

PERMANENT MANURIAL EXPERIMENT IN PADDY

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The permanent manurial experiment on paddy was started during the first crop season of 1964 at the Rice Research Station, Mannuthy. The variety under trial was tall indica till 1967 and with the introduction of high yielding varieties dwarf indica (IR-8) was substituted for the local strain.

The experiments conducted at Pattambi from 1936 to 1939 indicated that higher yields were recorded by the application of ammonium sulphate than compost or farm yard manure. Results obtained at Aduthurai (1939-40 and 1944-47) also showed the same trend. Inconsistent results were reported for the application of superphosphate or superphosphate in combination with green leaf at Coimbatore (1938 to 1940 and 1943-1946). Mariyakulandai and Thyagarajan (1959) were of the view that a judicious application of organic and inorganic manures was the best, in their analysis of the results of permanent manurial experiment after 32 years. Based on the results of permanent manurial trials for 9 years at Aduthurai Natarajan and Govindaswamy (1967) reported that there was no response for potash either alone or in combination with P or lime or both, in the presence of bulky organic manure. In reviewing the results of permanent manurial experiment at Palur for 12 years Narayanaswamy (1968) reported that application of nitrogen as ammonium sulphate was inferior to organic nitrogenous manure. The yields in 19th, 20th and 21st seasons after the commencement of the experiment were critically studied and the results are presented in this paper.

Materials and methods.

The experiment was under a Randomised Block Design with 4 replications. There were seven treatments viz (N) Ammonium Sulphate 80 kg/ha (N') 80 kg/ha of nitrogen as green leaf (NP) 80 kg N as ammonium sulphate and 50 kg phosphate as super Phosphate (NK) 80 kg N and 50 kg. K. (P.K) 50 kg phosphate and 50 kg potash (NPK) 80 kg N, 50 kg phosphate and 50 kg potash (N'PK) 40 kg N as green leaf 40 kg N from Ammonium Sulphate 50 kg Phosphate and 50 kg Potash.

Grain and straw yields were recorded separately for the treatments at the time of harvest. The number of tillers and plant height measurements were taken both at vegetative and productive phases by taking the average of 10 plants at random. The productive tillers were estimated by counting the number of ears from 10 random plants. The panicle length and weight of ears were

Table 1 Yield components and grain yield in three seasons during 1972-1973

Treatment	Vegetative tillers	Productive tillers	Height in cm		Panicle length in cm.	No. of grains per ear	100 grains in weight	Yield in kg/hectare		
			Vegetative phase	Productive phase				1972-'73 1st crop	1972-'73 2nd crop	1973-'74 1st crop
N	6.2	5.2	57.0	73.3	20.57	102.1	31.0	4525	4853	5796
N ¹	7.3	4.9	63.1	72.7	20.30	94.6	32.6	4752	5876	6219
NP	8.1	4.9	57.2	74.3	20.57	91.0	32.0	4676	5082	5703
NK	5.9	4.9	58.8	73.9	19.81	88.7	32.2	4570	5006	5735
M ⁵	4.2	2.6	46.6	59.2	20.16	99.7	30.2	2648	2665	3314
N ⁵ PK	6.4	4.7	57.4	72.8	20.50	107.7	29.8	4298	5028	5857
N ⁵ PK	7.0	4.9	63.4	75.0	21.10	98.4	30.2	4540	5408	6084
C. D. at 1% level	1.654	1.325	6.787	5.300	N. S.	N. S.	N. S.	611	540	510

recorded at the average of 30 plants from each plot. The 1000 grain weight was calculated by drawing three samples from each plot.

Results and discussion.

The average vegetative and productive tiller counts, plant height measurements recorded during the vegetative and productive phases, average length of panicles, number of grains per ear and the thousand grain weight and the yield over the 3 seasons viz., 1st crop 1972-1973, 2nd crop 1972-1973 and 1st crop 1973-74 are given in Table 1.

Treatment N' application of green leaf alone to supply 80 kg N recorded the highest yield in all the 3 seasons and the treatment PK, application of P and K @ 50 kg/ha each gave the lowest yield. However in both 1st crop seasons, the yield of treatments N, N', NP, NK, NPK and N'PK were on par. In the second crop season alone the treatment N' showed significant yield increase over the treatments, N, NP, NK and NPK. But in this season the treatments N' and N'PK were on par. Treatments PK consistently gave significantly inferior yields to all other treatments. Among the yield components vegetative and productive tillers showed marked reduction in the treatment PK. There was no significant difference among the treatments in all other yield components suggesting that the reduction in grain yield was due to the poor growth and drastic reduction in the vegetative and productive tillers.

The grain yield showed that continuous application of ammonium sulphate alone, gave grain yield on par with green leaf application or green leaf with ammonium sulphate indicating that continuous application of inorganic nitrogen has no deleterious effect on grain yield in seasons where there is sufficient moisture in the field. Disagreeing results were reported by Narayanaswamy (1968) while reviewing the results of the permanent manurial experiments at Palur. In the second crop season of 1972-1973 towards the ripening stage there was slight drought due to scarcity of moisture. This might be the reason for the better performance of the treatments receiving green leaf probably because of the improved physical condition of the soil and consequent water holding capacity as reported by Manickam and Venkataraman (1972).

P and K with either organic or inorganic N failed to show any response. Even after their discontinuance for 21 continuous seasons the grain yield was not affected in the laterite soils of the R. R. S. Mannuthy. The same trend in yield was reported by Narayanaswamy (1968) while reviewing the results of PME after 12 years. The results also agree with the findings of Natarajan and Govindaswamy (1967) who analysed the results of PME at Adu-thurai after 9 years. The results tend to show that the continuous application of inorganic N alone as ammonium sulphate is as good as organic N in the form of green leaf either alone or with P and K in normal seasons and that

P and K failed to give any response even after their discontinuance for 21 seasons in the laterite soils.

Summary

The results of the P. M. E. consisting of treatments receiving organic nitrogen in the form of green leaf or inorganic nitrogen in the form of ammonium sulphate or both and treatments without N, for three successive seasons were reviewed. The results showed that the plots receiving P and K alone gave the lowest yield and that P and K failed to show any effect even after their discontinuance for 21 continuous seasons. In normal seasons inorganic and organic N were on par as far as grain production was concerned.

സംഗ്രഹം

സ്ഥിരവള പരീക്ഷണത്തിലെ ഫലങ്ങൾ 21 വിളകൾക്കുശേഷം പരിശോധിച്ചതിൽ നിന്നും പാകുജനകം കിട്ടാത്ത പരീക്ഷണനിലങ്ങൾ എപ്പോഴും കുറഞ്ഞവിളവു തരുന്നതായി തെളിഞ്ഞിട്ടുണ്ട്. ഭാവകവും ക്ഷാരവും 21 വിളകൾക്കു തുടർച്ചയായി ഉപയോഗിക്കാതിരുന്നിട്ടും, ഇവയുടെ കുറവ് അനുഭവപ്പെട്ടിട്ടില്ല. സാധാരണ കാലാവസ്ഥയിൽ പാകുജനകം രാസവളങ്ങളിൽ നിന്നായാലും ജൈവ വളങ്ങളിൽ നിന്നായാലും അതിന്റെ ഉൽപ്പാദനക്ഷമതയിൽ യാതൊരു വ്യത്യാസവും കാണപ്പെട്ടിട്ടില്ല.

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(M. S. Received: 31-10-1978)