

Management of Turcicum Leaf Blight of Maize Caused by *Exserohilum Turcicum* in Maize

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Abstract- Seven fungicides were evaluated in vitro against *Exserohilum turcicum* causing leaf blight of maize. The treatment mancozeb 0.25% and combination treatments of carbendazim and mancozeb i.e. saff 0.25% recorded the lowest percent disease index (PDI) reducing the disease by 73.0% and 72.1% respectively. The treatment which had a combination metiram + pyraclostrobin i.e. cabriotop 0.3% was found to be the next best treatment in reducing the disease by 61.5% with PDI of 14.6 following propiconazole with PDI of 18.6.

Index Terms- Maize, turcicum leaf blight, *Exserohilum turcicum*, Mancozeb, Management

I. INTRODUCTION

Maize is one of the important cereal crops and it is 3rd major crop in India after rice and wheat. The crop is affected by number of fungal diseases of which leaf blight or northern corn leaf blight or turcicum leaf blight is one of the important diseases affecting photosynthesis with severe reduction in grain yield to an extent of 28 to 91%. Disease symptoms first appear on the leaves at any stage of plant growth, but usually at or after anthesis. The maneb formulations were most effective in minimising the *E. turcicum* severity under field conditions followed by ziram, vacide and Z-65. These fungicides increased the grain yield and seed quality (Cox, 1956). Sohi *et al.* (1965) tested six fungicides for the control of leaf blight on maize hybrid Ganga-5 and found that zineb was found more effective fungicide in controlling the disease with an increase in grain yield of 15.18 per cent followed by captan (10.19 %) over check plots.

Foliar application of fungicides like mancozeb, propiconazole and zineb have been found to be effective against southern leaf blight of maize caused by *Helminthosporium maydis*. Seed dressing with maneb, captan, carboxin + thiram and benomyl + thiram improved seed germination (Miller, 1970).

Kumar *et al.* (1977) evaluated eight fungicides and found that mancozeb, unizeb and dithane-Z-78 significantly reduced the maize leaf blight severity by 55, 47.4 and 44.43 per cent, respectively, and increased grain yield by 8.54, 10.12 and 9.90 per cent.

Field trials conducted by Issa (1983) in Brazil revealed that mancozeb @ 2 kg ha⁻¹ as foliar spray was found to be effective in

reducing turcicum leaf blight severity in maize. This treatment gave the maximum number of healthy leaves and improved yield over untreated plots. Patil *et al.* (1984) reported that vitavax was found to be the best seed dresser against Drechsler spp. of barley. Three sprays of propiconazole at weekly interval was effective in reducing the rate of turcicum leaf blight development in maize (Bowen and Pederson, 1988).

Kachapur and Hegde (1988) tested seven fungicides and observed that mancozeb and captafol were the most effective fungicides for controlling turcicum leaf blight of maize. Sharma and Mishra (1988) found that *E. turcicum* infection of maize was effectively controlled by six sprays of mancozeb (0.2 %) at 10 days interval starting from three days after inoculation at 30 days after sowing. The infection rate and severity rating were reduced and the grain yield was increased with this treatment.

Begum *et al.* (1993) evaluated five fungicides for control of artificial infections of *E. turcicum* on susceptible maize cultivars. All the chemicals reduced disease intensity and increased the grain yield with mancozeb being distinctly the most effective, followed by carbendazim, zineb, thiophanate methyl and lastly copper oxychloride. Pandurangegowda *et al.* (1993) tested the field efficacy of eight fungicides and found that foliar spray of mancozeb (0.25 %) and maneb (0.25 %) thrice at an interval of 10 days were significantly effective in minimising the disease intensity of turcicum leaf blight. Praveen Kumar *et al.* (2010) reported that the combinations of the mancozeb (0.25 %) + T. viride (0.4 %) + mono potassium phosphate (1 %) + potassium silicate (1 %) were found effective in reducing turcicum leaf blight. In this paper studies were conducted on management of turcicum leaf blight of maize caused by *Exserohilum turcicum* using seven fungicides.

II. MATERIALS AND METHOD

In order to identify a suitable fungicide for the control of turcicum leaf blight a field experiment was carried out at Agriculture Research Institute, Rajendranagar, Hyderabad during Rabi season 2011-12. The maize cultivar pioneer 30V 92 was sown in a randomized block design with a spacing of 70 × 25 cm with three replications. The details of the treatments are given in Table 1.

