

ESTIMATION OF LOSSES DUE TO INSECT PESTS OF RICE

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Field experiments conducted at Tamil Nadu Rice Research Institute, Aduthurai to develop a better pest management programme to brown planthopper (BPH), green leaf hopper (GLH) and stemborer (SB) revealed that the variety ADT 31 recorded lower population of BPH and very low SB incidence during kuruvai season. During thaladi, BPH population and SB damage were lesser in white ponni, CO 43 and RP 1-14. PY 3 and CO 43 registered higher yield during kuruvai and thaladi respectively with lesser incidence of above two pests. Application of carbofuran 3 G @ 125 kg a. i/ha on 30 days after transplanting (DAT) during kuruvai and on 5 DAT during thaladi reduced both GLH and BPH population resulting in higher grain yields.

Introduction of high yielding varieties of rice coupled with continuous cropping and indiscriminate use of broad spectrum insecticide have made the pest problems on rice more complex and plant hoppers which were not of much significance, have assumed major importance in recent years. The present study was designed to test the efficacy of resistant and susceptible varieties of BPH and SB in relation to carbofuran 3 G applied at different stages of crop growth.

MATERIALS AND METHODS

Two field experiments were conducted at Tamil Nadu Rice Research Institute, Aduthurai during kuruvai and thaladi, 1985. The experiments were conducted in a split plot design, the varieties as main plots and five insecticidal treatments as sub plots (Table 3). The plots were 20m² with three replications.

Varieties

Kuruvai

- V₁ IET 7575 (Resistant to BPH)
- V₂ Sona (Susceptible to BPH)
- V₃ PY 3 (Resistant to BPH)
- V₄ ADT 31 (Tolerant to BPH)

Thaladi

- IET 9576 (Resistant to stemborer)
- RP 1-14 (Susceptible to stemborer)
- White ponni
- CO 43

The population of green leafhopper (GLH) and BPH were recorded from 10 hills selected at random commencing from 25 DAT at 15 days intervals during kuruvai and thaladi seasons. The total number of tillers and the number of tillers with white-ears in each plot were observed before harvest. Grain yield was recorded at harvest.

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RESULTS AND DISCUSSION

Significant differences among varieties were noticed in BPH population only on 75 DAT. The population of BPH was very low in IET 7575 followed by ADT 31 and PY 3 which recorded 5.60, 7.87 and 20.13 BPH/10 hills during kuruvai compared to higher population in Sona (47.53). The SB incidence was minimum in ADT 31 during kuruvai which was significantly superior to other varieties (Table 1). During thaladi, the BPH population and SB infestation were less in white Ponni, RP 1-14 and CO 43 compared to IET 9576 (Table 2).

Table 1 Influence of varieties on the incidence of BPH and SB (Kuruvai 1985)

Variety	75 DAT BPH/10 hills	White ear %	Grain yield kg/ha
IET 7575	5.60 ^a	4.46 ^c (2.20)	6319 ^b
Sona	47.53 ^b	4.82 ^c (2.32)	6489 ^b
PY 3	20.13 ^a	3.53 ^b (1.88)	7029 ^a
ADT	7.87 ^a	0.68 ^a (1.04)	4074 ^c

Figures in parentheses are $\sqrt{X+0.5}$ transformed values. Means followed by a common letter in a column are not significantly different at 0.01% level.

Table 2 Influence of varieties on the incidence of BPH and SB (Thaladi 1985)

Variety	75 DAT BPH/10 hills	White ear %	Grain yield kg/ha
IET 9576	4.60 ^a	4.55 ^c (2.11)	2985 ^c
RP 1-14	1.80 ^a	2.60 ^a (1.58)	4415 ^b
White Ponni	1.60 ^a	2.04 ^b (1.40)	5104 ^{ab}
Co 43	2.00 ^a	21.9 ^a (1.44)	5254 ^b

Figures in parentheses are arcsin transformed values. Means followed by a common letter are not significantly different at 0.05% level.

