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# Evaluation of new fungicides for rice-sheath blight control

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Field experiment was conducted during *kharif* (wet) season, 2002 and 2003 to evaluate the relative efficacy of new fungicides against sheath blight disease of rice caused by *Rhizoctonia solani.* Two sprays of tolclophos-methyl (Rizolex 50 WP) 0.2% were highly effective in reducing sheath blight severity and imporving grain yield over other fungicides.

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

## INTRODUCTION

Sheath blight (ShB) caused by *Rhizoctonia solani* Kuhn is one of the most important fungal diseases of rice (*Oryza sativa* L.) during the *kharif* (wet) season in almost all rice growing areas of India (Reddy and Reddy, 1986 ; Biswas, 2000). The yield loss caused by the disease varies according to cultivars, meteorological conditions, soil topography etc. However, under favourable conditions the loss may be upto 50% of the total yield (Kannaiyan and Prasad, 1978 ; Rajan, 1987). There is also strong relationship between symptom severity and yield reduction (Marchetti and Bollich, 1991). Presently no commercial resistant cultivars are available to the farmers and the occurrence and course of the disease can little be influenced by sanitary and cultural measures alone, and so, effective fungicides are the only way of controlling the disease in intensive cultivation.

Very little information is available about experiment conducted with new fungicidal formulations, eigher singly or in combination, for sheath blight control (Biswas, 2002 ; Saha, 2003). Here, an attempt has been made on that line.

## MATERIALS AND METHODS

A field experiment was conducted during *kharif* (wet) seasons 2002 and 2003 at Rice Research Station, Chinsurah, West Bengal under the 'All India Coordinated Rice Improvement Programme (AICRIP). Thirty days old seedling of sheath blight susceptible cultivar swarna (MTU 7029) were transplanted having 15 × 15 cm spacing in a randomized complete block (RCB) design with three replications (plot size 3m × 1.5m). Uniform fertilizer dose of both basal and split of 120 kg N, 50 kg $P_2O_5$ and 30 kg $K_2O$ $ha^{-1}$ were applied in all plots and standard agronomic practices were followed to raise the crop.

Seventeen (17) treatments comprising of seven new fungicides, namely, β-methoxy acrylates strobilurins (Amistar 25 SC, RIL-010/F1 25 SC and RIL-011/F1 50 SC) tolclophos-methye (Rizolex × 50 WP), Copper sulphate + amino acid ready mix (Shield 2.62 SC), flusilazole 40 EC, epoxyconazole (Opal 7.5 EC) were evaluated. Shield was tested during 2002 while amistar, flusilazole and opal were tested during 2003. Opal was evaluated at a concentration of (3.0 ml/1), rizolex was evaluated at three different concentrations (1.0, 1.5 and 2.0 g/1). Similarly amistar (0.75 and 1.0 ml/1), RIL 010 (0.75 and 1.5 ml/1), RIL 011(0.5 and 1.0 ml/1), flusilazole (0.4 and 0.6 ml/1) were evaluated at two different concentrations. Shield, a biorational fungicide, was tested only at one concentration (2.0 ml/1). Along with these new formulations the existing commercially available fungicide iprobenphos (kitazin 48 EC) was also evaluated during 2002 at a concentration of (2.5 ml/1), Validamycin (Rhizocin 3L and sheathmar 3L), an antibiotic, was included as the standard check fungicide for comparison of the efficacy of the new formulations.

During maximum (active) tillering stage, all the plants (except the border ones) were inoculated with ten days old highly virulent isolate of the pathogen by the 'straw-bit' method (Rao and Kannaiyan, 1973). Fungicides were sprayed twice at an interval of about ten days starting from the initial appearance of the disease after four days of artificial inoculation depending upon the disease development and weather conditions. Ten days after the last spray, final disease incidence was recorded 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 this formula :

$$\frac{0(N_0)+5(N_1)+10(N_3)+30(N_5)+50(N_7)+100(N_9)}{\text{Total no. of tillers of hills observed}} \times 100$$

where $N_0 - N_9$ = No. of tillers / hills, classified as 0-9 grades respectively, according to SES (0-9) scale for rice. Dry grain yield recorded on plot basis were converted to Kg $ha^{-1}$ for statistical analysis.

## RESULTS AND DISCUSSION

All the fungicides significantly reduced the sheath blight infection and increased the grain yield over untreated check (Table 1). However, among the fungicides, rizolex 50 WP (0.2%) was highly effective in checking sheath blight infection and increasing the grain yield by more than 1.0 t $ha^{-1}$ over untreated check and almost at par with the standard check fungicides during the two consecutive crop seasons. However, opal 7.5 EC (0.3%), tested only in 2003, was the best in reducing sheath blight infection and increasing the grain yield by 1.2 t $ha^{-1}$ over untreated check. In order of efficacy, opal was followed by rizolex having 10.6 and 10.7 percent disease severity respectively. A maximum increase of 186.1 percent in grain yield was achieved with opal followed by rizolex with an increase of 156.1 percent over the untreated check. The performance of opal was slightly better than the standard check fungicide.

