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Original Research Article

Efficacy of Fungicides against Grain Discoloration of *Oryza sativa* L. Variety 'Mahamaya'

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Abstract	Keywords
<p>The present study has been conducted in the College of Agriculture, IGKV, Raipur, (C.G.) during <i>kharif</i> season in 2006. The split plot design was adopted with five main treatments and three sub-treatments, each with three replications. Four fungicides <i>viz.</i>, kocide 200 54 F, contaf, carbendazim, mancozeb and control (water) were used for the control of pathogens at tillering stage, milk stage and dough stage of growth of <i>Oryza sativa</i> L. variety "Mahamaya". The results showed that single spray of carbendazim at tillering stage of crop recorded the disease incidence of 19.49% and two sprays, one at tillering and second at milking stage showed the incidence of discoloration of 17.39%. However, application of three sprays of carbendazim, one spray at each growth stage showed the lower disease incidence of 16.96% compared to all the other treatments applied. The two sprays of mancozeb and contaf applied on tillering and milk stage gave good effect and minimum disease incidence. Similarly three sprays of Contaf and Mancozeb were recorded effective in reducing disease incidence i.e., 20.65 and 21.21% respectively. However the Kocide was not effective in any sprays applied at all growth stages of the crop. Carbendazim was found to be the most effective in controlling the grain infection.</p>	<p>Chemical control Disease Fungicide Grain discoloration Rice</p>

Introduction

Rice (*Oryza sativa* L.) is one of the most important crops of the world both in terms of area (152 mha) and production (585.6 mt) (Anonymous, 2009). Rice is main food source for more than 60% population in India. Chhattisgarh is famous as "Rice

Bowl" in India. However, the productivity of rice in the state is less than national productivity level. Rice crop suffers with many biotic and abiotic stresses. Discoloration has been prevalent in almost all part of the world where rice is grown. It was earlier

At harvesting the rice seeds were collected, stored and finally observed for disease incidence. The results obtained were subjected to statistical analysis and the results were expressed as CD at 5% level.

Results and discussion

Various microorganisms may infect rice grain before and after harvest causing discoloration. The grain yield/ unit area of rice is reducing due to various factors among which diseases are one of the major factors. Rice is attacked by 76 diseases caused by fungi, bacteria, viruses, mycoplasma like organisms and nematodes. Grain discoloration of rice is a complex disease due to infection by certain microorganisms on the glumes, kernels, or both. Ray (1988) and Rajappan et al. (2001) reported that rice yield loss due to pests and diseases has been noticed more seriously. Recent study by Bodalkar and Awadhiya (2014) revealed that the rice variety used in the present study, Mahamaya showed 29.46% grain discoloration. Although grain discoloration disease has been minor disease in India but it is becoming a serious problem and if no proper attention is given to this disease, it may become a potential threat for the rice crop. Data from the Table 1 revealed that single spray of carbendazim at tillering stage of the rice crop showed the disease incidence of 19.49%. The incidence of discoloration was 17.39% in the grains harvested from carbendazim application at tillering and milk stage. Similarly, three sprays one at each growth stage showed the incidence of disease of

16.96% which was lower when compared with all the other treatments.

The application of three sprays (one spray at each stage) of contaf and mancozeb were recorded effective in reducing disease incidence i.e. 20.65 and 21.21%, respectively. Overall, carbendazim was found to be effective in reducing the incidence of grain discoloration followed by contaf and mancozeb (Table 1 and Fig. 2). However the kocide application was not effective at any stage of the crop. Similar findings were also observed by Ray (1988, 1993), Sachan and Agarwal (1994), Vaid et al. (1994) and Sistema and Ronco (1994). They suggested that carbendazim was found to be the most effective in controlling the grain infection at all the concentrations even through there were significant variation in the percentage of the grain discoloration. So, the application of carbendazim at tillering, milk and dough stages is useful in reducing the rice grain discoloration in Mahamaya variety.

