of potash: It is thus indicated that application of potash is not likely to benefit the cotton crop in a soil where the available potassium status is very high.

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