
Bioefficacy of some commercially available chemicals against grain discoloration disease of rice in West Bengal

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Rice grain discoloration (Gd) is one of the most important rice diseases reported from all over the rice growing areas in India. Its intensity varies according to seasons and localities (8). Factors such as lodging, frequent rain, high relative humidity and cloudy weather, prevailing particularly from booting to maturity influence the development of Gd. The main cause of Gd is mainly due to various pathogens, especially fungi viz. *Curvularia* spp., *Drechslera* spp., *Sarocladium* spp., *Fusarium* spp. etc. (3,9). That's why infected seeds are not preferred as quality seeds, posing a serious problem to seed certification (6) and marketing. Gd results in seedling mortality and reduction in germination and seedling vigour (3,5,11), causing significant yield loss. Thus, the pathogens causing Gd have direct influence on both quantity and quality of seeds. Management of Gd by different fungicides at different stages of flowering and grain filling has earlier been reported (2). Percentage of seed germination of discolored grains was improved by fungicides by eradicating the seed mycoflora. Thiram combined with carbendazim provided best management (7,10). Keeping all these in view, a field experiment was conducted to evaluate some commercially available fungicides (belonging to different groups and sites of action) for their bio-efficacy against the Gd in rice.

A field trial was conducted at the Rice Research Station, Chinsurah, Hooghly, West Bengal during *kharif*, 2008. Six fungicides viz. tebuconazole 250 EC, propineb 75 WP, 'carbendazim 12% + mancozeb 63%' 75 WP, carbendazim 50 WP, mancozeb 75 WP and propiconazole 25 EC were tested against untreated check in a randomized complete block design (RCBD) with three replicates keeping a plot size of 5 m x 2 m. Being a high-yielding cultivar susceptible to Gd, Savitri was sown on June 25, 2008 and transplanted on July 31, 2008 at a spacing of 20 cm x 15 cm using three seedlings/ hill. Standard agronomic practices were followed to raise the crop. Chemicals were sprayed thrice at booting, late dough stage and 10 days after the second spray. Data were recorded at 10 days after the last spray by taking random samples on % panicles affected/ m² and % spikelets affected/panicle. Grain yields were recorded at harvest and subjected to statistical analysis to find out the significance of such treatments.

All the tested fungicides significantly reduced the disease and increased the grain yield over untreated check plot (Table 1). Among these, carbendazim performed better in reducing panicle infection (59.3%) and spikelet infection (11.6%), and was followed by carbendazim + mancozeb which reduced both the panicle and

spikelet infection by 59.5 and 12.3%, respectively. But carbendazim and carbendazim + mancozeb were at par in reducing the disease and protecting the grain yield of rice. In case of all other fungicides, panicle infection was above 60% whereas spikelet infection was above 12.3%. Compared with untreated check, carbendazim and carbendazim + mancozeb proved to be outstanding as both the fungicides reduced spikelet infection (by 33.0 and 28.9%, respectively) and panicle infection (by 20.4 and 20.1%, respectively), and resulted in % yield increase (by 47.9 and 46.3%, respectively). Similar type of findings was reported in an experiment on hybrid rice seed production (4). Under the AICRIP trials in India, all the fungicides under study were also evaluated at different locations viz. Aduthurai, Chatha, Coimbatore, Faizabad, Khudwani and Varanasi where both carbendazim and carbendazim + mancozeb were found promising at some locations and remained on par at others (1).

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Table 1.

Evaluation of some fungicides against grain discoloration in rice

Fungicide	Dosage litre ⁻¹ of water	Panicle infection		Spikelet infection		Grain yield (kg/ha)	% yield increase over check
		% infected panicle*	% disease control over check	% infected spikelet**	% disease control over check		
Tebuconazole 250 EC	1.0 ml	64.4 (53.4)	13.6	14.1 (3.7)	18.5	6480	30.4
Propineb 75 WP	3.0 g	66.5 (54.6)	10.7	15.4 (3.9)	11.0	5650	13.7
Carbendazim 12% + Mancozeb 63% 75 WP	1.5 g	59.5 (50.5)	20.1	12.3 (3.5)	28.9	7270	46.3
Carbendazim 50 WP	1.0 g	59.3 (50.4)	20.4	11.6 (3.4)	33.0	7350	47.9
Mancozeb 75WP	2.5 g	66.3 (54.5)	11.0	14.3 (3.8)	17.3	6520	31.2
Propiconazole 25 EC	1.0 ml	70.8 (57.3)	5.0	15.9 (4.0)	8.1	5470	10.1
Check (Untreated)	-	74.5 (59.7)	-	17.3 (4.2)	-	4970	-
CD (P=0.05)	-	3.7	-	0.2	-	475.0	-

*Figures in parentheses indicate arc sin transformed values

**Figures in parentheses indicate square root transformed values