

Effect of *Sarocladium oryzae* and *Fusarium moniliforme* on Seed Quality of Parental Lines of Hybrid Rice during Storage

RAJBIR SINGH AND KARUNA VISHUNAVAT

Centre of Advanced Studies in Plant Pathology,
G.B. Pant University of Agriculture and Technology, Pantnagar-263 145

To break the plateau in rice yield, research and development efforts were accelerated on hybrid rice in India, during the last decade. These efforts have lead to the identification of more than 10 heterotic combinations of CMS and restorer lines which are being cultivated throughout India, majority of them in southern part of the country. However, CMS lines of rice are known to be highly susceptible to number of diseases, including seedborne pathogens. The present investigation, therefore, was conducted to compare and study the effect of two very important pathogens (*S. oryzae* and *F. moniliforme*) of rice on the seed quality during storage.

During crop surveys in 1999-2000, seed samples of CMS line (IR 58025A), maintainer (IR 58025B), restorers (IR 66 and KMR 3) and a conventional variety (Pant Dhan-11) were collected showing varying degree of infection. Collected seeds were dried in shade and then sealed in polythen bags (700 gauze) for further studies in storage.

On the basis of visual observations seeds were categorized as healthy and discoloured seeds. Healthy and discoloured seeds were examined for seedborne pathogens using blotter test and agar plate test as per ISTA rules [1]. Seed quality parameters such as seed weight, seed density, seed volume and seed viability were assessed in both the categories of seed. Seed viability was estimated using tetrazolium test as suggested by Grabe [1]. Seed germination was estimated using towel paper method [2].

Discoloured seed on visual observation appeared ashy brown in colour. The maximum seed infection of *S. oryzae* and *F. moniliforme* was recorded in CMS (IR 58025A) followed by maintainer (IR 58025 B) at different storage intervals. Restorer lines, KMR 3 had the least infection (Table 1). Auto elimination of these pathogens occurred with the advancement of the storage. In blotter test, the per cent seed infection of both the fungi was higher as compared to agar plate method indicating superiority of this method over agar plate method. In addition to *S. oryzae* and *F. moniliforme*, *Helminthosporium oryzae*, *Curvularia lunata* and *Colletotrichum* spp. were also observed in lower proportion. The trend for loss in seed weight, volume, density and viability was also influenced by seed health and was directly proportional to the health of different genotypes (Table 2 and 3). Similar findings have been reported by other workers [3-7].

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Table 1. Per cent infection of *S. oryzae* and *F. moniliforme* at different storage period

Genotype	January				February				March				April				May			
	Blotter method		Agar plate method		Blotter method		Agar plate method		Blotter method		Agar plate method		Blotter method		Agar plate method		Blotter method		Agar plate method	
	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>	<i>S. oryzae</i>	<i>F. moniliforme</i>
CMS 58025A	13.50	20.0	10.50	16.50	8.0	17.0	4.0	12.0	5.00	16.0	3.00	10.25	3.00	8.50	1.0	8.50	0.0	6.50	0.0	4.25
CMS 58025B	12.00	18.0	7.75	14.25	7.0	15.5	3.0	11.50	4.50	10.0	2.50	7.00	1.00	6.00	1.0	6.0	0.0	5.25	0.0	3.00
IR-66	6.00	11.0	5.0	9.25	4.0	9.0	3.0	7.50	2.50	4.0	1.00	5.00	0.00	2.00	0.0	2.0	0.0	2.0	0.0	1.00
KMR-3	0.00	6.0	0.0	3.0	0.0	4.0	0.0	1.0	0.00	1.0	0.00	0.00	0.00	0.00	0.0	0.0	0.0	0.0	0.0	0.00
Pant Dhan-11	3.00	12.0	3.0	10.25	2.0	10.0	1.0	9.0	1.00	8.0	0.50	7.00	0.00	3.00	0.0	3.0	0.0	3.0	0.0	2.00
CD at 5%	5.08	6.23	2.82	2.11	4.46	5.98	0.85	2.24	2.38	4.48	2.05	1.06	2.24	1.25	4.57	2.90	0.0	1.58	0.0	1.92

Table 2. Effect of *S. oryzae* and *F. moniliforme* on seed quality parameters in different genotypes of rice

Genotype	Thousand seed weight (g)		Seed Volume of 100-seed (ml)		Density of 100-seed			
	Healthy seeds		Infected seeds		Healthy seeds		Infected seeds	
	Flotted seeds	Sunken seeds	Flotted seeds	Sunken seeds	Flotted seeds	Sunken seeds	Flotted seeds	Sunken seeds
CMS 58025A	20.82	17.20	1.57	1.03	18.00	82.00	30.33	69.67
CMS 58025B	19.82	16.80	1.50	1.06	18.33	81.67	31.00	69.00
IR-66	21.05	20.75	2.13	2.00	8.67	91.33	14.67	85.33
KMR-3	20.07	20.00	2.03	1.90	7.00	93.00	11.33	88.67
Pant Dhan-11	21.24	20.50	2.13	2.06	8.67	91.33	14.67	85.33
CD at 5%	0.29		0.18	0.16	0.77	0.77	1.32	1.32

Table 3. Effect of *S. oryzae* and *F. moniliforme* on pre-and post-emergence health of seed at different storage periods

Genotypes	Normal seedlings					Seed rot				
	January	February	March	April	May	January	February	March	April	May
CMS 58025A	67.92	66.04	63.96	61.33	59.71	3.33	4.38	5.58	6.00	7.36
CMS 58025B	68.79	66.45	64.96	63.17	61.55	2.71	3.46	4.21	5.63	6.00
IR-66	82.54	80.79	78.83	76.75	74.54	0.00	0.33	0.75	0.83	1.71
KMR-3	84.79	82.45	80.79	78.96	76.21	0.00	0.54	0.88	0.93	0.93
Pant Dhan-11	82.36	80.33	78.86	77.17	74.38	0.33	0.96	1.21	1.29	2.10
CD at 5%	1.57	1.42	1.30	1.45	0.96	1.65	1.32	1.79	1.52	2.09

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