

Severity and Reaction of Rabi Sorghum Genotypes Against Downy Mildew and Rust Diseases

Downy mildew of sorghum caused by *Peronosclerospora sorghi* (Weston and Uppal C.G. Shaw is a potentially destructive disease in areas of Karnataka, Tamil Nadu, Andhra Pradesh and Maharashtra (Sundaram 1997, Anhosur 1978) where well distributed rains provide high levels of humidity and temperatures are optimal for disease developments. However, the disease also appeared during rabi season causing considerable systemic infection.

The downy mildew of sorghum is a severe disease in Kharif and effective control measures have been worked out (Hiremath and Laxman 1991). The disease is also becoming important wherever climate is favorable for its development in rabi. During survey in rabi it was noticed that whenever, farmer takes thick sowing followed by rains, optimum temperature, humidity and the inoculum established on kharif ratoon crop the disease causes severe damage. The loss due to downy mildew in kharif was 2.7% (CSV-4) to 93.4% (DMS 652) in different varieties (Anahosur and Laxman 1991). So it is at most important to take care of sorghum downy mildew during rabi too. As recommended by earlier workers (Hiremath and Laxman 1991) the seed treatment with metalaxyl @ 2 g a.i./kg of seed can control the systemic infection more effectively. To avoid rust infection DM-45 @ 0.2% can effectively control the disease in Rabi growing areas of northern Karnataka.

The rust of sorghum (*Sorghum bicolor* (Linn) Moench) caused by *Puccinia purpurea* Cooke has become serious in Karnataka both in Kharif and rabi sorghum. It causes complete drying of the foliage of varieties such as Nandyal, Gm 2-3-1 and local varieties. During October 2000, rainfall average was 86% under these conditions downy mildew and rust appeared moderate to severe under natural conditions at Dharwad.

The trial was conducted in randomized block design with 2 rows of 5 m length at 45 x 15 cm spacing with three replications. The genotypes were sown on October 8th 2000. The inoculum established during kharif served as source of initial inoculum and spread by conidia as secondary source of inoculum. The rust was inoculated by washing rust infected leaves in tap water and sprayed on the crop. Three sprays of spore suspension of rust was given starting from 30 days, 40 days and 50 days after sowing. The observations on systemic infection of downy mildew was recorded at 60 days after planting. The rust was recorded at physiological maturity using 1-5 scale as followed in AICSIP where;

- 1 - traces to no infection
- 2 - traces to 10 % leaf area covered.
- 3 - 11 to 25 % leaf area covered.
- 4 - 26 to 50 % leaf area covered
- 5 - 51% or more leaf area covered.

The percentage data was transformed ($\sqrt{x+1}$) and analyses statistically (Table).

The observations during rabi 2000 revealed that the systemic infection of sorghum downy mildew in advanced varieties ranged from 0.00 to 14.55 per cent. The genotypes CSV8R, CSV14 R and SPV1500 recorded 0.0 per cent systemic infection whereas SPV 1423, SPV 1380 and SPV 1413 recorded 14.55, 10.37 and 8.09 per cent systemic infection respectively. The remaining genotypes showed less than 5% SDM.

In advanced hybrids the incidence was ranged from 0.00 to 15.82 % systemic infection. The genotype SPH1225 recorded 0% SDM whereas CSH 15SPH1230 SPH 1233, SPH 1079, SPH1219 and SPH 1077 recorded 15.82, 13.50, 12.13, 11.39 and 10.97 per cent systemic infection respectively. The remaining genotypes recorded >10% SDM. The rust severity in ad-

Table 1. Severity of sorghum downy mildew and rust on advanced genotypes, hybrids, parents and local sorghums

Sl.No.	Genotypes	Rust	%SDM
1	SPV 1380	3	10.37 (3.31)*
2	SPV 1411	3	4.16 (2.02)
3	CSV 8R	3	0.00 (1.00)
4	SPV 1413	3	8.09 (2.936)
5	SPV 1423	2	14.55 (3.80)
6	SPV1452	5	6.41 (2.69)
7	CSV 14 R	4	0.00 (1.00)
8	SPV 1457	4	4.25 (2.29)
9	SPV 1491	4	3.60 (2.12)
10	CSV 216R	3	3.23 (2.03)
11	SPV1500	2	0.00 (1.00)
12	SPV 1501	3	4.44 (2.07)
13	SPV 1502	3	2.08(1.63)
14	M-35-1	4	2.18 (1.78)
15	SPV1503	3	5.12 (2.17)
16	SPV 1504	3	2.22 (1.66)
17	SPV 1505	4	1.11 (1.39)
18	SWATI	4	1.08 (1.61)
19	RSLG 262	4	1.16 (1.41)
20	SPV 1018		24.81 (5.05)
	SEm ±		0.66
	CD at 5%		1.96
Hybrids			
1	SPH 1077	4	10.97 (3.77)
2	SPH 1078	4	7.08 (2.83)
3	SPH 1079	4	11.93 (3.59)
4	CHS 15R	4	15.82 (2.27)
5	SPH 1089	4	9.10 (3.16)
6	SPH1174	4	7.39 (2.87)
7	SPH 1219	3	11.39 (3.46)
8	SPH 1221	3	5.27 (2.49)
9	SPH 1225	3	0.00 (1.00)
10	SPH 1226	3	5.26 (2.43)
11	SPH 1227	3	8.41 (3.06)
12	CSH 19R	3	1.38 (1.47)
13	SPH 1229	4	14.67 (3.95)
14	SPH 1230	4	13.50 (3.79)
15	SPH 1231	3	5.46 (2.53)
16	SPH 1233	3	12.13 (3.56)
17	SPH 1234	4	4.00 (2.18)
18	M 35-1	3	1.06 (1.38)
19	SPH 1235	3	1.35 (1.46)
20	SPH 1236	4	7.42 (2.97)
21	SPH 1237	3	8.20 (3.03)

