

EFFECT OF DIFFERENT FUNGICIDES ON GROWTH AND SPORULATION OF RICE COLLAR ROT FUNGI

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Five different types of fungicides, viz., Bavistin, Blitox-50, Dithane M-45, Foltaf and Topsin-M, when applied to rice plant, diseased with collar rot caused by *Pestalotiopsis versicolor* (Speg) and *Chaetomium globosum*, the disease is effectively controlled. These fungicides also helped in the enhanced grain yield of the rice plant.

Keywords : Fungicides, Collar rot disease, rice plant.

Different methods are used for the control of diseases caused by fungi, and of which fungicides are the effective methods. There are different types of fungicides which control the fungal diseases. These fungicides have metals as their components, like copper, mercury, sulphur, etc. The most commonly used fungicides are Bordeaux mixture, ferbam, foltaf, methoxy ethyl mercury chloride, etc. Rice the common staple food of the major population of the world is often damaged due to the infection by varieties of fungi. The collar rot disease of rice is caused by fungi belonging to different species of the genus, *Fusarium*, *Chaetomium*, *Pestalotiopsis*, etc. For the first time in India the authors discovered two types of fungi which bring about the collar disease of rice; they are *Chaetomium globosum* and *Pestalotiopsis versicolor*. These two fungi cause considerable damages to the rice crops of Manipur. Control of these diseases during the present investigation could be brought about by spraying five fungicides, viz., Bavistin, Blitox-50, Diathane M-45, Foltaf and Topsin-M. The importance of fungicides in controlling the rot disease was reported by many workers^{1,2}.

The efficacy of five fungicides mentioned above on the *in vitro* growth and sporulation of collar rot fungi of rice, was studied using poisoned food technique of Sharvelle³. The concentrations of each fungicide were

adjusted to 100 per cent active ingredient. In all cases solution strength of 0.1, 0.05, 0.025% were incorporated with 50 ml of Potato Dextrose broth after autoclaving. A 5 mm mycelial plug taken from 3-day old actively grown in each culture medium was aseptically transferred to each conical flask. Each treatment was replicated 8 times (5 for growth and 3 for sporulation). The inoculated flasks were incubated at $25 \pm 1^\circ\text{C}$ for 7 days. Medium without fungicides served as control. Mycelial mats were harvested by filtering through preweighed No. 1 Whatman filter paper (11 cm diameter) and dried at 60°C for 72 hours in a hot air oven and then weighed.

It was observed from Table 1 that Bavistin, Blitox-50, Diathane M-45, Foltaf and Topsin-M could completely control the growth of *P. versicolor* and *C. globosum* at recommended doses. However, at lower concentration (0.025%) each of Bavistin, Diathane M-45, Foltaf and Topsin-M both fungi could not grow. But though *C. globosum* could not grow at low concentration of 0.05 and 0.025% of Blitox *P. versicolor* could grow at these concentrations.

It is also clearly seen from Table 2 that mycelial plugs of *P. versicolor* and *C. globosum* could not grow on Potato Dextrose broth poisoned with each fungicide. Hence, Bavistin, Diathane M-45 and Topsin-M showed fungicidal action to both fungi; however, Blitox-50

had fungistatic effect on these two fungi.

Results on Table 3 indicates that Bavistin, Diathane M-45, Foltaf and Topsin-M could control rot disease of rice with increased grain yield. However, Blitox-50 though could control the rice rot disease cause by *C. globosum* with increased grain yield the disease intensity of *P. versicolor* was 80 per cent with lower grain yield.

From the findings it is clear that the five fungicides act effectively in controlling the rice collar rot disease caused by *P. versicolor* and *C. globosum* though here and there certain variations. The findings are in conformity with the earlier findings^{4,7}. One interesting finding is that Bavistin, Diathane M-45, Foltaf and Topsin-M not only could control the disease caused by these two fungi but also they brought about the increase in

the grain yield of the diseased rice plant. However, the condition is reverse when the diseased rice plant was applied with Blitox-50. These findings are in conformity with the findings of Sugha and Singh⁸ and Devi⁵. It seems that these fungicides act at the molecular level of both the host and pathogens. During the process the fungicides inhibit the pathogenic activity of the invading fungi thereby controlling the collar rot disease of rice plant, on the other hand, the combined action of the fungicides and the toxic substances secreted by the pathogen help in more grain yield.

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Table 1. Effect of Different Fungicides on Growth of Collar Rot Fungi.

Sl. No.	Fungicides	Conc. (%)	Growth (mg*)		Inhibition on growth (%)	
			<i>P.v.</i>	<i>C.g.</i>	<i>P.v.</i>	<i>C.g.</i>
1.	Bavistin	0.1	0.00	0.00	100	100
		0.05	0.00	0.00	100	100
		0.025	0.00	0.00	100	100
2.	Blitox-50	0.2	0.00	0.00	100	100
		0.05	174.50	0.00	68.77	100
		0.025	251.75	0.00	54.94	100
3.	Dithane M-45	0.2	0.00	0.00	100	100
		0.05	0.00	0.00	100	100
		0.025	0.00	0.00	100	100
4.	Foltaf	0.1	0.00	0.00	100	100
		0.05	0.00	0.00	100	100
		0.025	0.00	0.00	100	100
5.	Topsin-M	0.1	0.00	0.00	100	100
		0.05	0.00	0.00	100	100
		0.025	0.00	0.00	100	100
6.	Control	0.00	368.685	368.685	0.00	0

P.v. = *Pestalotiopsis versicolor*

C.g. = *Chaetomium globosum*

Table 2. Fungistatic and Fungicidal Effects of Fungicides on the Growth of Collar Rot Fungi.

Sl. No.	Fungicides	Conc. (%)	Growth					
			Fungistatic		Fungicidal			
			<i>P.v.</i>	<i>C.g.</i>	<i>P.v.</i>	<i>C.g.</i>		
1.	Bavistin	0.1	0	0	+	+		
		0.05	0	0	+	+		
		0.025	0	0	+	+		
2.	Blitox-50	0.2	+	0	0	+		
		3.	Dithane M-45	0.2	0	0	+	+
				0.05	0	0	+	+
4.	Topsin-M	0.025	0	0	+	+		
		0.1	0	0	+	+		
		0.05	0	0	+	+		
5.	Foltaf	0.025	0	0	+	+		
		0.1	0	0	+	+		
		0.05	0	0	+	+		
		0.025	0	0	+	+		

P.v. = *Pestalotiopsis versicolor*

C.g. = *Chaetomium globosum*

Table 3. Fungistatic and Fungicidal Effects of Fungicides on the Growth of Collar Rot Fungi.

Sl. No.	Fungicides	Conc. (%)	Disease intensity (%)		Yield 1000 grain (g)	
			<i>P.v.</i>	<i>C.g.</i>	<i>P.v.</i>	<i>C.g.</i>
			1.	Bavistin	0.1	0
2.	Blitox-50	0.2	80	0	15.75	28.30
3.	Dithane M-45	0.2	0	0	26.50	29.50
4.	Foltaf	0.1	0	0	27.25	30.10
5.	Topsin-M	0.1	0	0	28.35	30.50
6.	Control	0.00	100	100	8.45	16.70

P.v. = *Pestalotiopsis versicolor*

C.g. = *Chaetomium globosum*

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