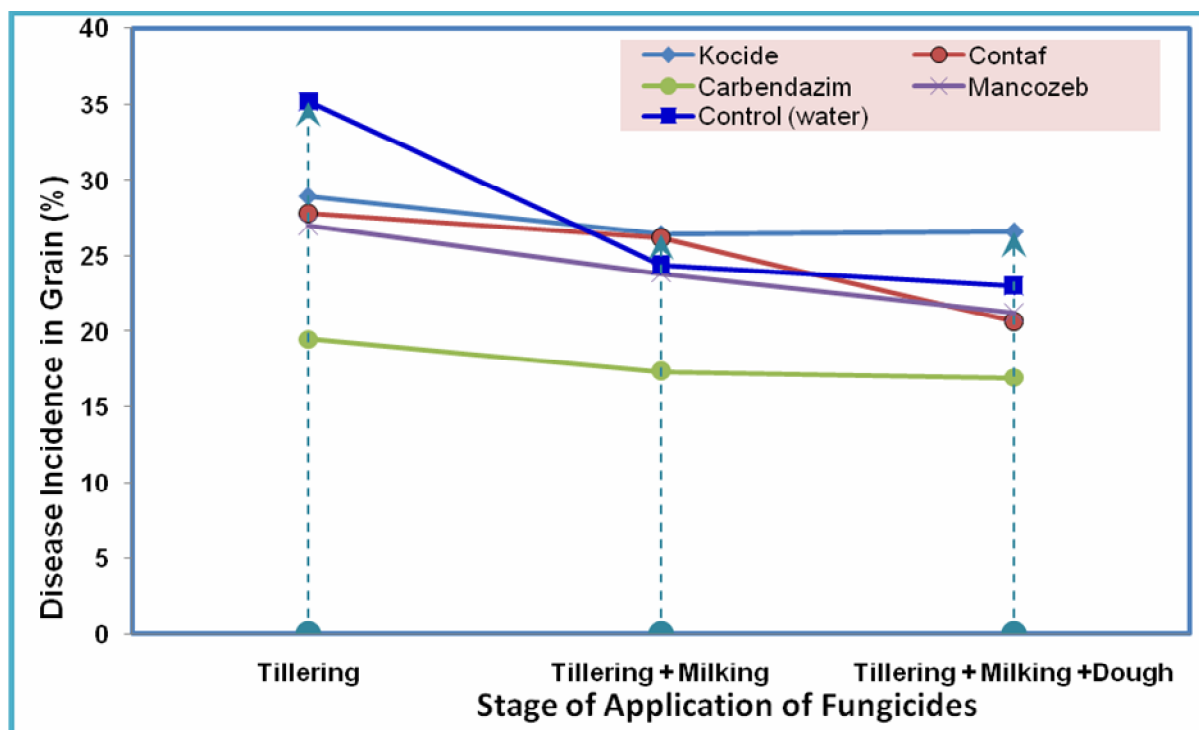
Conclusion

The application of fungicides, kocide, contaf, carbendazim and mancozeb on different stages of growth of *Oryza sativa* L. resulted in different degrees of grain discoloration incidence. Carbendazim applied on tillering, milk and dough stage of rice showed significant effect on the reduction of disease incidence in grains. However, the fungicide Kocide did not show any effect on grain discoloration.

Table 1. The incidence of discoloration of grains (%) by the application of fungicides at different stages of growth of *Oryza sativa* L.

Fungicides	Disease incidence (%)			
	Tillering stage	Tillering + Milk stage	Tillering + Milk + Dough stage	Mean
Kocide	28.95	26.45	26.62	27.34
Contaf	27.84	26.20	20.65	24.89
Carbendazim	19.49	17.39	16.96	17.94
Mancozeb	27.01	23.86	21.21	24.02
Control (water)	35.24	24.45	23.03	27.57
	SEM ±	CD (5%)		
Fungicides	1.216	2.720		
Stages	3.890	8.020		

Fig. 2: Effect of different fungicides applied during different stages growth of *Oryza sativa* L. on seed discoloration. Drop lines compare the efficacy of each fungicide applied against different stages of plant growth on disease incidence in rice grains.



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