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Fungi associated with mouldy seeds of sorghum [*Sorghum bicolor* (L.) Moench] cv. CSH-9 in Western Maharashtra

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ABSTRACT

Seven fungal pathogens *i.e.*, –*Alternaria alternata* (Fr.) Keissler, *Curvularia penniseti* (Mitra) Boedijn, *Drechslera rostrata* (Drechs.) Richardson and Fraser, *Fusarium culmorum* (W.G. Smith) Sacc., *Aspergillus niger* van Tiegh., *Aspergillus fumigatus* Fres., *Rhizopus stolonifer* (Ehx-ex-fr) Lind. were found associated with various discoloured grades of sorghum cv. CSH-9 externally. However, *A. alternata*, *C. penniseti*, *D. rostrata*, *F. culmorum* and *Aspergillus niger* were found associated with seed of sorghum internally. *Fusarium culmorum* was associated with dark brown and crimson red discoloured seeds. *Alternaria alternata* and *Drechslera rostrata* were found in gray discoloured seeds. *Curvularia penniseti* and *Drechslera rostrata* were associated with dark black discoloured seeds. *Aspergillus niger, A. fumigatus* and *Rhizopus stolonifer* were isolated from all discoloured grades of sorghum seeds.

Key words : Sorghum, Grain moulds, Fungicides, Seed treatments, Germination, Seedling vigor index.

Grain sorghum (*Sorghum bicolour* (L.) Moench) is one of the main cereal crop of Maharashtra. Sorghum suffers from number of fungal diseases. Among the several diseases the grain moulds has become a major constraint for high yield yielding and early maturing hybrids during *kharif* season, which are usually exposed to late rains of October-November. The warm and humid climate is most congenial for the development of grain moulds resulting in quantitative and qualitative losses in seed. Therefore, it was felt necessary to study the fungi associated with seeds of sorghum externally and internally.

MATERIALS AND METHODS

Mouldy seeds of sorghum hybrid CSH-9 were collected from, All India Co-ordinated Sorghum Improvement Project (AICSIP), Rahuri and graded on basis of various discolorations caused by seed-borne fungi. These grades are as below:

Grade	Symptoms on seeds
I	Dark brown spots on the seeds
II	Dirty white or gray discolouration
III	Crimson red discolouration
IV	Dark black discolouration
V	Healthy seeds

The graded seeds were used for the isolation of external and internal seed borne pathogens.

Detection and isolation of external seed-borne fungi:

The externally seed-borne fungi were detected by adopting the ISTA's standard blotter test method (Neergaard, 1997). Blotters were soaked in distilled or sterilized water and placed in three layers in transparent Petriplates (plastic) after draining off excess of moisture. A fixed number of seeds *i.e.* 25 per plate were placed equidistant from one another under aseptic condition. Likewise 400 seeds were plated. After plating the seeds, the Petriplates were incubated for 7 days at 20 ± 2°C under near ultraviolet light (NUV) or fluorescent light with an alternate cycle of 12 hr light and 12 hr darkness in an incubation room. The seeds were examined on 8th day under steriobinocular microscope. The fungi were identified mostly on the basis of morphological characters of conidia, conidiophores and fruiting structures. The per cent incidence of different seed borne fungi associated with seeds was recorded.

The fungal colonies of different fungi associated with the seeds were picked up with the help of a sterilized inoculating needle and transferred on PDA slants, numbered and incubated at 26 ± 2°C for seven days to obtain the pure culture of the pathogen. The pure isolates grown on PDA slants were kept at low temperature in the refrigerator with a view to preserve the cultures for longer period without any loss in the viability.

Detection and isolation of internal seed-borne fungi:

The internally seed-borne fungi were detected by employing ISTA's standard Agar plate test (Neergaard, 1997). Prior to plating, the seeds of sorghum were treated with 0.1% $HgCl_2$ solution to prevent saprophytes development. Three washings with sterile water were given to remove corrosive sublimate. The seeds were placed in Petridishes containing PDA. Ten seeds were placed at equidistant per 9 cm plate. Plates were