

Response of Irrigated Cambodia Cotton to different Nitrogenous Fertilisers *

by

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Synopsis: An experiment conducted at Coimbatore for three consecutive seasons to test the efficacy of three nitrogenous fertilisers viz, ammonium sulphate, calcium ammonium nitrate and urea on irrigated Winter American Cotton (MCU. 3) revealed that there was no differential response to the three nitrogenous fertilisers regarding yield, ginning outturn and lint quality, and there was no significant difference between doses viz, 45 kg and 67.5 kg of N per hectare.

Introduction: Manuring cotton, especially with nitrogenous fertilisers, has been established to increase yields appreciably (Panse and Khana, 1953; Neelakantan, Kamalanathan and Krishnamurthy, 1959; Kannian and Krishnamurthy, 1964; Srinivasa Iyengar and Kottur, 1964) and 45 kg nitrogen per hectare is the recommended dose for irrigated Cambodia cotton in Madras State (Kamalanathan and Nagarajan, 1961). But Ramachandran *et al* (1964) have recommended 67.5 kg N per hectare for irrigated Winter Cambodia cotton. With increasing demand for and consequent shortage of ammonium sulphate, it became necessary to switch over to other nitrogenous fertilisers. With this end in view, an experiment was laid out at Coimbatore to test the efficacy of various nitrogenous fertilisers and the results are presented.

Materials and Method: The study was conducted on irrigated Cambodia cotton with three nitrogenous fertilisers viz, ammonium sulphate, calcium ammonium nitrate and urea applied in two levels at 40 kg and 67.5 kg nitrogen per hectare in randomised blocks replicated four times. The fertilisers were applied in two equal doses at four and eight weeks after sowing over a basal dose of 32.5 kg of P_2O_5 as super and 12 tonnes of farm yard manure per hectare. The experiment was conducted for three consecutive seasons from 1962—'63 to 1964—'65. The crop was sown every year in the first week of September adopting a spacing of 75 cm X 22.5 cm and except for the difference in the manurial schedule all treatments were uniform. Yields of seed cotton were recorded and data analysed statistically for each year and also for pooled data of the years. Ginning outturn and fibre properties were determined and the economics of manuring were also computed.

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Results and Discussions: The three nitrogenous fertilisers and the two levels of nitrogen had equal effect in influencing cotton yields in all the three years of study (Table I).

TABLE I
Yield of seed cotton

No.	Treatment	Yield of seed cotton (kg/hectare)			
		1962-'63	1963-'64	1964-'65	Pooled
1.	Ammonium sulphate at 45 kg N per hectare	1,057	1,477	554	1,029
2.	Calcium ammonium nitrate at 45 kg N per hectare	984	1,447	479	970
3.	Urea at 45 kg N per hectare	1,115	1,295	617	1,009
4.	Ammonium sulphate at 67.5 kg N per hectare	1,025	1,453	510	996
5.	Calcium ammonium nitrate at 67.5 kg N per hectare	1,168	1,448	540	1,052
6.	Urea at 67.5 kg N per hectare	1,077	1,385	371	944
	Mean yield at 45 kg N per hectare	1,052	1,406	530	1,003
	Mean yield at 67.5 kg N per hectare	1,090	1,429	474	997
	Whether significant by 'F' test	No	No	No	No
	Standard error	78.6	82.8	57.2	38.3

The pooled data of the three year study even though not significant, showed that application of calcium ammonium nitrate at 67.5 kg N per hectare was the best followed by 45 kg N per hectare as ammonium sulphate.

Garg (1964) who tried urea and calcium ammonium nitrate on cotton found no difference in effect between the two forms at 45 kg N and 67.5 kg N per hectare; but at 22.5 kg level of N, calcium ammonium nitrate proved better of the two. Jaisinghani and Mehta (1964) experimenting on 320F cotton with ammonium sulphate, urea and ammonium sulphate nitrate concluded that ammonium sulphate gave significantly higher response than ammonium sulphate nitrate but was on par with urea. According to Wahab and Ahmed (1960) urea at 56 kg N per hectare gave higher response than organic manures and was also cheaper. Recently, Dargan, Dhar and Sahni (1965) reported that among the various nitrogenous fertilisers *viz*, chilean nitrate, ammonium sulphate nitrate, calcium ammonium nitrate, ammonium sulphate and urea applied to cotton at 60 kg N per hectare, Chilean nitrate was the best, yielding significantly higher than others except ammonium

sulphate nitrate. They have commented that the higher response to Chilean nitrate might be due to the presence of various micro-nutrients in it. The different forms of nitrogenous fertilisers have been thus proving better in one place or the other, thereby indicating the interaction of soil types with different nitrogenous fertilisers. However, from the three nitrogenous fertilisers tested at Coimbatore, it is evident that irrigated Winter Cambodia cotton responds equally to all the three.

Ginning outturn and also the fibre properties of cotton were not influenced by the different forms and dosages of nitrogenous fertilisers used (Table II).

TABLE II
Ginning and Fibre Properties

S. No.	Treatments	Ginning %	Mean Fibre length (inch)	Length irregularity %	Mean Fibre Weight (milli tex)	Maturity co-efficient	Bundle strength (gm/tex)
1.	Ammonium sulphate at 45 kg N per hectare	35.9	1.04	26.2	128	0.69	37.0
2.	Calcium ammonium nitrate at 45 kg N per hectare	35.8	1.04	24.7	132	0.70	36.4
3.	Urea at 45 kg N per hectare	36.4	1.03	25.2	129	0.70	36.4
4.	Ammonium sulphate at 67.5 kg N per hectare	36.7	1.02	24.6	130	0.71	36.4
5.	Calcium ammonium nitrate at 67.5 kg N per hectare	35.4	1.03	25.2	128	0.70	36.4
6.	Urea at 67.5 kg N per hectare	36.3	1.04	24.2	129	0.69	35.9

Economics of cultivation with the three forms of nitrogenous fertilisers at the two levels tried are presented in Table III below.

TABLE III
Economics of Manuring

No.	Treatments	Cost of cultivation (Rs. per hectare)	Yield of seed cotten (kg per hectare)	Ratio of input and output (kg per rupee)
1.	Ammonium sulphate at 45 kg N per hectare	909	1,029	1.133
2.	Calcium ammonium nitrate at 45 kg N per hectare	902	970	1.075
3.	Urea at 45 kg N per hectare	893	1,009	1.130

TABLE III (Contd.)

S. No.	Treatment	Cost of cultivation (Rs. per hectare)	Yield of seed cotton (kg per hectare)	Ratio of input and output (kg per rupee)
4.	Ammonium sulphate at 67.5 kg N per hectare	946	996	1.053
5.	Calcium ammonium nitrate at 67.5 kg N per hectare	936	1,052	1.124
6.	Urea at 67.5 kg N per hectare	921	944	1.025

Among the six treatments, ammonium sulphate applied at 45 kg N per hectare gave more return per rupee invested, closely followed by urea at 45 kg N per hectare (Table III).

Conclusion: Even though ammonium sulphate, calcium ammonium nitrate and urea were equally effective in increasing cotton yield, ammonium sulphate and urea scored over the other at 45 kg N per hectare. However, as the cost of fertilisers are likely to be revised, the choice of fertilizers should be based on the cost of unit nitrogen.

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