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Screening of Sorghum Genotypes against Charcoal Rot caused by *Macrophomina phaseolina* (Tassi) Goid.

S. N. Chattannavar[1] and Vinayaka A. Bannur[2*]

[1]All India Coordinated Sorghum Improvement Project, Dharwad, India
[2]Department of Plant Pathology, College of Agriculture, Dharwad, India University of Agricultural Sciences, Dharwad, Karnataka, India-580005

**Corresponding author*

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Twenty-three genotypes were screened for charcoal rot resistance in the sick plot during *rabi* 2018-19. The results of the study indicated that the genotypes E 36-1 (12.00) followed by SPH 1903, SPV 2654, SPV 2655, SPV 2656 and CSH 13R (13.00) showed minimum charcoal rot index compared to other genotypes. Highest charcoal rot index was recorded in SPV 2662 (31.00) followed by Phule Anuradha (29.00). Out of twenty-three genotypes screened twenty-one genotypes showed moderately resistant reaction and remaining two genotypes showed susceptible disease reaction

Introduction

Sorghum [*Sorghum bicolor* (Linn.) Moench] has occupied an area of 56 lakh hectares with the production of 46 lakh tons and productivity of 812 kg/ha. The major sorghum cultivating states are Maharashtra, Karnataka, Rajasthan, Tamil Nadu and Andhra Pradesh. It is being grown in two seasons: *kharif* season as a rainfed crop while in *rabi* season under remaining soil moisture conditions. In Karnataka, it is cultivated on 10.90 lakh hectares of which 1.16 lakh hectares in *kharif* and 9.74 lakh hectares in *rabi* with production and productivity of 11.50 lakh tons and 1,052 kg ha^{-1}respectively (Anon., 2017). The hunt for new varieties and hybrids with better productivity and resistance is a continuous process in crop improvement.

Charcoal rot disease has become a major production constraint in *rabi* sorghum. The indirect loss computed to this disease alone amounts to 40 per cent (Hiremath and Palakshappa, 1994). Patil (1980) reported that the loss in grain yield was more in *rabi* (40.83

%) than in *kharif* (17.69 %). The present study was carried out to screen twenty-three genotypes for charcoal rot resistance.

Materials and Methods

A field experiment was conducted at Main Agricultural Research Station, Dharwad in sick plot conditions during *rabi* 2018-19. Test genotypes were sown during the second fortnight of October with a spacing of 45 cm × 15 cm with three replications. The susceptible check, CSV 8R was sown after two test entries. Observations on charcoal rot incidence, mean length of spread (cm), mean number of nodes crossed and charcoal rot index (CRI) were recorded for screening purpose.Charcoal rot percentage and mean length of spread of lesion were used for estimation of charcoal rot index (CRI) using the formula (CRI = CRP × 0.4 + MLS × 0.6). Disease reaction of each genotype was determined following the CRI scales (Das *et al*., 2018).

CRI VALUE	Disease Reaction
≤ 5	Highly Resistant
6 – 10	Resistant
11 – 25	Moderately resistant
26 – 40	Susceptible
>40	Highly susceptible

Results and Discussion

The results revealed that, charcoal rot index was least in E 36-1 (12.00) followed by SPH 1903, SPV 2654, SPV 2655, SPV 2656 and CSH 13R (13.00). Highest charcoal rot index was recorded in SPV 2662 (31.00) followed by Phule Anuradha (29.00) (Table 1).

Table.1 Field evaluation of sorghum genotypes against charcoal rot of sorghum

Sl. No.	Genotype name	Charcoal rot index
1.	SPH 1902	20
2.	SPH 1903	13
3.	SPV 2562	16
4.	SPV 2653	18
5.	SPV 2654	13
6.	SPV 2655	13
7.	SPV 2656	13
8.	SPV 2657	17
9.	SPV 2658	19
10.	SPV 2659	14
11.	SPV 2660	17
12.	SPV 2661	19
13.	SPV 2662	31
14.	SPV 2663	22
15.	SPV 2664	16
16.	CSH 13R	13
17.	CSH 15R	22
18.	CSV 26R	15
19.	M 35-1	18
20.	Phule Anuradaha	29
21.	Phule Maulee	14
22.	Local Check	21
23.	E 36-1	12

Table.2 Reaction of sorghum genotypes to charcoal rot

CRI value	Genotypes	Disease reaction
< 5	Nil	Highly resistant
5-10	Nil	Resistant
11-25	SPH 1902, SPH 1903, SPV 2562, SPV 2653, SPV 2654, SPV 2655, SPV 2656, SPV 2657, SPV 2658, SPV 2659, SPV 2660, SPV 2661, SPV 2663, SPV 2664, CSH 13R, CSH 15R, CSV 26R, M 35-1, Phule Maulee, Local Check and E 36-1	Moderately resistant
26-40	SPV 2662 and Phule Anuradha	Susceptible
> 40	Nil	Highly susceptible

Out of twenty-three genotypes screened against charcoal rot incidence in sick plot, none of the genotype showed highly resistant reaction and resistant reaction. Twenty-one genotypes showed moderately resistant reaction. Two genotypes showed susceptible disease reaction. None of the genotype showed highly susceptible reaction (Table 2).

The results of the screening were in accordance with studies made by Sukanya *et al*., (2017) who reported that the genotypes GS 23 (15.50 %) followed by GS 11 (18.50 %) and GS 22 (19.00 %) recorded least charcoal rot incidence compared to other genotypes. SPV 86 genotype recorded higher disease incidence (48.00 %).

Anahosur and Naik (1985) reported that susceptible genotypes possess less sugar content compared to resistant genotypes. Similarly, Nalawade *et al*., (2008) reported that resistant genotypes have more amount of sugar and phenolic compounds which confer resistant against the pathogen.

In this present study, this may be the reason for genotypes showing resistant and susceptible disease reaction. Thus, from the results it is clear that employment of newer resistance sources particularly SPH 1902 and SPH 1903 have shown resistance to charcoal rot over the years and can be effectively employed in resistance breeding programme against charcoal rot in sorghum.

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