

SEED-BORNE FUNGI OF SORGHUM IN SAUDI ARABIA

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Abstract

Using ISTA technique, 16 species of fungi were isolated from three local varieties of sorghum of Saudi Arabia. High number of species were isolated by agar plate method than by blotter method. Of the various fungicides, Benlate at 0.2% inhibited *Drechslera sorghicola* and *D. specifera* pathogenic to sorghum. Use of surface disinfectant or the fungicides did not inhibit the growth of *Rhizopus stolonifer*.

Introduction

Sorghum an important cereal is grown in the south of Saudi Arabia. Seeds are carriers of important diseases which cause considerable reduction in yield of crop plants. Studies on the mycoflora of sorghum seeds from different parts of the world have established that species of *Alternaria*, *Aspergillus*, *Botrytis*, *Cephalosporium*, *Chaetomium*, *Curvularia*, *Drechslera*, *Fusarium*, *Helminthosporium*, *Penicillium*, *Pestalotia*, *Phoma*, and *Rhizopus* are commonly pathogenic (Tripathi, 1974; Krishna *et al*, 1977; Bhale & Khare, 1982). Various fungicides have been used for the control of seed-borne fungi (Dharam Vir *et al*, 1970; Agarwal & Singh, 1974). This work was undertaken to isolate fungi from the seeds of three local varieties of sorghum and to study the effect of some fungicides on the seed-borne fungi.

Materials and Methods

The method suggested by International Seed Testing Association (Anon., 1973) for the isolation of seed-borne, fungi was used. Isolation of fungi was made by the agar plate method (Muskett & Malone, 1941) and blotter technique (de Tempe, 1953). Seeds of three local varieties of sorghum viz; red, white and shahla were used.

Seeds were surface sterilized with 0.1% HgCl₂ for 2 min., washed three times in sterile distilled water and then air dried. Seeds were placed on moist filter papers in Petri dishes or on PDA plates for the growth of seed-borne fungi. A total of 400 seeds of each variety were used. The seeds were incubated under alternate cycles of 12 h light and 12 h darkness at 20°C for one week. Fungi were identified after reference to Barnett & Hunter (1972), Booth (1971); Ellis (1971, 1961) and Raper & Fennel (1965).

In another experiment, sorghum seeds were separately treated with 0.2% Bavistin, Benlate, Ceresan, Dithane M-45 and Vitavax 200. A total of 100 gm of each variety was used in each treatment. The fungi growing from treated and untreated seeds were confirmed by the agar plate method.

Table 1. Percentage incidence of seed-borne fungi based on the number of fungal colonies arising out of three varieties of sorghum seeds by blotter technique.

Fungi	Sorghum cv.		
	Red	Shahla	White
<i>Alternaria alternata</i>			
IMI 257166a	15	20	0
<i>Aspergillus glaucus</i>	25	30	0
<i>A. terreus</i>	5	5	0
<i>Aureobasidium pullulans</i>			
IMI 267492	0	35	0
<i>Penicillium</i> sp.	5	5	0
<i>Rhizopus stolonifer</i>	30	30	5

Results and Discussion

Fungi isolated by the blotter method are shown in Table 1. Five species viz; *Alternaria alternata*, *Aspergillus glaucus*, *A. terreus*, *Penicillium* sp. and *Rhizopus stolonifer* were isolated from the red variety and 6 species viz; *A. alternata*, *Aspergillus glaucus*, *A. terreus*, *Aureobasidium pullulans*, *Penicillium* sp. and *Rhizopus stolonifer* were isolated from cv. shahla. Only *R. stolonifer* was isolated from the white variety.

Fungi isolated by the agar plate method are shown in Table 2. Sixteen species of fungi viz., *A. alternata*, *A. dianthicola*, *Aspergillus chevalieri*, *A. funiculosus*, *A. glaucus*, *A. sacchari*, *A. terreus*, *Aureobasidium pullulans*, *Chaetopsis grisea*, *Curvularia lunata*, *Drechslera specifera*, *D. sorghicola*, *Fusarium equiseti*, *Mucor globosus*, *Penicillium* sp. and *R. stolonifer* were isolated from the three varieties of sorghum. The number of species of fungi and colonies of fungi isolated by the agar plate method was much higher than by the blotter method. Sorghum variety shahla yielded maximum number of species and colonies of fungi whereas sorghum var. white showed the minimum number. The common fungi isolated from the three varieties were, *Alternaria alternata*, *Aspergillus* spp; *Penicillium* sp; *Curvularia lunata* and *R. stolonifer*.

The number of fungi reduced when the seeds were treated with fungicides before placing them on the agar plates. Growth of *A. funiculosus*, *A. sacchari*, *Chaetopsis grisea*, *Curvularia lunata* and the two species of *Drechslera* were completely inhibited after fungicidal treatment. Ceresan inhibited the growth of most of the fungi followed by Benlate, Bavistin and Dithane M-45. Vitavax 200 was least effective. Ceresan inhibited the growth of all fungi except *R. stolonifer*. Agarwal & Singh (1974) also found that Ceresan reduced the growth of many fungi of jute seeds when used at the rate of 0.25%. Similarly

Table 2. Percentage incidence of seed-borne fungi based on the number of fungal colonies arising out of three varieties of sorghum seeds on PDA medium.

Fungi	Red	Sorghum cv. Shahla	White
<i>Alternaria alternata</i>	15	0	10
<i>A. dianthicola</i>	0	10	0
<i>Aspergillus chevalieri</i>	10	10	0
<i>A. funiculosus</i>	0	5	0
<i>A. glaucus</i>	50	30	15
<i>A. sachari</i>	0	5	0
<i>A. terreus</i>	5	10	0
<i>Culvularia lunata</i>	10	0	5
<i>Chaetopsis grisea</i>	0	0	15
<i>Aureobasidium pullulans</i>	0	40	0
<i>Drechslera specifera</i>	5	5	0
<i>D. sorghicola</i> IMI 267497	0	10	0
<i>Fusarium equiseti</i>	0	0	20
<i>Mucor globosus</i>	0	15	0
<i>Penicillium</i> sp.	10	10	0
<i>Rhizopus stolonifer</i>	30	50	15

Dithane M-45 was effective in the control of seed-borne fungi (Sharma & Basuchaudhry, 1973. Dharam Vir *et al.*, 1970). Benlate did not prove effective against the species of *Drechslera* in Denmark (Dharam Vir *et al.*, 1970). Our results show that Benlate completely inhibited the growth of *Drechslera specifera* and *D. sorghicola* when used at 0.2%. *R. stolonifer* grew after the seeds were treated with surface disinfectants as well as after treatment with various fungicides.

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