

GENETICS OF MOULD TOLERANCE IN SORGHUM

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GRAIN deterioration in early maturing sorghum varieties and hybrids due to moulds was investigated by Koteswara Rao and Poornachandrudu (1971). They isolated several genera of fungi, both saprophytic and pathogenic in nature. Mouldiness reduces market price and germination of sorghum seeds. Rana Rao, Tripathi and Rao, (1977) and Rana, Rao and Rao (1978) reported that low water absorption capacity when soaked and hard seed, together with tan plant colour offered resistance to grain deterioration.

Among the agronomically good cultivars, 'CSV-4' is resistant to head moulds. 'H-112' is a reselection from 'IS 3086' for bold pearly white grains and earliness. Using 'CSV-4' in crosses, various progenies were developed (Kulkarni, Murty, Hussain Sahab, 1975). The present study evaluates these progenies for grain yield and head mould resistance and estimates the magnitude of variance components for these characters.

MATERIALS AND METHODS

Thirteen mould tolerant progeny of F₆ generation from the crosses 'CSV-4 × H-112' constituted the material for this study. These varieties along with one resistant check 'CSV-4' and one susceptible check 'CSH-1' were grown in two locations, Adilabad and Rajendranagar, in randomised block design replicated thrice. The sowings were done in 1977 *kharif* season at Agricultural Research Station, Adilabad and in 1977-78 *rabi* at Agricultural Research Institute, Rajendranagar. Each entry was sown in four rows of 6 meter length; a spacing of 45 cm × 15 cm was adopted between and within the row. Manuring and other cultural operations were attended to as per the recommended practice. Observations were recorded on plant height, days to 50% bloom, mould incidence, sheath colour, grain yield and straw yield per plot, on each entry in each replication.

The heavy rains received during the milky and crop maturity stages resulted in the natural incidence of the grain moulds at Adilabad. The inoculum of *fusarium* and *Curvularia* was sprayed at Rajendranagar. Heads were examined for mould development. The mould score was from 1 to 5, 1 = below 20 percent incidence and 5 = completely damaged. The data was analysed using the standard procedures.

RESULTS AND DISCUSSION

Among the varieties studied, 'H-142' recorded the highest grain yields at both the locations, with lowest incidence of head moulds (Table 1). Progenies with tan plant were found to be tolerant to head moulds; this character can form criterion for selecting progenies resistant to moulds. Progenies 'H-143' and 'H-145' were the next best yielders at Adilabad and Rajendranagar respectively, with tan plant type. These varieties with a capacity to withstand grain moulds can provide stability of production in dry years and scope for double cropping in

TABLE I
Average performance of different progenies

Progeny Number (H. Nos)	Plant height (cm)		Days to 50% bloom		Grain yield (kg/ha)		Straw yield (kg/ha)		Mould incidence		Sheath colour
	A	R	A	R	A	R	A	R	A	R	
134	215	198	74.3	73.0	1630	3148	12592	10185	1.7	2.3	Tan
135	200	187	76.0	74.7	1907	3648	12777	11666	3.7	3.3	Coloured
136	195	170	74.3	75.3	2463	3204	12036	8888	1.2	1.0	Tan
137	254	230	70.4	78.7	2555	3518	12222	11111	3.7	2.7	Tan
138	178	187	72.7	70.0	2000	3574	12777	12592	3.7	2.7	Coloured
139	195	198	66.3	72.7	2130	3333	12592	11296	3.3	2.7	Coloured
140	265	205	71.3	74.7	2299	3759	12962	12407	1.3	2.7	Tan
141	150	138	79.3	77.7	2962	3889	10084	8518	1.7	1.3	Tan
142	192	159	66.0	75.9	3296	4074	12407	9815	1.0	1.0	Tan
143	164	173	72.0	73.3	3092	3759	13148	12777	2.3	2.3	Tan
144	165	146	80.0	77.0	3000	2352	11666	5926	1.3	1.7	Tan
145	200	215	69.0	70.7	2222	4018	14074	15555	1.0	2.7	Tan
146	232	206	68.3	72.7	1704	3278	13333	11666	4.0	3.3	Coloured
CSH-1	147	150	64.3	66.3	2778	3889	9074	9259	2.7	3.3	Coloured
CSV-4	147	124	77.7	73.0	2222	3463	9074	7407	1.0	1.3	Tan

A=Adilabad; R=Rajendranagar.

years of adequate rainfall, specially in the high rain fall zone of Adilabad where only single cropping is presently in vogue.

The differences from one location to the other were absent for mould incidence while progeny differences were significant for all the characters (Table 2). The magnitude of σ_g^2 was largest for mould incidence. Progeny \times location interaction was also not significant for mould reaction, indicating that the phenotypic variability can be attributed to genetic rather than the environmental causes. Progenies 'H-142' and 'H-136' with tan plant type recorded the lowest incidence of moulds both under artificial and natural infestation. Resistant progenies were resistant at both locations, while susceptible progenies were susceptible both under artificial and natural infestation.

TABLE 2

Analysis of variance and variance components

Source	D.F.	Mean squares				
		Plant height (cm)	Days to 50% bloom	Grain yield	Straw yield	Mould incidence
Reps within location	4	216.05	2.50	0.09	0.85	0.60
Location	1	4551.00**	54.00**	7.40**	13.20**	0.10
Progenies	14	6321.86**	73.79**	0.26**	5.81**	5.54**
Progenies \times location	14	577.86**	26.86**	0.16**	1.16	0.42
Error	56	121.46	1.57	0.04	0.86	0.31
σ_g^2		957.33	7.82	0.02	0.77	0.85
σ_{g1}^2		152.13	8.43	0.04	0.10	0.04
σ_e^2		40.49	0.52	0.01	0.29	0.10
σ_g^2/σ_{g1}^2		6.3	0.9	0.05	7.7	21.3

*Significant at 5% level; **Significant at 1% level.

SUMMARY

Thirteen progenies developed from mould resistant varietal cross were evaluated for mould reaction under natural and artificial screening conditions. Yield components and the magnitude of σ_g^2 , σ_{g1}^2 and σ_e^2 were also studied

for five characters. Progeny \times Location interaction were not significant. Progeny 'H-142' was high yielding and resistant to head mould, both under natural and artificial infestation. The tan plant type progenies were found to be mould resistant and can form criteria for selecting progenies resistant to moulds.

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