Studies on the Time of Application of Fertilizers for Rice (Oryza sativa L.)

By

V. SUBRAMANIAN 1 and Y. B. MORACHAN 2

ABSTRACT

The study revealed that the optimum dose of N, P and K for "Padma" rice was 100, 50 and 50 kg/ha respectively. The basal dressing of full dose of P and K combined with one third of N application, followed by two doses of N applications one at tillering and other at floral initiation stage resulted in maximum yield of "Padma" rice.

INTRODUCTION

In India, average yield of rice per hectare is 1300 Kg, one of the lowest in the world. Important causes for this low productivity are low yielding varieties and inadequate use of fertilizers. Lately, dwarf, high yielding varieties have been introduced and use of fertilizers is also increasing. However, fertilizers should be applied at the time when crop needs them most to increase their efficiency. Therefore, a study on the time of application of fertilizers to rice variety Padma was undertaken in 1969.

MATERIALS AND METHODS

The experiment was laid out in the Kharif season of 1969, in the wet lands of the Agricultural College, Coimbatore. Nitrogen, phosphorus and potassium were applied as follows:

1. N1 P1 K1 - Nitrogen, phosphorus and potassium were applied as complete basal.

- 2. N2 P2 K2 Nitrogen, phosphorus and potassium were applied in two splits half basal and half at tillering.
- 3. N3 P3 K3 Nitrogen, phosphorus and potassium were applied in three splits one third basal, one third at tillering and remaining one third at floral initiation stage of the crop.

A 3° confounded design with three blocks, nine plots each, partially confounding the higher order interaction NPK was adopted with two replications. A single level of fertilizer was adopted and ammonium sulphate, super phosphate and muriate of potash were used to supply respectively 100 kg. of N, 50 kg of P₂O₅ and 50 kg of K₂O/ha. The crop was harvested and yields were recorded separately. Both grain and straw yields were subjected to statistical analysis and inferences were made.

^{1.} Assistant Scientist (Agronomy), Regional Research Station, Kaveripattinam, Dharmapuri District.

^{2.} Professor and Head, Department of Agronomy, Tamil Nadu Agricultural University,
Coimbatore - 641 003.

TABLE 1. Yield of grain as influenced by main yield in rice. It is also observed that effects of the treatment.

	L. L no		
	Yield Kg/plot		
N ₁	8.09		
N ₂	7.80 7.80		
N ₃	8.70		
C. D. 0.5469	se of M. P and Kitori Fa		

It is clear that nitrogen application in split doses has significant influence on grain yield (Table I). The time of application of P and K has no effect on grain yield. In N application, three splits are found to be significantly superior to complete basal and two split applications. Application in three splits has increased grain yield by 7.54 per cent and 11.53 per cent respectively over complete basal and two splits.

The interaction between N and K has significantly influenced the yield of rice (Table 2.) The interaction between N and P and P and K did not have any effect on grain yield.

TABLE 2. Yield of grain as influenced by two aterioly factor interactions nitrogen and potassium.

BIY 190 kg. 50 kg of	bas Ki	K ₂	K ₃
N 1	8.48	7.10	9.70
N 2	7.66	8.35	7.48
N 3	9.23	8.52	8.63

S. E. 0.323 C. D. 0.947

Only the interaction between N and K has significantly influenced the

the three split of N in combination with K gives the highest yield irrespective of the time of application of potassium.

TABLE 3. Straw yield as influenced by main effects of the treatments.

BA ,	Yield	V - 1	Yield	259/1	Yield
N 1	13.43	P 1	13.59	K 1	14.64
N 2	13.49	P 2	14.01	K 2	13.91
N 3	14.16	Р3	13.78	КЗ	12.85
S. E.	0.2517	0.2517		0.2517	
C. D.	N. S.		N. S.		0.7381

From the Table 3 it is clear that N and P do not exert any influence on the straw yield by their time of application. In the case of K which significantly influences straw yield, complete basal application gives the maximum straw yield. The interaction effects of treatments on straw yield were also studied. Interaction of N and P and of N and K are significant (Tables 4 and 5).

TABLE 4. Effect of interaction of nitrogen and phosphorus on straw yield. Yield in kg per plot

		PART THE MALE	ariya adı
	lew epini		P3 Mean
	14.35	13,88	13.07 13.43
N 2	12.40	14.55	13.52 13.49
N 3	14.13	13.60	14.77 14.16
Mean	Iggs 13.59	14.01	18.78 autoriq
S. E	E. 0.4359	C. D.	1.278

The the reveals that the split application of N and P results in highest straw yield though there is no

significant difference between the timings and various combination of nutrients.

TABLE 5. Effects of interacion of nitrogen and potassium on straw yield.

				-	
Yield	ın	kg	per	p	ot

	К 1	K 2	К 3	Mean
N 1 .150	14.43	14.08	12.78	13.76
N 2	13.20	14.38	12.88	13.49
N 3	16.30	13.25	12.95	14.16
Mean	14.64	13.90	12.87	

S. E. 0.4359 C. D. 1.278

toxaphene + DDT, phosphamiden, quinalphos, endrin, endosulfan, orthene 75 SP (Acephate, Ortho 12420), monocrotophos and fentrothion + DDT. The first round of spraying was given 20 days after transplanting and the other three rounds at fortnightly intervals thereafter. Orthene soluble powder was mixed with sand and applied in between rows of plants on 20th and 60th days after planting. Five weekly counts were made commencing from 20 days after planting.

One field experiment each for seed treatment and seedling-dip treatment was conducted with six insecticides viz., dicrotophos, phosphamidan, dimethoate, monocrotophos and methyl demeton each at one concentration, and orthere at 0.1, 0.2 and 0.3 per cent concentration.

in the case of seed treatment, rice seeds were soaked for 24 hours in insecticide solution of specified

With three splits of N the interaction between N and K has resulted in higher yield but the split application of potassium is less important because complete basal application of it along with three splits of nitrogen has resulted in the maximum yield of straw.

ACKNOWLEDGEMENT

The Senior author is thankful to the University of Madras for permission to publish the M. Sc. (Ag.) dissertation submitted by the senior author.

of rice causing severe damage to high yielding varieties. The blue jassid, Typhlocyba maculifrons (M.) assumed serious proportions in recent years. The leaf hopper punctures and sucks the chlorophyll from the lamina, with the result, the infested leaves show transparent wavy lines, (Israel and Misra, 1968). In the present investigation twelve insecticides as foliar application and six recticides as seed and seedling dip treatments were evaluated for the control of the blue conditions.

MATERIALS AND METHODS

Two field experiments were conducted, the first during (June-September and the second during (October-January) in 1973-1974 to test the afficacy of insecticides as foliar sprays. The trials were laid out in randomised block design with three replications. The insecticides used

Instructors and 2. Professor and Head Department of Entomology, Tamil, Nadu Agricultura. University, Colombatora, 641,002