

Effect of Carbofuran on the Growth and Yield Components and Yield of Lowland Rice (IET 1444)*

P. BALASUBRAMANIAN¹ and Y. B. MORACHAN²

Carbofuran, an insecticide, also has growth stimulating effect. To find out its effect on rice, field experiments were carried out during the summer and monsoon seasons of the year 1979. Carbofuran application was found to increase the growth and yield components and also the grain yield of rice.

High yielding varieties of rice require proper plant protection measures to get the maximum yield. Carbofuran is one of the important insecticides used in rice. Irrespective of its insecticidal property, it also has growth stimulating character (Apple, 1971 and Charles et al. 1971). The experiment was conducted to find out the effect of Carbofuran on rice and the results are presented in this paper.

MATERIAL AND METHODS

Field experiments were conducted in the Tamil Nadu Agricultural University, wet land farm at Coimbatore, from March 1979 to November 1979, coinciding with summer and monsoon seasons. The soil of the experimental field is deep, moderately drained, clay loam with a pH of 7.8. It was low in available N, medium in available P_2O_5 and high in available K_2O contents. A short duration rice variety IET 1444 was the test variety. The experiment was

laid out in a split plot design replicated three times with the treatments as shown below.

Main plot

1. SYSTEMS OF PLANTING - CUM-LEVELS OF HERBICIDE.

T1 : Normal row spacing + recommended dose of butachlor at the rate of 1.6 kg a.i./ha (32 kg of product/ha).

T2 : Normal row spacing + Hand weeding only.

T3 : Paired row + Recommended dose of Butachlor at the rate of 1.6 kg a.i./ha (32 kg of product/ha)

T4 : Paired row + 25% reduction of recommended dose of butachlor at the rate of 1.2 kg a.i./ha (24 kg of product/ha) applied only in the wider spacing of paired row.

T5 : Paired row + Handweeding only.

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1. Research Associate, University Research Centre, Aduthurai.

2. Director of Extension Education, Tamil Nadu Agricultural University, Coimbatore 641 003.

2. INSECTICIDE :

I 1: With Carbofuran (Furadan 3G at 0.5 kg a.i./ha)

I 0: Without Carbofuran.

SUB PLOTS

N LEVELS

N 1: 100 kg/ha (Recommended dose)

N 2: 85 kg/ha (15 per cent reduced level)

N 3: 70 kg/ha (30 per cent reduced level).

Carbofuran (Furadan 3G) granules were applied at the rate of 0.5 kg a.i./ha on 20 and 45 days after planting over the water surface along with urea. A common spray of phasalone 0.05% was given 50 days after planting to avoid maximum infestation of leaf roller in control plots. Plant height and LAI of the crop were taken at the time of flowering while DMP at the time of harvesting. The grain yield was recorded at 14% moisture level.

RESULTS AND DISCUSSION

Growth components:

The data on the growth components are presented in the Table I.

Carbofuran application was found to influence the plant height. Carbofuran applied plots recorded significantly increased plant height (91.7cm and 86.2 cm) compared to no application (81.0 cm and 76.2 cm) during both the seasons. It may be due to

the stimulating effect of Carbofuran as observed by Apple (1971) and Charles *et al* (1971) in corn and Venugopal (1979) in rice.

Maximum LAI and also increased dry matter production was registered with the application of Carbofuran. Available N was higher in Carbofuran applied plots (170.5 kg/ha during summer and 157.8% kg/ha during monsoon). Increased N uptake by crop was also noticed with the application of Carbofuran. Singaram (1975) reported increased N uptake by the crop due to Carbofuran application mixed with fertilizer. Increase in LAI in rice with increased N supply had been reported by several workers (Engi, 1965, Fegade and De Datta, 1971 and Tanaka, 1972). The incidence of whorl maggot and leaf roller was less due to Carbofuran application which was on line with the reports of International Rice Research Institute (1975) and Chandra Mohan and Jeyaraj (1976.) Thus, the increased N availability and also uptake by the crop and less the incidence of pests resulted in giving maximum LAI and increasing DMP.

Yield components and yield:

The data on the yield components and yield of rice are presented in Table II.

Carbofuran application was noticed with increased productive tillers in both

the seasons. There was spectacular increase in filled grains per panicle due to Carbofuran application. More or less steady and continuous N supply until grain filling due to Carbofuran application would have resulted in increased number of filled weight also. Carbofuran application increased the chlorophyll content and the senescence of the flag leaf was delayed. This in turn would have caused the increased translocation of photosynthates reflecting on the grain weight.

Grain Yield:

A maximum grain yield of 46.8 q/ha in summer and 41.8 q/ha in monsoon was obtained with the application of Carbofuran. The main reasons might be the vigorous growth of the plant, increased LAI, DMP and the cumulative effect of yield attributes such as productive tillers, number of grains per panicle and 1000 grain weight. Better control of insects also contributed its favourable effect on the grain yield. Many workers

TABLE I Effect of Carbofuran on growth components of rice (IET 1444).

Treatments	Summer, 1979			Monsoon, 1979		
	Height (cm)	LAI	DMP (kg/ha)	Height (cm)	LAI	DMP (kg/ha)
With Carbofuran	91.7	7.21	10053	86.2	5.12	8696
Without Carbofuran	81.0	4.91	9499	76.2	3.63	8313
S.E.	0.74	0.12	26	0.70	0.12	20
C.D. (P=0.05)	2.20	0.36	78	2.08	0.36	59

TABLE II Effect of Carbofuran on yield components and yield of rice (IET 1444).

Treatments	Summer, 1979				Monsoon, 1979			
	Productive tillers/hill	Filled grain	1000 grain weight (g)	Yield (kg/ha)	Productive tillers/hill	Filled grain	1000 grain weight (g)	Yield (kg/ha)
With Carbofuran	8.65	100.0	22.17	4682	8.36	100.8	22.14	4181
Without Carbofuran	7.39	93.7	21.90	3931	6.29	90.8	21.85	3570
S.E.	0.16	0.40	0.09	79	0.15	0.70	0.13	84
C.D. (P=0.05)	0.48	1.20	0.27	250	0.45	2.10	N.S.	250

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had also reported increased grain yield due to Carbofuran application in rice. (Anon., 1971; Jayaraj et al., 1976; Venugopal, 1979 and Selvaraj and Venugopal, 1979).

To conclude, it can be stated that Carbofuran application had a definite favourable benefit on the growth and yield components and yield of rice.

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