

Evaluation of selective fungicides against Pepper spot, Blight and Fusarium leaf spot of groundnut

M. K. ROUT, K. B. MOHAPATRA AND B. MISHRA

Department of Plant Pathology, Orissa University of Agriculture & Technology, Bhubaneswar 751003, Orissa

Performance of three foliar diseases of groundnut crop from various locations of Orissa State were studied. The diseases were caused by *Leptosphaerulina crassiasca*, *Phoma microspora* and *Fusarium equiseti*. Efficacy of six fungicides against these three pathogen was evaluated which caused minor diseases in groundnut. Their effect in disease control was studied. The results revealed some selective useful fungicides which reduced growth of the pathogens.

Key Words : *Leptosphaerulina crassiasca*, saff, bavistin

INTRODUCTION

Groundnut is presently cultivated in over eighty countries and major producers are India (8.0 million tonnes), China (5.3 million tonnes) and the United States (1.8 million tonnes), (Fletcher *et al.*, 1992). Among oilseed groups grown in India, groundnut alone claims the largest share in the oil seed area (32%) among oil seed production (41%) and the edible oil production (50%) (Anon, 1997). Orissa is one of the groundnut producing State in India. In Orissa it is grown in soils like red sandy, alluvial, mixed red, black and medium and black soils within a pH range of 5.5-7.5. Fifty per cent of groundnut are produced in Orissa as rainfed crop during monsoon (June-September) and remaining fifty per cent in November-March.

Diseases are major constraints in groundnut production. Substantial reduction in yield are reported to be by *Cercospora*, *Puccinia*, *Aspergillus niger*, *Macrophomina phaseolina*, *Sclerotium rolfsii* and yieldloss is reported up to 70% (Basu and Ghosh, 1986). In this investigation, a study has been undertaken on minor fungal diseases of groundnut caused by *Leptosphaerulina crassiasca*, *Phoma microspora*, and *Fusarium equiseti* in Orissa. The pathogenic potential of three fungi are proved under

artificial inoculation condition. The fungi are able to produce characteristic disease symptom under control condition. Efficacy of six fungicides has been tested against the above three pathogens and experimental result are recorded.

MATERIALS AND METHODS

Isolation

Disease samples of the infected groundnut leaves were collected from five locations of the east and south-eastern coastal plain zone of Orissa. Potato dextrose agar and Richard's broth medium were prepared and used as natural substrate for three pathogens. Six fungicides namely Indofil-M-45, Blitox, Kocide 101, Cover, Bavistin and Saff were used for control of test pathogens. Isolation of fungi exhibiting disease symptoms were done in PDA petriplates by single spore and hyphal tip method. The cultural characteristics, taxonomic studies, pathogenicity of the fungi were carried out. Three fungi associated with the infected leaf samples *Leptosphaerulina crassiasca*, *Fusarium equiseti* and *Phoma microspora* were identified as causal pathogen for diseases like Pepper spot, Blight and Leaf spot respectively.

Effect of fungicide on the mycelial growth of the fungi

In order to determine the relative efficacy of different fungicides taken for study on the inhibition of mycelial growth of the test fungi under investigation, Poison food technique was followed (Carpenter, 1942). Each chemical was incorporated in potato dextrose agar medium aseptically after sterilization. Medium without any test chemical served as control. Each petriplate was inoculated at the centre with a mycelial disc of 5 mm diameter taken from the periphery of 5 day old colony of the desired fungus. Three replications were maintained for each treatment. The petriplates were incubated at $28 \pm 1^\circ\text{C}$ for 7 days. The colony diameter was measured in each case on the seventh day. Inhibition of mycelial growth was calculated using Vincent formula (Vincent, 1947).

RESULTS AND DISCUSSION

The results on the efficacy of various fungicides tested *in vitro* on mycelial growth of the test pathogen is presented in the Table 1. Analysis of data revealed significant difference among the treatments on their efficacy in inhibiting mycelial growth of the test pathogen. Perusal of data indicated that there was total inhibition (100%) of mycelial growth *in vitro* by Kocide 101 at 0.3% and bavistin, Saff at 0.1% concentration. Least inhibition of mycelial growth (44.35%) was shown by Blitox 50 at 0.3% concentration.

Table 1 : Effect of different fungicides on the mycelial growth of *L. crassiasca*.

Fungicide	Concentration (%)	Colony diameter (mm)	Per cent growth inhibition
Indofil-M-45	0.3	18.66	47.18
Blitox 50	0.3	19.66	44.35
Kocide 101	0.3	0.00	100.00
Cover	0.1	15.00	57.57
Bavistin	0.1	0.00	100.00
Saff	0.1	0.00	100.00
Control	—	35.33	—
CD (P=0.05)		21.18	

Effects of fungicides on the mycelial growth of *Phoma microspora*

The data of the experiment indicated that total

inhibition (24.05%) was obtained by application of Blitox 50 at 0.3% concentration (Table 2).

Table 2 : Effect of different fungicides on the mycelial growth of *P. microspora*

Fungicide	Concentration (%)	Colony diameter (mm)	Per cent growth inhibition
Indofil-M-45	0.3	30.00	57.54
Blitox 50	0.3	53.66	24.05
Kocide 101	0.3	0.00	100.00
Cover	0.1	29.00	58.95
Bavistin	0.1	0.00	100.00
Saff	0.1	0.00	100.00
Control	—	70.66	—
CD (P=0.05)		2.94	

Effects of fungicides on the mycelial growth of *Fusarium equiseti*

Examination of data indicated that total inhibition of mycelial growth (100%) was observed in case of Indofil M-45 (0.3%), Kocide 101 (0.03%), Cover (0.1%), Bavistin (0.01%), and Saff (0.01%). Blitox 50 inhibited the mycelial growth least (64.86%) as compared to other fungicide tested (Table 3).

Table 3 : Effect of different fungicides on the mycelial growth of *E. equiseti*

Fungicide	Concentration (%)	Colony diameter (mm)	Per cent growth inhibition
Indofil-M-45	0.3	0.00	100.00
Blitox 50	0.3	17.33	64.86
Kocide 101	0.3	0.00	100.00
Cover	0.1	0.00	100.00
Bavistin	0.1	0.00	100.00
Saff	0.1	0.00	100.00
Control	—	49.93	—
CD (P=0.05)		2.45	

Several diseases have been reported to occur on groundnut during cultivation from different areas of the world (Jackson and Bell, 1969 ; Porter *et al.*, 1982). In this investigation *P. microspora* appeared in low to moderate proportions at four test locations. *F. equiseti* was noted from two test locations whereas *L. crassiasca* was found to be the most common disease in the coastal tracts of Orissa during the rainy season.

The efficacies of various fungicides tested *in vitro* on the fungal growth were studied in the present investigation. Fungicide Kocide 101 (Copper hydroxide 0.3%), Bavistin (Carbendazim 0.1%),

and Saff (Carbendazim + Mancozeb 0.1%) were found to be effective in inhibition of mycelial growth (100%) of three test fungi i.e., *L. crassiasca*, *P. microspora* and *F. equiseti*. Lowest inhibition of mycelial growth was observed in Blitox 50 (0.3%) against above three fungi. All the fungicides except Blitox-50 did not show any inhibitory result against the growth of the fungus *F. equiseti*. Moderate fungicidal action was shown by indofil M-45 which controlled the pathogens partially as compared to the other fungicides tested in this experiment.

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