

Evaluation of fungicides against leaf blight of dicoccum wheat both under laboratory and field conditions

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ABSTRACT

To know the efficacy of ten fungicides against *E. hawaiiensis* was tested both in laboratory and field condition. Propiconazole, Hexaconazole, tridemefon and Mancozeb were most effective in inhibiting the growth of the fungus at all the three concentrations of 0.025, 0.05 and 0.1 per cent tested. In field studies the best control of the disease was obtained with Hexaconazole @ 0.1% and Mancozeb @ 0.25 per cent with higher cost benefit ratio.

Key words : Leaf blight, Wheat, Fungicides.

INTRODUCTION

Exserohilum hawaiiensis infects wheat crop and causes severe blighting of dicoccum wheat leaves resulting in destruction of foliage. Severe infection in early stages often results in death of seedlings. Hiremath (1985) made the evaluation of fungicides against *E. hawaiiensis* under both laboratory and field conditions and reported that three fungicides Aureofungin, RH-2161 and Dithane M-45 were effective. Subramanyam *et al.* (1992) tested the 7 fungicides against the same pathogen under field condition. They found that RH 2161 at 0.1% and Mancozeb at 0.2% were most effective in reducing the disease index and increasing test weight and yield. Hence the study was undertaken to find out the effective fungicides to manage this disease.

MATERIALS AND METHODS

In vitro evaluation of fungicides against *E. Hawaiiensis*

The effect of ten fungicides were tested against *E. hawaiiensis* by using poisoned food technique. (Nene and Thapliyal, 1982) under laboratory conditions. Three different concentrations were used in all the fungicides. The fungus *E. hawaiiensis* was grown on PDA medium in Petriplate for twelve days prior to setting of the experiment. PDA was prepared and 100 ml of the medium was taken in 250-ml flasks and sterilised. To the molten cooled sterilized media requisite quantity of the fungicides were added and thoroughly mixed so as to get the required concentrations.

About twenty-ml of poisoned medium was poured into each of the 90 mm sterilised Petriplates. Each plate was seeded with 5 mm mycelial disc taken from the periphery of twelve day old fungal culture and incubated at $26\pm 1^{\circ}\text{C}$. Three replications were maintained for each treatment. Suitable control plates were maintained, where in the culture discs were inoculated into the centre of the PDA plates without fungicide. The plates were incubated at room temperature for twelve days.

The colony diameter was recorded and per cent inhibition of growth over control was calculated by using the formula given below (Vincent, 1947).

$$I = \frac{100(C - T)}{C}$$

Where,

I = Per cent inhibition
C = Radial growth in control

T = Radial growth in treatment.

Field evaluation of fungicides against *E. Hawaiiensis*

The experiment was carried out at Main Research Station, University of Agricultural Sciences, Dharwad to evaluate the fungicides under field conditions during rabi 1999-2000. Ten fungicides were tested against *E. hawaiiensis* under field conditions. Propiconazole, Hexaconazole, Tridemefon, Iprobenfos and Carbendazim + Mancozeb at 0.1 per cent concentration, Chlorothalonil, Mancozeb, at 0.25 per cent concentration, Neemgold, Nimbicidin and Ovis at 0.3 per cent concentration were tested.

The experiment was laid out in a randomized block design. Water sprayed plots were considered as control. Allotment of treatments in each replication was done randomly. In each replication, there were eleven plots of size 2 x 1.5 m. Three replications were maintained. Seeds of DDK-1001 were sown in each plot. The usual cultivation practices were carried out as per the recommendation. The first spray of fungicides at required concentration was taken up after the appearance of clear symptoms of the leaf blight disease in the field (25 days after sowing) and subsequent two sprays were given at 15 days interval. Observations on the disease incidence were recorded a week after last spray.

The observations regarding the effect of fungicides on thousand-grain weight and grain yield were also recorded. Data were analyzed statistically. The cost benefit ratio of ten fungicides was calculated.

RESULTS AND DISCUSSION

The results pertaining to the fungicides against *E. hawaiiensis* are presented in the table 1 and 2. Among the systemic fungicides tested, Propiconazole (0.1%) and Pexaconazole (0.1%) gave cent per cent inhibition of mycelial growth of *E. hawaiiensis*. It was found that as the concentration increased the per cent inhibition of mycelial growth also increased, at all concentrations tested.

Among non-systemic fungicides tested, Mancozeb showed maximum per cent inhibition at 0.3 per cent followed by Chlorothalonil. Least inhibition was observed in Neemgold treatment. These results are in accordance with Meli and Kulkarni (1994) who reported that Propiconazole and Mancozeb were effective against the pathogen.

