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Seed Mycoflora of Stored Mustard and Its Control by Fungicides

ATUL K SRIVASTAVA, V N SINGH and K K PATHAK
Department of Botany, Banaras Hindu University, Varanasi 221005

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Brassica juncea (Mustard var. Varuna) seeds were examined after two years for the presence of external and internal mycoflora. In all, 35 species, including two sterile mycelia, were recorded. The dominant fungi were *Aspergillus luchuensis*, *A. flavus*, *Alternaria alternata*, *Aspergillus niger*, *Chaetomium globosum*, *Penicillium lanosum*, *Trichoderma viride* and *Cladosporium cladosporioides*. Seeds were treated with 0.1, 0.2 and 0.3% Agallol, Agrosan 'GN', Ceresan, Cupramar, Dithane M-45, Dithane Z-78, Furadan and Phygon. Dithane Z-78 and Dithane M-45 were found to be very effective against the seed mycoflora. Higher percentage of seed germination was recorded for treated seeds with all the fungicides tested in comparison to control. 0.3% Dithane Z-78 was found to be the best fungicide to control seed mycoflora as it also facilitated seed germination at the said concentration.

Key words: **Seed Mycoflora, Mustard,** *Brassica juncea*, **Fungicides**

Introduction

Fungi are the main agents amongst the micro-organisms which deteriorate quality of seeds in storage; and fungicidal treatments are known to reduce the seed mycoflora and thereby improve the germination and emergence of seedlings. The seed mycoflora of mustard has been studied by some workers (Lodhi & Naeem 1955 Mishra & Kanaujia 1973, Upadhyay & Singh 1978). The authors have studied the seed mycoflora of mustard (var. Varuna) in relation to fungicidal treatment to suggest control method.

Materials and Method

Seeds were collected from Government Agricultural Trial and Demonstration Centre, Varanasi, in June 1975 and were stored in earthenware pots covered with lids under laboratory conditions for two years. Seed mycoflora was analysed by standard techniques recommended by International Seed Testing Association, 1966. For the isolation of endophytic seed-borne fungi, the seeds pretreated with 0.1% mercuric chloride were plated. For fungicidal treatments, eight

fungicides viz., Agallol '3' (3% mercury as methoxy-ethyl mercury chloride). Agrosan GN (phenyl-mercury acetate and ethyl mercury chloride), Ceresan dry (1 % mercury as phenyl mercury acetate), Cupramar (Copper oxychloride; 50% copper), Dithane M-45 (75% of co-ordination product of zinc ion and manganese ethylene bisdthiocarbomate), Dithane Z-78 (75% of zinc ethylene bisdithiocarbamate and 25% inert ingredients), Furadan (2, 3-Dihydro-2, 2-dimethyl-7 benzofuranyl methylcarbamate), Phygon XL (dichloro (2,3-dichloro 1,4-naphthoquinone) were selected. 0.1, 0.2 and 0.3% of each were used. Treated seeds were tested using standard Blotter method and Potato dextrose agar method.

Results and Discussion

Twenty-seven species were isolated by both the techniques. Of these only 8 were recorded on surface-sterilised seeds. The dominant mycoflora isolated from unsterilized seeds were *Alternaria alternata Aspergillus flavus, A. luchuensis, A niger, Chaetonium globosum; C. nigricolor, Cladosporium cladosporioides, Penicillium lanosum* and *Trichoderma Viride* and from surface sterilized seeds, were *A. alternata, Fusarium poae, P. citrinum, T. viride* and a white steriel mycelium. Nine species viz., *Aspergillus candidus, A. fumigatus, A. humicola, A. sydowi, A. terreus, Aureobasidium pollulans, Humicola grisea, Paecilomyces varioti* and *Penicillium digitatum*, were isolated only by agar plate method. Likewise, some fungi viz., *Bipolaris spicifera, C. nigricolor, Curvularia lunata, P. rubrum* and a white sterile mycelium grew only on blotter. This might be due to the competition between slow-growing and fast-growing fungi.

None of the fungicides tested could eliminate the associated mycoflora completely at the concentrations used though they reduced the incidence of mycoflora at each concentration. Nevertheless some of these viz., Dithane M-45, Dithane Z-78 and Cupramar were noted to be very effective fungicides. Phygon and furadon were mild in their action while rest of the fungicides used were least effective in controlling the seed mycoflora of the stored mustard. At 0.3% concentration, Dithane Z-78 and Dithane M-45 completely eliminated the mycoflora excepting the white sterile mycelium in the case of former and *A. luchuensis* and *A. sydowi* in case of the latter. Higher percentage of seed germination was recorded for all the fungicides tested except 0.2 and 0.3% Agallol, as compared to control. However, the effect varied at different concentrations of each fungicide. The highest percentage of seed germination was recorded at 0.3% of Dithane Z-78. While it was considerably higher in the case of Dithane M-45, Cupramar, Phygon and Furadon. The fungicidal effects of Dithane Z-78, Dithane M-45 and cupramar showed increasing tendency with the increase of their concentration from 0.1 to 0.3%. Since none of the fungicides used exhibited any phytotoxic effect, they can safely be recommended, particularly Dithane Z-78 and Dithane M-45, for use to control the mycoflora associated with stored mustard seeds (var. Varuna).

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