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## A B S T R A C T

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Sorghum [*Sorghum bicolor* (L.) Moench] is a vital life-sustaining food crop for humanbeing as well as for livestock in many parts of world. It is one of the major staple foods for the world's poorest and insecured people. Many improved varieties have developed in several countries in recent years, many of them were found to be susceptible to diseases due to narrow genetic makeup. Therefore, were discarded by the farmers within a short period of use.

Among, the several sorghum fungal diseases occurring in Maharashtra, viz., Anthracnose (foliar, head, root and stalk rot), Charcoal rot, Downy mildew, Damping-off, Grain discoloration, Leaf spot, Leaf blight, Root rot, Seedling blight and Smut are appearing every year. Among the several sorghum diseases, majority of them are reported to be seed borne. Therefore, considering the importance of the problem, the present investigations were carried out on various aspects to generate more information on seed borne fungi of sorghum.

The natural symptoms and signs of discolored sorghum grains were studied by collecting different discolored earheads from various parts of Maharashtra. The isolation, microscopic examination and identification of detected fungi were carried. Nine fungi viz., *Fusarium moniliforme*, *Fusarium oxysporum*, *Colletotrichum graminicola*, *Macrophomina phaseolina*, *Curvularia lunata*, *Alternaria alternata*, *Phoma sorghina*, *Aspergillus niger* and *Aspergillus flavus* belonging to seven genera were found associated with discolored disease sorghum grains. The pathogenicity test of predominant fungi, viz., *F. moniliforme*, *C. graminicola*, *A. alternata*, *F. oxysporum* and *M. phaseolina* were found positive. These pathogens adversely affect seed germination and cause seedling mortality in *in vitro* and *in vivo*. In case of *F. moniliforme* seed germination and seedling mortality *in vitro* and *in vivo* was 58.0, 75.00 and 62.0, 78.00 per cent, respectively, which was found to be most pathogenic. The reisolation from diseased seeds and blighted seedlings yielded the same respective pathogen, used for inoculation.

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Considering, the overall performance of various synthetic and semi synthetic media, both in solid and broth state, Potato dextrose medium was found to be best for growth and sporulation of *F. moniliforme* and *A. alternata*. The growth and sporulation of *C. graminicola*, *F. oxysporum* and *M. phaseolina* were maximum on Richard's medium.

Seeds treated with cultural filtrates of mixture of nine fungi revealed significantly the lowest seed germination (28.75%) followed by *F. moniliforme* (66.00%), *F. oxysporum* (68.30%), *C. graminicola* (71.53%), *A. alternata* (73.20%) and *M. phaseolina* (77.23%) inoculated seed. Minimum adverse effect on seed germination was observed in sorghum seed inoculated with *C. lunata* (88.85%), *P. sorghina* (91.05%), *A. niger* (92.98%) and *A. flavus* (93.45%) over control (95.03%).

The bulb extract of Garlic and Neem seed kernal extract were most effective in checking the growth and sporulation of *A. alternata*, *F. oxysporum*, *C. graminicola*, *F. moniliforme* and *M. phaseolina*. Among the different antagonists tested *T. viride*, *T. harzianum* and *A. niger* consistently showed strong antagonistic activity against *M. phaseolina*, *C. graminicola*, *F. moniliforme*, *A. alternata* and *F. oxysporum*.

Nine fungicides were screened *in vitro* by food poisoned technique against *C. graminicola*, *A. alternata*, *F. moniliforme*, *M. phaseolina* and *F. oxysporum*. Among different fungicides tested against *A. alternata*, Propiconazole and Hexaconazole (0.1 %) were the most effective fungicides providing maximum inhibition of fungal growth and sporulation. In case of *F. oxysporum* the most effective fungicides were Carbendazim, Propiconazole and Chlorothalonil providing maximum growth inhibition, whereas Carbendazim and Copper oxychloride proved most effective in *C. graminicola* growth inhibition. The fungicides Carbendazim, Propiconazole, Metalaxyl 8% + Mancozeb 64% and Chlorothalonil each at 0.1 % concentration proved to be most effective against mycelial growth and sporulation of *M. phaseolina* and Carbendazim and Triadimefon both at 0.1 % concentration were effective against *F. moniliforme*.