Under AICRIP, these new fungicides were also evaluated at several other locations of India during *kharif* 2002 and 2003. Rizolex 50 WP (0.2%) was proved highly effective at Bankura, Cuttack, Faizabad and Pattambi during 2002 (Anonymous, 2002) and Faizabad, Kapurthala, Raipur and Udheywalla (Jammu) during 2003 (Anonymous, 2003). Singh and Sethunathan (1987) reported almost complete inhibition of mycelial growth and sclerotial formation in *R. solani* at 2.5 $\mu$g $me^{-1}$ by tolclophas-methyl *in vitro*.

**Table 1 :** Effect of different new fungicides against the mean sheath blight severity and yield of rice during *kharif* 2002 and 2003 at Chinsurah

| Treatment | Dose per liter of water | Mean disease severity (%) | Average yield (Kg $ha^{-1}$) | Percent yield increase over control |
|---|---|---|---|---|
| Kitazin 48 EC | 2.5 ml | 11.1 (19.4) | 1451 | 119.8 |
| Amistar 25 SC | 0.75 ml | 12.7 (20.8) | 1463 | 121.7 |
| Amistar 25 SC | 1.0 ml | 12.5 (20.7) | 1581 | 139.5 |
| RIL-010/F1 25 SC | 0.75 ml | 12.6 (20.7) | 1362 | 106.4 |
| RIL-010/F1 25 SC | 1.5 ml | 12.8 (20.9) | 1271 | 92.6 |
| RIL-011/F1 50 SC | 0.5 ml | 11.2 (15.4) | 1571 | 138.0 |
| RIL-011/F1 50 SC | 1.0 ml | 11.4 (15.6) | 1537 | 132.9 |
| Flusilazole 40 EC | 0.4 ml | 12.1 (20.4) | 1555 | 135.6 |
| Flusilazole 40 EC | 0.6 ml | 12.0 (20.2) | 1574 | 138.5 |
| Opal 7.5 EC | 3.0 ml | 10.6 (19.0) | 1888 | 186.1 |
| Rizolex 50 WP | 1.0 g | 11.1 (19.4) | 1617 | 145.0 |
| Rizolex 50 WP | 1.5 g | 10.9 (19.2) | 1642 | 148.8 |
| Rizolex 50 WP | 2.0 g | 10.7 (19.1) | 1691 | 157.1 |
| Shield 2.62 SC | 2.0 ml | 12.6 (20.8) | 1265 | 91.7 |
| Rhizocin 3L | 2.5 ml | 10.5 (18.9) | 1808 | 173.9 |
| Sheathmar 3L | 2.5 ml | 10.2 (18.6) | 1879 | 184.7 |
| Check (Untreated) | — | 36.5 (37.1) | 660 | |
| LSD (0.05) | | 1.35 | 229 | |
| CV (%) | | 3.85 | 9.30 | |

Figures in parentheses indicate angular transformed values and statistics applied to them.

Validamycin and iprobenphos, which are commercially available in the country, have already been recommended as specific fungicides for sheath blight control. In this study, rizolex proved superior in its efficiency over other fungicides tested during two consecutive crop seasons in reducing disease severity and increasing the grain yield.

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## REFERENCES

Anonymous (2002). *Progress Report*, 2002, vol 2. Entomology and Pathology, AICRIP, DRR (ICAR), Hyderabad, Andhra Pradesh, India. p.3. 99-3. 107.

Anonymous (2003). *Progress Report*, 2003, vol 2. Entomology and Pathology, AICRIP, DRR (ICAR), Hyderabad, Andhra Pradesh, India. p.3. 113-3. 125.

Biswas, A. (2000). Changing trends of rice diseases in West Bengal, India. *J. Mycopathol. Res.* **38**(1) : 33-36.

Biswas, A. (2002). Evaluation of new fungicidal formulations for sheath blight control. *J. Mycopathol. Res.* **40**(1) : 9-11.

IRRI (1996). *Standard Evaluation System for Rice.* International Rice Research Institute, Manila, Philippines, p. 25.

Kannaiyan, S. and Prasad, N. N. (1978). Seed borne nature of sheath blight pathogen, *Rhizoctonia solani* in rice. *Intern. Rice Res. Newsl.* **3** : 10.

Marchetti, M. A. and Bollich, C. N. (1991). Quantification of the relationship betweeen sheath blight severity and yield loss in rice. *Plant Dis.* **75** : 773-775.

Rajan, C. P. D. (1987). Estimation of yield loss to sheath blight of rice. *Ind. Phytopath.* **40** : 174-177.

Rao, A. V. and Kannaiyan, S. (1973). An easy method of screening rice varieties for resistance to sheath blight disease. *Ind. J. Mycol. Pl. Pathol.* **3** : 106-107.

Reddy, A. P. K. and Reddy, C. S. (1989). Present status of sheath blight disease and its control. pp. 118-117. In : *Diamond Jubilee Souvenir.* Agri. Res. Stn., Maruteru, Andhra Pradesh, India.

Saha, S. (2003). Evaluation of new fungicidal formulations against sheath blight of rice in West Bengal. *Environ. Ecol.* **21**(1) : 237-239.

Singh, U. D. and Sethunathan, N. (1987). Individual and combined effects of certain pesticides on *Rhizoctonia solani*, sheath blight pathogen of rice. *J. Phytopath.* **199** : 240-247.

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