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**RICE GRAIN DISCOLORATION AND ITS NATURE WITH RELATION TO
ASSOCIATED MYCOFLORA**

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ABSTRACT

Discoloration in rice it is minor disease presently gaining importance due to its severity in tropical rice growing areas. Grain discoloration is an early indication of poor quality seeds associated with microorganisms. The present study entitled "Studies on grain discoloration of rice" was conducted in the Department of Plant Pathology, College of Agriculture, IGKV, Raipur, (C.G.). The fourteen mycoflora were isolated from discolored as well as healthy rice grains but their intensities were very high in discolored grains. The pathogens like: *Curvularia lunata*, *Drecheslera oryzae*, *Fusarium moniliforme* and *Sarocladium oryzae* showed their pathogenic ability and metabolites of these pathogens were also affected seed germination. Studies have reported discolored seeds associated with several pathogenic and saprophytic fungus viz. *Sarocladium* sp., *Penicillium* sp., *Fusarium* sp., *Curvularia* sp., *Phyllostieta* sp., *Pyricularia* sp., *Diplodia* sp., *Aspergillus* sp. and *Alternaria* sp. in recent years. Keeping this in view, investigations were carried out to assess the effect of fungicides for control of seed discoloration of rice.

Keywords: Grain Discoloration, Mycoflora Associated

INTRODUCTION

Rice (*Oryza sativa* L.) is one of the most important crop of the world both in terms of area (152 mha) and production (585.6 m) [1,

2]. One out of the three people depends on rice for more than half of their daily diet. About 90 per cent of the world's rice is grown

and consumed in Asia and 60 per cent of world population also depend on rice for their half of the calorie intake from this crop. Seed discoloration is an early indication of poor seed or grain quality which is generally associated with micro-organisms. Such grains are of poor market value and low consumption quality due to degradation in nutritional value. Various microorganisms may infect Rice grain before and after harvest causing discoloration [3, 4]. The seed borne inoculum of *Alternaria alternata* is responsible for ashy grey discoloration and *Helminthosporium oryzae* (*Cochliobolus miyabeanus*) (responsible for black discoloration, dark brown spots and light to dark brown dot like spots) were found in the seed coat and endosperm of discolored seed, where as *Curvularia geniculata* (*Cochliobolus geniculatus*) found responsible for eye shaped spots. Besides, *Fusarium equiseti*, *Fusarium oxysporum* (*Gibberella zae*), *Fusarium moniliforme* (*Gibberella fujikuroi*) found responsible for pink discoloration and *Sarocladium oryzae* responsible for light brown discoloration were found in the seed coat, endosperm and embryo of discolored seed [5-7].

MATERIAL AND METHODS

The detection of mycoflora was done by standard blotter method. This method was

used to detect the presence of fungi on or in the seeds. By this method fast growing fungi are better detected than the slow growing ones. In each plate, 25 seeds of rice varieties were placed on the moistened blotter paper in such a manner that 16 formed the outer circle, 8 formed inner and one at center. For each variety four replications were maintained and incubated at $22\pm 2^{\circ}\text{C}$ for 12 hours light/ dark cycle. The observations were recorded after seven days of incubation.

RESULT AND DISCUSSION

The detection of mycoflora was done by standard blotter method are presented in **Table 1**. The fungi *Fusarium moniliforme* and *Rhizopus* sp. were detected from all the varieties tested. The highest (77.31%) association of mycoflora was observed in variety IR-64 followed by IR-36 (70.63%) and Mahamaya (70.63%). The least (51.95%) association of mycoflora was observed in discolored seeds of variety Pant-4. The germination percentage of infected and discolored seeds were very poor ranged from 54.81 to 76.00 per cent in all the varieties tested.

CONCLUSION

Grain discoloration has been prevalent in almost all part of the world and is an early indication of poor seed or grain quality, which is associated with micro-organisms. Such

grains have poor market value and low consumption quality due to degradation in nutritional value. The mycoflora detected from infected and discolored grains were fourteen, out of which *D. oryzae*, *S. oryzae*, *F. moniliforme* and *C. lunata* were highly pathogenic.

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Table 1: Mycoflora Associated in Discoloured Seeds

Variety	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Total	Germination (%)
Mahamaya	8.00	-	10.66	10.66	18.66	-	-	-	-	18.66	2.66	-	1.33	-	70.63	76.00
IR-64	8.00	13.33	1.33	2.66	16.00	-	-	2.66	4.00	9.33	-	20.00	-	-	77.31	71.81
IR-36	9.33	4.00	2.66	5.33	16.00	9.33	2.66	-	-	18.66	-	1.33	-	1.33	70.63	68.66
MTU-1010	4.00	9.33	8.00	8.00	6.66	1.33	1.33	5.33	2.66	8.00	-	-	-	-	54.64	68.32
Indira-9	4.00	10.66	-	4.00	12.00	-	2.66	2.66	-	9.33	-	-	2.66	6.66	54.63	66.14
Sona masur	-	9.33	8.00	6.66	9.33	1.33	-	1.33	4.00	4.00	2.66	6.66	6.66	-	59.96	65.68
Swarna	4.00	2.66	-	6.66	12.00	2.66	-	-	1.33	4.00	1.33	20.00	1.33	-	55.97	62.71
HMT	4.00	5.33	14.66	2.66	8.00	1.33	-	-	-	10.66	-	9.33	2.66	-	58.63	60.39
Pant-4	6.66	9.33	-	-	13.33	-	-	2.66	2.66	5.33	-	2.66	6.66	2.66	51.95	54.81
Kranti	-	12.00	8.00	6.66	16.00	-	-	4.00	2.66	1.33	4.00	-	5.33	-	59.98	62.00

NOTE: 1: *Alternaria alternata*; 2: *Aspergillus* sp.; 3: *Curvularia lunata*; 4: *Drecheslera oryzae*; 5: *Fusarium moniliforme*; 6: *Memnoniella* sp.; 7: *Nigrospora* sp.; 8: *Penicillium* sp.; 9: *Periconia* sp.; 10: *Rhizophus* sp.; 11: *Sarocladium oryzae*; 12: *Stachybotrytis* sp.; 13: *Trichoconis padwickii*; 14: *Trichoderma viride*