

RESEARCH ARTICLE

Seed mycoflora of *sorghum* from Telangana

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Abstract: Stored grains of 3 *Sorghum* cultivars (296 - B, SPV – 1068 and White Cultivar) collected from Telangana districts have been worked out during the year 2019 to 2020. The results indicate the association of 27 - 29 fungi associated with unsterilized seeds of 296 –B and SPV – 1068 cultivars, respectively. The seeds sterilized with 1% Sodium hypochlorite have been found colonized by less fungal species. White Cultivar, which is a resistant variety has been found colonized with 9 fungal species in unsterilized seeds, while the sterilized did not show any infection. Thus, the data indicates the need for seed treatment before storage and also to provide healthy storage conditions.

Keywords : Cultivar, Fungi, Seed, Storage, Sterilized, Unsterilized

Introduction

Semi-arid tropics are characterized by high temperature, varied rainfall and relative humidity values. Though agricultural productivity is increased, but the ever increasing human population require more agricultural productivity. Telangana region has got more of dry land having semi-arid environment and low-fertile soils. Therefore, farmers will be growing most of the millets. *Sorghum* cultivars cover the largest area among the Indian food crops after the rice as it forms staple food for poor classes. Number of *Sorghum* cultivars suffer from diseases such as rusts, leaf spots, smuts, downy mildews, bacterial diseases, viral diseases and others. The early flowering stage of the plant gets exposed to wet condition during rainy season and to more humidity in winter season resulting in the infection of the grain. The moldy grains lose their germinability, grain quality and nutrient loss besides facing market problems. The *Sorghum* grains get infected at pre-harvesting stage, during transit and under storage conditions.

Thus, the seed mycoflora associated with *Sorghum*

may result in lower viability, loss of quality, nutrition, change in colour and size of the grain besides having reduced market value and mycotoxin contamination due to some fungal infections. The seed mycoflora of *Sorghum* cultivars has been studied earlier by Balakrishna *et al.* (1977), Bandyopadhyay *et al.* (1991), Berber *et al.* (2021), Castor, (1981), Christensen and Lopez (1963), Desai *et al.* (2021), Koteswara Rao and Poornachandrudu (1971), Manoharachary *et al.* (1993) and Rai and Gupta (1978). It is important to mention that seed mycoflora of *Sorghum bicolor* stored under different conditions in different districts of Telangana has not been worked out qualitatively earlier. So, an attempt is made to study the seed mycoflora of *Sorghum* under different storage conditions.

Materials and methods

Around 600 samples of stored *Sorghum* grains have been collected from Mahabubnagar, Vikarabad, Medak and Hyderabad regions. The storage facilities include Gummi (basket painted with dung), Gunny bag, storage in the open rooms, plastic bags and cold storage. The seed samples collected from the above have been subjected for evaluation of fungi associated using detection techniques of ISTA, (2001). This includes plating

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200 unsterilized seeds on moist blotter, plating 200 sterilized seeds with 1% Sodium hypochlorite. Similarly, the unsterilized and seeds sterilized were also plated on plates on PDA. All the treatments were incubated for 5 days at $28 \pm 2^\circ\text{C}$. The fungi encountered have been studied and identified upto species level by observing the plates from 5th day to 10th day (Barron 1968, Ellis 1971, 1976; Nagamani *et al.* 2006). The seed samples of three *Sorghum* cultivars namely 296-B, SPV1068 and White Cultivar have been selected for the present study.

Results and discussion

Sorghum cultivars (296 – B, SPV – 1068, White Cultivar) grown in Telangana districts have been worked out for associated seed mycoflora. The fungi have been estimated and evaluated as per the procedures of ISTA (2001). The fungi have been identified upto species level. The fungi associated with the grains under different storage conditions are listed in Table --1. Altogether, 29 fungal species have been encountered.