Fungicides, which were used for in vitro studies, were tested for their efficacy in field. The per cent disease index, thousand grain weight, grain yield and cost benefit ratio are presented in Table 3. Among systemic fungicides tested Propiconazole sprayed plots showed least PDI followed by Hexaconazole, which were on par with each other. There was significant difference between the non-

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Table 1: *In vitro* evaluation of systemic fungicides against *E. hawaiiensis*

Sl No.	Fungicides	Per cent inhibition of radial growth (mm)			Mean
		Concentration (%)			
		0.025	0.05	0.10	
1.	Propiconazole 25 EC	97.30 (80.54)	99.90 (88.19)	100.00 (90.00)	99.70 (86.65)
2.	Hexaconazole 5 EC	85.20 (67.34)	89.60 (71.15)	100.00 (90.00)	94.30 (76.16)
3.	Mancozeb 63% + carbendazim 12% WP	73.30 (58.87)	82.40 (65.16)	86.70 (68.62)	81.10 (64.22)
4.	IBP 48 EC	78.50 (62.37)	83.40 (65.94)	91.20 (72.71)	84.80 (67.01)
5.	Tridemefon 25 WP	63.70 (52.93)	91.40 (72.93)	99.80 (87.64)	89.60 (71.17)

Figures in the parentheses indicate arc sine transformed values.

Source	S.Em \pm	CD at 1%
Fungicides (F)	0.64	2.509
Concentration (C)	0.49	1.94
F X C	1.11	4.35

Table 2: *In vitro* evaluation of non systemic fungicides against *E. hawaiiensis*

Sl No.	Fungicides	Per cent inhibition of radial growth (mm)			Mean
		Concentration (%)			
		0.1	0.2	0.3	
1.	Chlorothalonil 75 WP	53.30 (46.85)	53.10 (46.76)	62.30 (52.17)	58.00 (49.57)
2.	Mancozeb 75 WP	64.20 (53.25)	72.40 (58.30)	80.20 (62.53)	72.50 (58.36)
3.	Ovis	19.50 (26.21)	29.20 (32.70)	39.00 (38.66)	28.90 (32.52)
4.	Neemgold (0.03%)	19.40 (26.09)	29.80 (33.00)	35.80 (36.78)	28.00 (31.99)
5.	Nimbecidin (0.03%)	20.00 (26.52)	25.30 (30.18)	44.40 (41.77)	29.40 (32.82)

Figures in the parentheses indicate arc sine transformed values.

Source	S.Em \pm	CD at 1%
Fungicides (F)	0.58	2.25
Concentration (C)	0.45	1.75
F X C	0.99	3.90

systemic fungicides. Among non-systemic fungicides Mancozeb was best and showed least PDI.

With respect to thousand grain weight there was no significant difference among the systemic fungicides. Maximum thousand-grain weight was recorded in plots sprayed with Propiconazole followed by Hexaconazole. However, significant difference was found in non-systemic fungicides sprayed plots, except Nimbecidin and Neemgold, Nimbecidin and ovis, which were on par with one other. Least thousand-grain weight (26.52 g) was recorded in control plot. The highest cost benefit ratio was recorded in the plots sprayed with Hexaconazole followed by Carbendazim + Mancozeb,

Iprobenfos and Mancozeb. Thus, for effective management of this disease Hexaconazole or Carbendazim + Mancozeb or Iprobenfos at 0.1% or Mancozeb at 0.25 per cent may be recommended as foliar sprays when there are no resistant varieties available to this disease. These results are in accordance with Hiremath (1985) and Subramanyam *et al.* (1992) who reported that Mancozeb (0.25%) was effective against *E. hawaiiensis* Singh *et al.* (1995) reported that maximum yield, grain weight and minimum disease was observed in plots sprayed with Propiconazole where *Helmenothosporium* blights of wheat was prominent. Similar results were observed by Valts and Chauhan (1995) and Mohto (1999).

Table 3 : *In vitro* evaluation of different fungicides against *E. hawaiiensis* and yield variation.

Sl No.	Fungicides	Per cent disease index	1000 grain weight (g)	Mean yield (q/ha)
Systemic				
1.	Propiconazole (0.1%)	13.8 (21.83)	38.35	40.12
2.	Hexaconazole (0.1%)	15.0 (22.78)	38.19	39.53
3.	Tridemefon (0.1%)	25.5 (30.30)	37.73	37.95
4.	IBP (0.1%)	33.4 (35.31)	36.50	37.22
5.	Macozeb + carbendazim (0.1%)	34.0 (35.66)	35.91	36.61
Non systemic				
1.	Chlorothalonil (0.25%)	37.3 (37.62)	32.77	32.56
2.	Mancozeb (0.25%)	21.5 (27.59)	35.33	33.99
3.	Nimbecidin (0.30%)	49.6 (43.78)	30.58	30.65
4.	Neemgold (0.30%)	54.6 (47.63)	28.21	29.63
5.	Ovis (0.30%)	61.6 (51.70)	30.21	29.00
6.	Control	87.0 (68.87)	36.52	22.87
	S.Em ±	1.243	1.19	1.23
	CD at 5%	3.66	3.50	3.62

Figures in the parentheses indicate arc sine transformed values.

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Received : October, 2005; Accepted : March, 2006