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Note on the use of Ammonium Sulphate Nitrate as a
Nitrogen carrier in the potato fertilizer mixture

by
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Introduction : Potato is an exhausting crop and requires heavy doses of manures in the Nilgiris. It has been computed that an acre of good potato crop removes from the soil 47 pounds of nitrogen, 22 pounds of phosphoric acid and 77 pounds of potash. But in actual practice, a very much higher dose of these three nutrients has been found necessary in view of the peculiar soil and other natural conditions under which the crop is grown.

Earlier manurial experiments at the Agricultural Research Station, Nanjanad have clearly indicated the value of organic manures like cattle manure and fish guano in promoting increased yields of potato, but sodium nitrate was not found useful either alone or in combination with cattle manure or fish guano when compared to the organic manures. The need for potash salts and high doses of phosphates was clearly indicated in these experiments and the first manure mixture which was formulated and proved successful at this farm consisted of fish guano 15 cwts, superphosphate 5 cwts and muriate of potash 2 cwts for one acre. A series of trials started later on to find out cheaper substitutes for fish guano resulted in the discovery of the manure mixture which came to be popularly known as Nanjanad mixture. This mixture for one acre is made of 500 pounds of groundnut cake, 350 pounds of bone meal, 200 pounds of ammonium sulphate, 3 cwts of concentrated super phosphate (or 6 cwts of ordinary super phosphate) and 2 cwts of sulphate of potash, to supply nearly 80 pounds of N, 200 pounds of P_2O_5 and 100 pounds of K_2O . Consistently high yields have been obtained by application of this mixture to the soils of this tract. Many experiments conducted to find out better substitutes for this mixture have not so far been successful and the Nanjanad mixture is at present the most economic and useful mixture for promoting maximum yields of potato in the Nilgiris.

The present investigation was carried out to examine if the replacement of the nitrogen content of the Nanjanad mixture either wholly or in part by ammonium sulphate nitrate on equal nitrogen basis would result in better yields.

Materials and Methods : Ammonium sulphate nitrate is a rich nitrogenous fertilizer containing 26 per cent of nitrogen (19.5% in the ammonical form and 6.5% in the nitrate form) as against 20.6 per cent nitrogen in ammonium sulphate. A trial was laid out over a period of three years (1956 to '58) with the summer crop of potato at the Agricultural Research Station, Nanjanad in randomised blocks replicated eight times with the following treatments including ammonium sulphate nitrate.

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| A: Control (Nanjanad mixture) | } on equal nitrogen basis. |
| B: Nanjanad mixture in which the ammonium sulphate content alone is replaced by ammonium sulphate nitrate. | |
| C: Nanjanad mixture in which the entire nitrogen content (provided by ammonium sulphate and groundnut cake meal) is replaced by ammonium sulphate nitrate. | |

The fertilizers were applied at the time of planting. The potato variety Great Scot was used in this trial.

Presentation of data : The results of the three years of the trial (1956 to '58) are presented below :—

Particulars	Treatments			F. value satisfied or not	Standard Error	Critical difference (P = 0.05)
	A	B	C			
<i>Summer crop 1956 :</i>						
Acre yield in pounds	11750	10650	10250	Yes	460	986
Percentage on Control (A)	100.0	90.6	87.2	...	3.9	8.4
<i>Summer crop 1957 :</i>						
Acre yield in pounds	8375	8350	9300	No	485	...
Percentage on Control (A)	100.0	99.7	111.1	...	5.79	...
<i>Summer crop 1958 :</i>						
Acre yield in pounds	15100	14700	14650	No	520	...
Percentage on Control (A)	100.0	97.35	97.01	...	3.4	...

Conclusion : Summer crop 1956: A, \overline{B} , \overline{C}
 Summer crop 1957: Not significant
 Summer crop 1958: Not significant

The results presented above though significant during one season (1956) go to show that the replacement of the nitrogen in the Nanjanad mixture either wholly or in part by ammonium sulphate nitrate has not been generally conducive for increasing potato yields.

Summary and conclusion: A trial was laid out over a period of three years to study the efficacy of ammonium sulphate nitrate as a nitrogen carrier in the Nanjanad mixture for application to potatoes at the Agricultural Research Station, Nanjanad. The results have revealed that (i) the replacement of the nitrogen in the Nanjanad mixture either wholly or in part by ammonium sulphate-nitrate has not resulted in increased yields and (ii) that the ammonium sulphate nitrate has no special virtue as a nitrogen carrier over ammonium sulphate and groundnut cake which are at present used in the Nanjanad mixture.

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