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1	2	3	4
22	SPH1238	2	2.63 (1.75)
23	CSV 8 R	3	-
24	SPV 1018		24.81 (5.05)
	S.E m±		0.44
	CD at 5%		1.29
	Parents		
1	104A	4	0.00 (1.00)
2	104B	3	2.00 (1.61)
3	116A	3	1.75 (1.43)
4	116B	3	1.25 (1.43)
5	1409A	3	2.56 (1.73)
6	1409B	3	5.16 (2.40)
7	RR 9803	3	5.47 (2.41)
8	RR 9807	3	3.11 (2.01)
9	RR 9808	4	6.93 (2.77)
10	RR 9809	4	2.63 (1.90)
11	RR 9810	3	1.72 (1.55)
12	RR 9811	4	4.16 (2.02)
13	AKMS14 A	2	1.66 (1.54)
14	AKMS 14B	2	1.56 (1.51)
15	2219A	2	0.00 (1.00)
16	2219B	2	0.00 (1.00)
17	296A	2	2.50 (1.70)
18	296B	2	2.27 (1.67)
19	27A	2	0.00 (1.00)
20	27B	2	0.00 (1.00)
21	C 43	2	2.99 (1.00)
22	RS 29	2	0.00 (1.00)
23	RS 585	4	3.63 (2.13)
24	RS 647	3	1.11 (1.41)
25	RS 653	3	3.47 (1.86)
26	RS 654	3	4.36 (2.30)
27	RS 673	2	1.72 (1.55)
28	AKR 150	2	0.00 (1.00)
29	IMS 9A	2	0.00 (1.00)
30	IMS 9B	2	4.28 (2.28)
31	INDORE 12	2	0.00 (1.00)
32	CS 3541	2	0.00 (1.00)
33	CSV 8 R	3	-
34	SPV 1018		24.81 (5.05)
	SEm ±		0.44
	CD		1.88
	Locals		
1	Hagari 1	3	0.00 (1.00)
2	Pop sorghum	3	8.47 (3.11)
3	Kadabina Jola	3	1.91 (1.70)

1	2	3	4
4	Sakkari Jola	3	4.89 (2.42)
5	Kagi Mothi	4	3.00(1.99)
6	basavana Pada	3	10.05 (3.32)
7	Biligundu	3	14.62 (3.94)
8	Y-4	3	11.36 (3.51)
9	Kandkur local	3	8.98 (3.15)
10	Kodmurkhy	3	0.00 (1.00)
11	Bidar local	3	27.0 (5.29)
12	Chitapur local	3	9.99 (3.31)
13	GRS-1	4	0.00 (1.00)
14	CSV 8R	3	-
15	SPV 1018		24.81 (5.05)
	SEm±		0.10
	CD		0.32

* Figures in the parenthesis are square root transformations

vanced varieties i.e. SPV 1500 and SPV 1423 showed resistant reaction upto grade 2. The genotype SPV 1502, SPV1380, SPV1411, CSV8R, SPV1413, CSV216R, SPV 1503 and SPV 1504 were found moderate reaction. In advanced hybrid line SPH 1238 showed resistant to rust and recorded grade 2. The remaining genotypes showed moderate to severe rust reaction.

Among the parents evaluated the genotypes AKMS 14 A and B, 2214 A and B,

296 A and B, 27 A and B, C-43, RS-29, Rs, 673, AKR-150, IMS-9 A and B. Indore 12 and CS 3541 showed resistance to rust and recorded grade 2. Among the local sorghums GRS- 1 and Hagari 1 recorded "0%" systemic infection of SDM whereas Bidar local, Biligundu, Yenigar-4, Basavana pada and Chitapur local recorded 27.00, 14, 62, 11.36, 10.05 and 10.00 per systemic infection of SDM. The remaining genotypes showed less than 10% SDM. The majority entries showed moderate reaction to rust.

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(Received: November, 2001)

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