III. PREPARATION OF INOCULUM

Conidia of the fungus was collected from actively growing 12 days old culture. The spores were harvested by adding sterilized distilled water into petriplates and scraped gently with camel hair brush. The spore suspension was transferred in to a beaker and the concentration of spore suspension was adjusted to 4×10^5 spores ml⁻¹.

IV. PATHOGEN INOCULATION

Artificial inoculation of the pathogen *E. turcicum* was done on 30 days old maize plants and further field was inoculated thrice at 2 day interval. To create high disease pressure the spore suspension was sprayed with an automizer in the late evening. To maintain high relative humidity the plots were irrigated frequently.

V. IMPOSITION OF TREATMENTS

All the treatments were imposed with the appearance of initial symptoms on the 40 day old plants. The second spray of treatment was done 10 days later *i.e.*, at 50 days stage of the crop. The data on per cent disease index was calculated 10 days after the second spray using the diseases scale given by Payak and Sharma (1983).

VI. RESULTS AND DISCUSSION

Foliar diseases which rapidly spread and cause epidemics can be managed effectively by developing suitable disease management strategies. In order to develop a suitable disease management protocol an attempt was made to evaluate different fungicides for the control of turcicum leaf blight. The treatment details, disease severity data are presented in the Table 2.

A perusal of the results indicates that all the treatments are superior in reducing the PDI of turcicum leaf blight of maize over control. The treatment mancozeb 0.25% and combination treatments of carbendazim and mancozeb *i.e.* saff 0.25% recorded the lowest percent disease index reducing the disease by

73.0% and 72.1% respectively. The treatment which had a combination metiram + pyraclostrobin *i.e.* cabriotop 0.3% was found to be the next best treatment in reducing the disease by 61.5% with PDI of 14.6 following propiconazole with PDI of 18.6.

The lowest reduction in disease was found by carbendazim 0.1% which could reduce the disease by 28.9% only with PDI of 27.3 over control followed by tebuconazole 0.1% alone with PDI of 21.0.

The results showed that (mancozeb 0.25%) and (carbendazim + mancozeb) was significantly superior over other treatments and can be recommended for the control of disease under field conditions.

From similar studies Harlapur (2005) observed carboxin powder seed treatment (2 g kg^{-1}) followed by two sprays of mancozeb (0.25 %) resulting in significantly minimum PDI and maximum grain yield. The effectiveness of fungicides mancozeb, propiconazole and carboxin against *Exserohilum turcicum* has been reported by earlier workers Singh and Gupta (2000) and Patil *et al.*, (2000) in maize. Pandurange Gowda *et al.*, (1993) reported that the foliar spray with mancozeb 0.25% three times at 10 day interval was found to be more effective and significantly reduced TLB severity and increased grain yield. Kumar *et al.*, (1977) and Kachapur (1988) have reported that maneb followed by mancozeb effective in controlling TLB of maize.

VII. CONCLUSION

The management studies showed that (mancozeb 0.25%) and (carbendazim + mancozeb 0.25%) was significantly superior over other treatments and can be recommended for the control of disease under field conditions.

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Table 1 : List of fungicides used in the present investigation

Treatments	Fungicides	Active ingredients	Concentrations (%)
T ₁	Propiconazole	25% EC	0.1
T ₂	Hexaconazole	5% EC	0.2
T ₃	Tebuconazole	25% EC	0.1
T ₄	Mancozeb	75% WP	0.25
T ₅	Metiram(55%)+ Pyraclostrobin (5%)	60% WG	0.3
T ₆	Carbendazim	50% WP	0.1

T ₇	Carbendazim (12%) + Mancozeb (63%)	75% WP	0.25
T ₈	Control	-	-

Table 2. Management of Turcicum leaf blight under field condition during Rabi, 2011-12

Treatments	Per cent Disease index (PDI)*	Per cent disease reduction over control
Propiconazole (T ₁)	18.6 (25.5)	51.0
Hexaconazole (T ₂)	20.0 (26.5)	47.3
Tebuconazole (T ₃)	21.0 (27.2)	44.7
Mancozeb (T ₄)	10.0 (18.3)	73.0
Metiram+ Pyraclostrobin (T ₅)	14.6 (22.4)	61.5
Carbendazim (T ₆)	27.3 (31.5)	28.9
Carbendazim+ Mancozeb (T ₇)	10.6 (19.0)	72.1
Control (T ₈)	38.0(38.0)	0
CD	2.50	
SE(d)	1.15	
SE(m)	0.81	

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