RATIONALISED FERTILIZER PRESCRIPTION FOR MAXIMISING THE PROFIT IN COTTON

RANI PERUMAL[1], P. RAMANATHAN[2], T. S. MANICKAM[3],
and G. V. KOTHANDARAMAN[4]

The fertilizer adjustment equation developed for cotton has been test verified to give rationalised fertilizer recommendation for getting maximum profit. The experiment has been conducted on typic chromustert with cotton MCU 5 and MCU 9. The treatments consisted of an absolute control, blanket recommendation and fertilizer recommendation for yield targets 20, 25 and 30 q/ha based on soil test value. Cent per cent achievement was obtained up to 25 q/ha yield target. The 't' test revealed that the equation holds good for yield targets up to 25 q/ha. Both yield and profit were maximum for 25 q/ha in both the varieties. The quality parameters except ginning percentage did not vary significantly. The post-harvest soil analysis showed a considerable reduction in available K compared to available N and P.

Cotton is one of the major cash crops grown in Tamil Nadu. High yields of cotton under irrigation can be obtained only with effective fertilizer management. In addition, with spiralling cost of fertilizer it becomes necessary to take appropriate steps to optimise the fertilizer use. Hence, the fertilizer recommendation should take into account of soil nutrients, nutrient requirement of crop and fertilizer efficiency. From Soil Test-Crop Response Studies fertilizer adjustement equations have been developed for tailoring fertilizer recommedation for desired yield target based on soil fertility status. This expeiment was undertaken to test the validity of these equations and to fix the optimum fertilizer level for maximum profit.

MATERIAL AND METHODS

The fertilizer adjustement equations have been developed from the Soil Test Crop Response trial on cotton (conducted during rabi-1982 at Tamil Nadu Agricultural University Farm, Coimbatore) as outlined by Ramamoorthy et. al. (1973). These equations have been test verified. The test verification trial was conducted on black clay-loam soils (Typic chromustert) with test crop of cotton MCU 6 and MCU 9, in a simple randomised block design. The treatments consisted of a blanket recommendation (N : P_2O_5 : K_2O — 90 : 45 : 45 kg/ha), fertilizer recommendation for 20 ($N_{36}P_2O_5$-O, K_2O-O kg/ha), 25 ($N_{68}P_2O_5$-O, K_2O-O), and 30 (N_{96} P_2O_5-4, K_2O-O kg/ha) q/ha respectively based on soil test values, besides an absolute control ($N_0O_0K_0$). The kapas yield was recorded. The kapas was analysed for quality parameters. The pre-sowing and post-harvest soil samples were analysed for $KMnO_4$ -N, Olsen-P and NH_4OAc-K. The equations are given below :

$$FN = 6.28\,T - 0.39\,SN$$
$$FP_2O_5 = 0.605\,T - 0.897\,SP$$
$$FK_2O = 0.741\,T - 0.024\,SK$$

1-4 Department of Soil Science and Agricultural Chemistry Tamil Nadu Agricultural University, Coimbatore-3.

(Where T targetted yield in Q/ha; S & .F — soil and fertilizer nutrients in kg/ha).

RESULTS AND DISCUSSION

The soil is clay-loam with pH 8.2 and free from salinity (EC-0.42 m. mhos./cm). The available nutrient status was medium in N (251kg/ha) and P (15.88 kg/ha) and high in K (946 kg/ha). The soil is having cation exchange capacity of 29.2 me/100 g and organic carbon content of 0.87 per cent.

The kapas yield, achievement and profit over control are given in Table 3. The seed cotton yield of MCU 5 ranged from 15.40 g/ha to 25.60 q/ha. The seed cotton yield increased up to 25 q/ha and then tended to decline. Jaganathan and Iruthaiaraj (1980) reported that 60 kg N/ha recorded the highest seed cotton yield. The blanket recommendation recorded 24.90 q/ha. The cent per cent achievement was obtained up to 25 q/ha yield target. In the case of varity MCU 9 the yield varied from 15.00 q/ha to 26.60 q/ha. The highest yield was observed in 25 q/ha (26.60 q/ha), thereafter the yield was reduced. This may be due to quadratic response behaviour for application. Ogunlela *et al*, (1982) observed an increase in yield up to 52 kg/ha. The cent per cent achievement was possible up to 25 q/ha. The economics of production at current price revealed that 25 q/ha recorded the maximum profit of Rs 5818/ha for MCU 5 and Rs. 6658/ha for MCU 9.

The data on quality parameter are presented in Table 4. In the case of MCU 5 the ginning percentage ranged from 32.6 to 36.2 per cent. The blanket recommendation, 20 q/ha and 25 q/ha were on a par. The fibre length did not show marked variation. The uniformity ratio ranged from 42 to 46 per cent. The difference in fineness due to different treatments was not significant. Similar trend was observed in maturity coefficient also. The fibre strength was in the range of 44.0 to 45.6 g/tex. In the case of MCU 9 the variation in the quality parameter such as ginning per cent fibre strength, uniformity ratio, fineness, maturity coefficient and fibre strength did not show any significant variation

The post-harvest soil analysis is given in Table 5. The available 'N' ranged from 215 to 253 kg/ha for MCU 5 and 208 to 234 kg/ha for MCU 9. There was not much reduction in available N status. The profound leaf fall which added to organic matter content of soil could be a reason for this trend. The Olsen. P showed a variation from 10 45 to 14.45 kg/ha and from 11 01 to 13 44 kg/ha for MUC 5 and MUC 9 respectively. The blanket recommendation recorded the highest 'P' status. The available K status was in the range of 851 to 951 and 859 to 918 kg/ha for MCU 5 and MCU 9 respectively. There was a reduction in available K status compared to that of available N and P. From the above investigation it was concluded that fertilizer recommendation for 25 q/ha based on soil available nutrient using the adjustement equations for MCU 5 and MCU 9 on Typic Chromustert yielded

maximum profit without effecting the quality parameter.

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Table 1 : Yield of seed cotton, petcent achievement, profit and ginning percent.

Treatment	MCU 5				MCU 9				
	Yield Q/ha	Achievement%	Profit Rs/ha	Ginning %	Yield Q/ha	Achievement%	Profit Rs/ha	Ginning %	't' value
Control	15.40	..	..	32.6	15.00	..	..	29.0	..
Blanket recommendation	24 90	..	4875	35.9	25.50	..	5475	29.3	..
20 Q/ha	22.10	110 5	3846	36.2	21.10	105.5	3486	30.5	2.11 NS
25 Q/ha	25.60	102 4	5819	34.2	26.60	106.4	6659	29.5	2.29 NS
30 Q/ha	25.10	83.6	5336	33.5	25.60	85.3	5876	29.9	5.84*
	CD (P=0.05) 2.3				CD (P=0.05) 2.0				

*Significant at 0.05 level   N5 Not Significan

Table 2 : Pre-sowing and post-harvest soil analysis (kg/ha) (Mean values).

Treatment	MCU 5			MCU 9		
	$KMnO_4$-N	Olsen-P	NH_4OAc-K	$KMnO_4$-N	Olsen-P	NH_4OAc-K
Control	215	10.45	851	208	11.01	859
Blanket	249	14.40	905	235	13.44	918
20 Q/ha	232	10.64	837	209	11 57	898
25 Q/ha	243	11.79	852	227	10.83	855
30 Q/ha	253	11.95	881	234	11.57	870
Pre-sowing	251	15.88	946	—	—	—