

EVALUATION OF FUNGICIDES AGAINST BIPOLARIS LEAF BLIGHT OF WHEAT (*TRITICUM AESTIVUM* L.)

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Abstract

Four commercial fungicides were evaluated for their efficacy to control bipolaris leaf blight of wheat under natural epiphytotic condition during 1991-92 and 1992-93. Among them Tilt 250 EC (0.05%) was the most effective and profitable one which controlled the disease significantly, producing the highest grain yield with maximum gross margin. The disease severity was also reduced by Dithane M-45 (0.2%) and Pencozeb (0.15%) and gave profitable yield. While application of Rovral (0.2%) was found to be uneconomic offering the lowest gross margin.

Key words : Fungicide, Wheat, Leaf blight.

Introduction

Wheat (*Triticum aestivum* L.) is the second most important cereal crop in the rice based cropping systems in Bangladesh. Like other field crops wheat is also susceptible to a number of diseases (Wiese, 1977). Leaf blight caused by *Bipolaris sorokiniana* (*Helminthosporium sativum*) is one of the major diseases of wheat in Bangladesh (Fakir, 1982, Anon., 1984). Ahmed (1986) reported that it is prevalent in almost all the wheat growing areas of the country, especially in Jessore-Ishurdi areas. In recent years, it has become a serious threat for wheat cultivation in Bangladesh. More than 22% yield loss was recorded due to this disease (Badaruddin *et al.*, 1991; Anon.,

1992). Information on chemical control of different wheat diseases is available but the same on the bipolaris leaf blight is scanty (Bidari and Govindu, 1975; Sankhila *et al.*, 1972; Khan *et al.*, 1985). The present study was undertaken to evaluate the efficacy of four fungicides against bipolaris leaf blight under natural epiphytotic condition.

Materials and Methods

The fungicides used in this study were Tilt 250 EC, Rovral, Pencozeb and Dithane M-45. The experiment was conducted during 1991-92 and 1992-93 and a susceptible wheat variety 'Kanchan' was used. The experiment was laid out in a randomized complete block design with

four replications and 4m × 5m unit plots. Seeds were sown @ 125 kg/ha with 20 cm spacing between rows. Fertilizers were applied @ 100-60-40 kg of N-P₂O₅-K₂O/ha from urea, triple superphosphate (TSP) and muriate of potash (MP), respectively. Two-thirds of urea, all TSP and MP were used at the time of final land preparation. The rest of urea was topdressed 20 days after sowing. The crop was irrigated at crown root initiation, maximum tillering and grain filling stages. The fungicides were sprayed thrice with an interval of 15 days commencing from the first appearance of the visible symptoms. Concentrations of the fungicides used were 0.05, 0.2, 0.15 and 0.2% for Tilt 250 EC, Rovral, Pencozeb and Dithane M-45, respectively. The control plots were treated with plain water. Disease severity was scored from 20 randomly selected plants per plot after seven days of each spray following a 0-9 rating scale (Stubbs *et al.*, 1986). The percentage of disease index (PDI) was calculated according to Wheeler (1969). Data on grain yield and number of spikes/m² were taken from five samples per plot each measuring 1/m²

with a quadrat. Number of grains/spike was recorded from 10 spikes selected randomly in each plot. Thousand grain weight was taken from three samples of sundried grains.

Results and Discussion

Disease index, number of grains/spike, 1000-grain weight and grain yield of wheat varied significantly among the treatments in both the years (Table 1). But the fungicides could not produce any significant increase in number of spikes/m² when compared to control.

The results revealed that the fungicides were equally effective in reducing the disease severity in both the years. The lowest disease severity was observed with Tilt 250 EC producing the highest number of grains/spike which was statistically similar to Dithane M-45. None of the fungicides except Tilt 250 EC could produce significant increase in number of grains/spike over control. Thousand grain weight obtained from the control plot was significantly lower than those obtained from the

Table 1. Effect of foliar spray of four selected fungicides on the severity of *bipolaris* leaf blight of wheat.

Treatments	% Disease Index		Spikes/m ²		Grains/spike		1000-grain wt.(g)		Grain yield (t/ha)	
	1991-92	1992-93	1991-92	1992-93	1991-92	1992-93	1991-92	1992-93	1991-92	1992-93
Tilt 250 EC (0.05%)	52.2 b	39.5 b	320 a	384	38 a	41 a	45 a	45 a	2.94 a	3.40 a
Rovral (0.2%)	55.7 b	42.0 b	347 a	383	34 b	37 b	44 c	44 b	2.18 b	3.00 c
Pencozeb (0.15%)	54.1 b	41.7 b	303 a	369	33 b	38 ab	45 b	43 c	2.19 b	3.20 b
Dithane M-45 (0.2%)	53.5 b	41.4 b	346 a	369	36 ab	38 ab	45 b	44 b	2.25 b	3.30 a
Control (Plain water)	67.7 a	50.0 a	362 a	368	33 b	35 b	43 d	42 d	2.04 c	2.80 d

Values within a column followed by the same letter (s) are not significantly different by DMRT (P = 0.05).

Table 2. Cost and benefit analysis of different fungicides in controlling bipolaris leaf blight of wheat.

Fungicides	Average grain yield (t/ha)	Gross return (Tk/ha)	Total fungicide cost (Tk/ha)	Gross margin (Tk/ha)
Tilt 250 EC	3.17	17,435	750	16,685
Rovral	2.59	14,245	1,500	12,745
Pencozeb	2.70	14,850	675	14,175
Dithane M-45	2.78	15,290	900	14,390
Control	2.42	13,310	—	13,310

Price : Wheat = Tk. 5.5 kg; Tilt 250 EC = Tk. 1000 /litre; Rovral = Tk. 500 /kg; Pencozeb = Tk. 300 /kg; Dithane M-45 = Tk. 300 /kg.

fungicide treated plots. Significantly higher 1000-grain weight was recorded with Tilt 250 EC compared to all other fungicides. A significant increase in grain yield was observed due to application of all the fungicides. The highest grain yield was obtained with Tilt 250 EC followed by Dithane M-45 in both the years. Dithane M-45 was in turn found superior to Rovral and Pencozeb even when average grain yield was considered.

Although the fungicides tested were equally effective in controlling bipolaris leaf blight, Tilt 250 EC came up as the most potential fungicide that checked the disease significantly and gave the highest yield in both the years. Lapis (1985) also found Tilt 250 EC as the most effective fungicide against *H. sativum* producing the highest yield under field condition. The second most effective fungicide identified in the present study was Dithane M-45.

Cost and benefit analysis on the fungicidal use showed that the highest gross margin of Tk. 16,685/ha was obtained from Tilt 250 EC application followed by Tk. 14,390/ha from

Dithane M-45 (Table 2). Rovral gave the lowest gross margin which was even lower than that obtained from the control plot. From the economic point of view it is assumed that the application of Tilt 250 EC (0.05%) in controlling bipolaris leaf blight of wheat may be acceptable to the growers (Table 2).

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