Table – I : Fungal Species associated with seed samples of three *Sorghum* cultivars

S.No.	Fungal species	<i>Sorghum</i> cultivars					
		296 - B		SPV - 1068		White Cultivar	
		A	B	A	B	A	B
1	<i>Acremonium strictum</i> W. Gams	+	-	+	-	-	-
2	<i>Alternaria alternata</i> (Fr.) Keissl	+	+	+	-	-	-
3	<i>Alternaria longissima</i> Dieghton & Macgarvie	+	-	+	-	-	-
4	<i>Alternaria tenuissima</i> (Kunze) Wiltshire	+	-	+	-	-	-
5	<i>Aspergillus candidus</i> Link	+	-	+	-	+	-
6	<i>Aspergillus flavus</i> Link	+	-	+	-	-	-
7	<i>Aspergillus niger</i> Tiegh	+	-	+	-	+	-
8	<i>Bipolaris spicifera</i> (Bainier) Subram	+	+	-	+	-	-
9	<i>Chaetomium orientum</i> Saha	+	+	-	-	-	-
10	<i>Cladosporium oxysporum</i> Berk. & M. A. Curtis	+	+	+	+	-	-
11	<i>Cladosporium sphaerospermum</i> Penz	+	-	+	-	-	-
12	<i>Colletotrichum gloeosporioides</i> (Penz) Penz. & Sacc	+	+	+	+	-	-
13	<i>Curvularia geniculata</i> (Tracy & Earl) Boedijn	+	-	+	-	+	-
14	<i>Curvularia lunata</i> (Wakker) Boedijn	+	-	+	-	+	-
15	<i>Curvularia lunata</i> var. <i>aeria</i> (Bat., J. A. Lima & C. T. Vasconc)	+	-	+	-	-	-
16	<i>Curvularia pallescens</i> Boedijn	+	-	+	-	-	-
17	<i>Exserohilum rostratum</i> (Drechsler) K. J. Leonard & Suggs	+	+	+	+	-	-
18	<i>Fusarium moniliforme</i> J. Sheldon	+	+	+	+	+	-
19	<i>Fusarium semitectum</i> Berk	+	+	+	+	-	-
20	<i>Gloeocercospora sorghi</i> Bain & Edgerton	+	+	+	+	-	-
21	<i>Nigrospora oryzae</i> (Berk. & Broome) Petch	+	-	+	-	+	-
22	<i>Penicillium citrinum</i> Thom	+	-	+	-	+	-
23	<i>Penicillium genseii</i> Zaleski	+	-	+	-	-	-
24	<i>Periconia macrospinoso</i> Lef. & John	+	+	+	+	-	-
25	<i>Phoma sorghina</i> (Sacc.) Boerema	+	+	+	+	-	-
26	<i>Rhizopus stolonifer</i> (Ehrenb.) Vuill	+	-	+	-	+	-
27	<i>Spadicoides obovata</i> Subram	+	-	+	-	-	-
28	<i>Torula graminis</i> Desm	+	-	+	-	+	-
29	<i>Trichothecium roseum</i> (Pers.) Link	+	-	+	-	-	-
		29	11	27	9	9	--

It has been observed that the unsterilized seeds, which were plated on moist blotter and agar plates have yielded more fungal species than the sterilized seeds. The seeds stored at cold storage godowns have shown less number of fungal species than others followed by gummi storage. This may be because of less exposure to the outside environment and other factors such as hygiene. In gummi method, probably the cow dung might have played an important role in controlling fungal contamination. The seeds stored in Gunny bag have yielded more broken seeds due to mechanical pressure applied while harvesting, hence got exposed to many molds. Similarly, grains stored in open rooms have also yielded more fungal species on par with unsterilized seeds due to heavy contamination by dust and other related factors. Besides the above, temperature, humidity, grain structure and storage facilities are the possible factors for fungal colonization of *Sorghum* grains of three cultivars.

In our studies, the seeds collected from Mahabubnagar, Vikarabad and Medak have almost shown more of fungal colonization than the samples collected from Hyderabad. The above data is in-depth analysis of seed mycoflora associated with three cultivars of *Sorghum* at post-harvest stage from Telangana.

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