

Evaluation of new fungicidal formulations for sheath blight control

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Field experiment was conducted during *Kharif* (wet) 1999 and 2000 to evaluate the relative efficacy of new fungicidal formulations against the sheath blight disease of rice caused by *Rhizoctonia solani*. Two sprays of either Pencycuron (Monceren 250 EC @ 0.15%) or Hexaconazole (Anvil 5 SC @ 0.20%) effectively controlled the disease and improved grain yield over other formulations.

Key words : Rice, sheath blight, *Rhizoctonia solani*, new fungicidal formulations, control.

INTRODUCTION

Sheath blight caused by *Rhizoctonia solani* Kuhn is one of the most important fungal diseases of rice during the *Kharif* (wet) seasons in West Bengal as well as in almost all rice growing States of India (Reddy and Reddy, 1986; Biswas, 2000). Kannaiyan and Prasad (1978) reported 5.2 – 50% loss and according to Rajan (1987) the loss in rice yield may be 1.6 – 48.4%, depending on disease severity. There is also strong relationship between symptom severity and yield reduction (Marchetti and Bollich, 1991). There are a few resistant cultivars developed so far. Therefore at the present moment use of fungicides appears to be the only practical solution to its control to achieve full yield potential of the crop. Foliar spray of Dithane M – 45 (Roy and Saikia, 1976), Bavistin (Kannaiyan and Prasad, 1979; Reddy *et al.*, 1981), Validamycin A (Arunyanart *et al.*, 1986; Dev and Mary, 1986), Rovral (Dash and Mishra, 1990; Sudhakar *et al.*, 1993), Tilt (van Eeckhout *et al.*, 1991; Sudhakar *et al.*, 1993) have already been reported. No information is available about experiment conducted with new fungicidal formulations, either singly or in combination, to find out the best and effective control of the disease. In this paper, an attempt has been made on that line.

MATERIALS AND METHODS

A field experiment was conducted for two consecutive crop seasons (1999 and 2000) during *Kharif* (wet) seasons at Rice Research Station, Chinsurah (8.62 m MSL), West Bengal under the 'All India Coordinated Rice Improvement

Programme' (AICRIP) on rice in a Randomized Complete Block (RCB) design with three replications. During *Kharif*'99, twelve treatments comprising eight new fungicidal formulations, viz., Hexaconazole (Anvil 5 SC), Tebuconazole (Folicur 250 EW), Difeconazole (Score 10 WP, Score 10 WP, Score 25 EC), Pencycuron (Monceren 250 EC), Epoxyconazole 125g + Carbendazim 125g ready-mix formulation (Swing 250 EC), Iprodione 25% + Carbendazim 25% ready-mix formulation (Quintal 50 WP), Propiconazole 15g ready-mix formulation (Armure 30 EC) whereas during *kharif* 2000 eleven treatments comprising seven new fungicidal formulations (Except Quintal 50 WP) were taken. Except Tebuconazole and Pencycuron, all other formulations were tested at one dosage. Validamycin (Sheathmar 3 L) was included as a standard check fungicide. One untreated check was also maintained. The plot size was 1.5m × 3m and a distance of 90 cm was kept between plots and 1m between blocks. 'Swarna'- a high yielding cultivar highly susceptible to sheath blight was used. Thirty days old seedlings were transplanted in the experimental field in the last week of July with a spacing of 15cm × 15cm @ 2 seedlings per hill. Fertilizers N, P₂O₅, K₂O @ 120, 50, 30 kg ha⁻¹ were applied and standard agronomic practices were followed to raise the crop.

During maximum (active) tillering stage in mid-September, all the plants (except the border ones) were inoculated with 10 days old highly virulent isolate of the pathogen by the 'straw-bit' method (Rao and Kannaiyan, 1973). The pathogen was isolated from the infected leaf sheaths of the

Table 1. Evaluation of new fungicidal formulations for sheath blight control in Kharif 1999 and 2000 at Chinsurah, West Bengal

Treatments	Dose (%)	1999*		2000*	
		Disease severity (%)	Grain yield (Kg ha ⁻¹)	Disease severity (%)	Grain yield (Kg ha ⁻¹)
Anvil 5 SC (Hexaconazole)	0.20	9.9 (18.2)	4644	9.9 (18.2)	2564
Swing 250 EC (Epoxyconazole 125g + Carbendazim 125g)	0.20	11.3 (19.6)	4262	11.5 (19.8)	1937
Folicur 250 EW (Tebuconazole)	0.15	11.2 (19.5)	4292	11.3 (19.6)	1994
	0.20	11.1 (19.5)	4321	11.2 (19.5)	2137
Quintal 50 WP (Iprodione 25% + Carbendazim 25%)	0.20	13.5 (21.5)	4027	--	--
Armure 30 EC (Propiconazole 15g + Difenoconazole 15g)	0.07	15.4 (23.1)	3527	15.4 (23.1)	1652
Score 10 WP (Difenoconazole)	0.15	13.0 (21.1)	4115	13.5 (21.5)	1852
Score 25 EC (Difenoconazole)	0.05	11.5 (19.8)	4203	13.0 (21.1)	1880
Monceren 250 EC (Pencycuron)	0.12	11.0 (19.3)	4556	11.0 (19.3)	2279
	0.15	9.6 (18.0)	5027	9.5 (17.9)	3989
Sheathmar 3 L (Validamycin)	0.25	14.2 (22.1)	3703	14.2 (22.1)	1766
Check (Untreated)	--	35.4 (35.3)	3057	35.5 (36.6)	997
L.S.D (0.50)		2.5	ns	1.7	507
C.V. (%)		6.9	14.8	4.5	14.2

Figures in parenthesis indicate angular transformed values and statistics applied to them
ns - not significant

* Average of three applications

susceptible high yielding cultivar 'Swarna'. Fungicides were sprayed twice at an interval of about 10 days starting from the initial appearance of the disease after artificial inoculation depending upon disease development and weather

conditions. During Kharif 2000, 2nd spray was delayed due to torrential rain and stagnation of flood water.

The disease incidence was recorded 10 days after last spray of fungicides from ten randomly

affected plants in each treatment and the plants were assessed individually using SES 0-9 scale (IRRI, 1996). Disease severity (%) was calculated using the formula :

Disease severity

$$= \frac{0(N_0) + 5(N_1) + 10(N_2) + 30(N_3) + 50(N_4) + 100(N_9)}{\text{Total no. of tillers or hills observed}} \times 100$$

Where $N_0 - N_9$ = no. of tillers/hill classified as 0-9 grades respectively according to SES (0-9) for rice.

The grain yield recorded on plot basis were converted to kg ha^{-1} for statistical analysis.

RESULTS AND DISCUSSION

Perusal of data (Table 1) revealed that all the fungicides were found significantly effective in checking the disease. Grain yield differences were, however, not significant during *Kharif* '99. Penycuron (Monceren 250 EC) and Hexaconazole (Anvil 5 SC) were found highly effective over other formulations in reducing the disease in both the crop seasons. Monceren 250 EC, a non-systemic fungicide, was proved most effective in checking sheath blight disease and improving grain yield followed by Anvil 5 SC, a broad spectrum triazole fungicide. Low grain yield was recorded in *Kharif* 2000 due to flood. The effectiveness of Penycuron and Hexaconazole have also been reported against sheath blight disease from India and abroad. (Arunyanart *et al.*, 1986; Yamada *et al.*, 1987; Sudhakar *et al.*, 1993; Chia Tio Huat, 1997).

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