

## Effect of Potash Nutrition on the Incidence of Certain Insect Pests of Rice

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### ABSTRACT

Graded levels of potash viz., 50, 100, 150, 200 and 250 Kg/ha were applied to ADT 31 rice and the results revealed that at 200 and 250 Kg levels the incidence of thrips, green leafhopper and brown plant hopper and damage by whorl maggot and leaf roller were significantly low.

### INTRODUCTION

Potassium plays a prominent role in providing resistance to crop plants against diseased and ecological adversities. But its role against crop pests is not adequately studied. Plants deficient in potash nutrition become more susceptible to the on set of damage by pests and pathogens (Chaboussou, 1972). Enhanced rate of application of potash was found to reduce the incidence of sugar beet-black fly (*Aphis fabae*) (Stapel, 1958). At higher K levels reduction of gallmidge of rice (*Pachydiplosis oryzae* and red oak-scale (*Eulecanium rufulum*) were reported. (Israel and Prakash Rao, 1967; Bruning and Uebel, 1971). Hatmosoe-warno, (1970) reported that application of potash to sugarcane halved the damage caused by *Chilo sacchariphages*. Sithanatham and Srinivasan (1972) reported that foliar application of potassium chloride with endrin resulted in survival of more number of mother shoots and reduced the number

of borer infested tillers, in sugarcane. Rangarajan *et al.* (1974) found that the incidence of sunflower leaf caterpillar and capitulum borer was the least on the plants nourished with higher level of  $K_2O$ . Since the information of the effect of K, on various insects incidence is scanty, a study was made to find out the effect of K level on the incidence of some important rice pests.

### MATERIALS AND METHODS

A field trial was laid out in 1975 Kuruvai season (June-September) in the experimental farm of Annamalai University, Annamalainagar in a simple randomized block design with five replications. The plot size was 5 x 4m<sup>2</sup>. N and P were applied @ 187.5 Kg and 87.50 Kg per acre and their levels were kept constant. The level of K varied from 0, 50, 100, 150, 200, and 250 Kg of  $K_2O$ /ha. Nitrogen was applied in the form of urea. One half of N was applied basally and the remaining dose was

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applied 25 days after transplanting. Entire P was given at the time of basal dressing in the form of superphosphate. K was applied in three split doses. One third was applied basally, one third 25 days after transplanting and the rest at the time of panicle initiation in the form of muriate of potash. Twenty five days old seedlings of ADT 31 were transplanted at two seedlings per hill with a spacing of 15 x 10 cm.

Observations on insect population were taken at fortnightly intervals for green leafhopper (*Nephotettix virescens* Distant), brown plant hopper (*Nilaparvata lugens* Stål), leaf roller (*Cnaphalocrocis medinalis* Guen), whorl maggot (*Hydrellia sasakii* Yuaso and Isnitani) and thrips (*Baliiothrips biformis* Bagnall).

Green leaf hopper population was assessed by a standard net sweeping (to and fro) for five times in each of plots. The net used for sweeping had a length of 40cm and a width of 20 cm. Visual observations were made on 10 hills to find out the average number of brown plant hopper per hill. The per cent damage by leaf roller and whorl maggot was estimated in 10 hills per plot. Thrips population was assessed by taking five wet hand sweeps per plot over the plants and counting the number of thrips sticking to the palm.

## RESULTS AND DISCUSSION :

The effect of K on the incidence of green leaf hopper is presented in Table 1. The population of green leafhopper varied significantly in different treatments. Increased quantity of K

applied reduced the incidence. The per cent reduction varied from 19.70 to 50.0. The reduction was on a par from plants which received both 200 and 250 Kg of  $K_2O/ha$ . The maximum population was observed on 60th day of sampling.

The brown plant hopper incidence was also found to be decreased at higher K levels. The maximum reduction (39.42 per cent) was observed at 250Kg of K level. The per cent reduction ranged from 8.01 to 39.42. As the plants matured, significantly more number of brown plant hoppers were observed.

The rice leaf roller incidence was found to be reduced due to enhanced K application (Table). The per cent reduction varied from 6.25 to 32.42. However, the reduction at 50, 100, 150 Kg of K levels were on a par. The maximum reduction was observed both at 200 and 250 kg level. The leaf roller incidence was maximum on 60th day after transplanting.

The whorl maggot incidence was reduced at higher K levels. Even though the maximum reduction (49.74) was observed at 250 Kg level, there was no significant difference among the plots which received 100, 150, and 200 Kg of  $K_2O/ha$ . However the reduction ranged from 14.53 to 49.74.

The rice thrips incidence was observed only on 15th day after transplanting. The results revealed that there was a direct relation between the incidence of thrips and K level (Table). Higher the level of K applied, lower the incidence of thrips was. The incidence

TABLE. Effect of potash application on the incidence of thrips, green leaf hopper, brown planthopper and infestation by whorl maggot and leaf roller in ADT 31 rice

Treatment (K <sub>2</sub> O level, Kg/ha)	Population of thrips	Population of green leafhopper	Population of brown plant hopper	Incidence of whorl maggot %	Incidence of leaf roller %
0	40.0	2.64 (1.70)	2.67	11.74 (19.81)	11.85 (19.30)
50	27.2	2.12 (1.56)	2.46	10.03 (18.15)	10.98 (18.53)
100	21.8	1.72 (1.42)	2.27	7.62 (15.91)	11.11 (18.58)
150	20.2	1.60 (1.37)	2.06	7.76 (15.99)	10.04 (17.77)
200	13.6	1.44 (1.30)	1.84	6.97 (15.12)	8.07 (16.04)
250	10.4	1.32 (1.28)	1.62	5.90 (13.94)	7.76 (15.56)
C.D. (P=0.05)	13.9	0.22	0.15	2.15	2.68

Figures in parentheses are transformed values.

of thrips from the plots which received 100, 150, 200 and 250 Kg of K was on a par.

The results indicated that the incidence of all the pests of rice studied was found to be reduced due to enhanced K application. The reduced incidence of the sap feeders *viz.*, green leaf hopper brown plant hopper and thrips was in consonance with the findings of Stapel (1958) who found that aphid incidence was reduced in sugar beet due to higher potash levels. Israel and Prakash Rao (1967) reported that whorl maggot of rice was also reduced. The similar result was noted in the present findings also.

In addition, this study indicated the leaf roller infestation was reduced when K was applied at increased levels. However, Michael Raj and Morachan (1973) have recorded higher incidence of leaf roller with increased nutrition of K.

The possible reason for the reduction of pests may be due to the fact that increased K produces a better proteogenesis, a physiological phenomenon correlated with deamination of the amino acids and reducing sugars in the sap which are otherwise favourable for the reproduction of sucking pests. (Chaboussou, 1972). Further, increase in the sclerenchymatous layer and silica content may also act as mechanical barrier in plants which received higher K (Vaithilingam, 1975). It may also be possible that some other biochemical alterations in the availability of essential amino acids may lead to the reduced incidence of pests.

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