The population of GLH was less in the treatments, protecting the crop with carbofuran 3 G @ 1.25 kg a.i./ha on 5 DAT or on 5, 30 and 60 DAT or on 30 DAT. During kuruvai season, the BPH was very less in the plots applied with carbofuran 3 G @ 1.25 kg a.i./ha on 30 DAT followed by three applications of carbofuran (5, 30 and 60 DAT) and one application on 5 DAT. In thaladi trial, the BPH occurred during tillering phase of the crop; applying the granule on 5 DAT reduced the BPH (Table 3). The next in merit was three applications of carbofuran which showed slightly higher BPH population. Rao and Parkasa Rao (1983) also reported the effectiveness of carbofuran in reducing the nymphs and adults of BPH. Higher yield of 6,474 kg/ha was recorded in treatment 3 (protecting the crop from 30 DAT to 60 DAT) during kuruvai while in thaladi, the yield data had not shown any significant difference among the treatments. However, an yield of 4,599 kg/ha was obtained in the plots treated with carbofuran on 5 DAT where both GLH and BPH populations were minimum. The data presented in Table 3 also indicated the avoidable loss during different growth phases. The loss was maximum in T₁ and T₂ (30 DAT to harvest). Protection of the crop to keep the BPH under check from 30 DAT had not only reduced the loss but also increased the yield significantly. These observations showed that BPH management was essential from 30-80 DAT since insecticides applied beyond

Table 3- Incidence of GLH and BPH as influenced by the time of application of carbofuran

Treatments	Kurtvai				Thaladi			
	25 DAT GLH/10 hills	60 DAT BPH/10 hills	Grain yield kg/ha	Avoid- able loss %	25 DAT GLH/10 hills	25 DAT BPH/10 hills	Grain yield kg/ha	Avoid- able loss %
Untreated check	10.92 ^b	15.75 ^b	5415 ^d	--	7.92 ^b	5.92 ^b	4179a	--
Carbofuran 8G @ 1.25 kg a.i. ha on 5 DAT	5.33 ^a	14.17 ^a	5926 ^{bc}	9.42	6.42 ^a	3.67 ^a	4599 ^a	10.05
Carbofuran 3G @ 1.25 kg a.i. ha on 30 DAT	9.97 ^{ab}	9.00 ^a	6474a	19.56	7.60 ^a	5.67 ^b	4626 ^a	7.83
Carbofuran 3G @ 1.25 kg a.i. ha on 60 DAT	9.33 ^{ab}	15.75 ^b	6244 ^{ab}	15.31	8.58 ^b	7.50 ^c	4420 ^a	5.77
T ₁ +T ₂ +T ₃	8.33 ^a	9.83 ^a	5622 ^{cd}	3.82	6.58 ^a	4.25 ^a	4495 ^a	7.54

Means followed by a common letter in a column are not significantly different from each other — by DMRT

90 days age did not have the desired effect in checking the BPH (Kalode, 1985).

Among the varieties tested, PY 3, Co 43 and White Ponni recorded higher yields during kuruvai and thaladi seasons respectively. The population of BPH was on par with ADT 31. The maximum yield of PY 3 was as expected and due to the resistance to BPH. During thaladi, CO 43 and White Ponni recorded higher yield in which the population of BPH was low and SB incidence was less.

It could be thus inferred that planting a resistant variety and protecting the crop during critical periods

of crop growth viz., 30-60 DAT during Kuruvai and up to 30 DAT during thaladi were effective. Besides economic control of GLH and BPH, increased grain yields were also recorded.

REFERENCES

- KALODE, M. B. 1985. Rice Brown plant hopper, leaf folder and gall midge as national pests. In "Integrated pests and disease management (Ed) S. Jayaraj, Tamil Nadu Agri. University, Coimbatore, p. 18-35.
- RAO, R. R. M. and PRAKASA RAO, 1983. Toxicity, persistence and effectiveness of certain granular insecticides against the brown plant hopper, *Nilaparvata lugens* (Stål.) Madras Agri. J., 70: 256-260