

Fungal ecology of BLSB infected maize fields

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Abstract

Screening of fungal population was done from the rhizosphere/rhizoplane of BLSB infected maize fields from different locality of District Bahraich. Nineteen species were isolated from rhizoplane and twenty-three species from rhizosphere. *Rhizoctonia solani* and *Aspergillus flavus* were dominant in serial dilution whereas *Aspergillus flavus* was dominant by Warcup method.

Keywords: *Rhizosphere, Rhizoplane, Fungal population, Maize, BLSB, Rhizoctonia solani*

Introduction

Maize (*Zea mays* L.) is a cereal grain commonly known as corn, originally referred to a granular particle. It occupies 3rd rank among principle staple of the world i.e. wheat and rice. India produces 12 million metric tons in total maize production of world. In spite of all advance agricultural practices, the crop suffers from severe losses every year. Poor seedling germination, attacks of pest and pathogen, microbial inoculum infested in the seeds also reduces the productivity. Maize suffers from number of diseases viz., bacterial stalk rot, pythium stalk rot, rusts, smuts, charcoal rot, maydis leaf blight, banded leaf and sheath blight (BLSB) etc. Among which bacterial stalk rot and banded leaf and sheath blight are economically important. Banded leaf and sheath blight is caused by the most versatile and dreaded pathogen *Rhizoctonia solani* which causes 15-20% yield loss annually (Saxena, 2002).

Rhizosphere is the well-recognized and specialized ecological niche for fungi, bacteria and actinomycetes. It is also a well-established region around root supporting beneficial and biotrophic microbes. Rhizosphere is the portion of the soil which is around root supporting diversified microorganism and is influenced by root exudates, soil factors, age and type of the host plant and molecular signals. Rhizospheric effect is indicated by the interaction of soil and rhizosphere microbes and their ratio. Significance of rhizosphere mycoflora in plant health has been reviewed. Present study has been undertaken to screen the mycobial population of maize plants infected with BLSB disease.

Materials and Method

Five fields in three maize growing blocks of district Bahraich that falls in Northern Tarai belt of U.P. were selected. Soil samples were collected from the rhizosphere of maize plants which were infected with BLSB disease in selected sites. The fungal population was recorded by Warcup method (Warcup, 1950). Fungal flora was isolated on PDA medium supplemented with streptomycin to suppress the bacterial growth.

For isolation of rhizoplane mycoflora serial dilution method was followed (Kanauija, 1972). Identification was done by mounting material in lactophenol and stained with cotton blue. Observations were done under microscope using standard manuals and monographs.

Results and Discussion

Twenty-three species belonging to sixteen genera were recorded from rhizosphere. *Aspergillus flavus* was recorded with 60% frequency whereas *R.solani* and *Cercospora* sp. have 50%; *Alternaria alternata* was recorded with 40%; *A.tenuis*, *Aspergillus fumigatus*, *A.niger*, *A.terreus*, *Cladosporium herbarum*, *Monilia* sp., 30% *Chaetomium globosum*, *Curvularia lunata*, *Fusarium oxysporum*, *Macrophomina phaseolina*, *Phoma* sp., *Trichoderma viride* and *Syncephalastrum* sp., 20%; *A.ochraceous*, *Dreschlera* sp., *Fusarium roseum*, *Pythium* sp., *Penicillium citrinum* and *T.harzianum* frequency was 10% only. *A.flavus* showed highest density (6) whereas *A.ochraceous*, *Pythium* sp., *P.citrinum*, *T.harzianum* was recorded in minimum density (1).

Isolation of rhizoplane mycoflora showed maximum frequency of *A.flavus* and *R.solani* 70% whereas *A.tenuis*, *A.alternata* showed minimum frequency 10%. *Fusarium oxysporum* and *A.niger* 60%, *A.ochraceous* 50%; *Fusarium roseum* and *Chaetomium globosum* 40%; *T.viride*, *T. harzianum*, *P.citrinum*, *Dreschlera* sp., *Curvularia lunata*, *Cercospora* sp. 30%; *Phoma* sp., *Monilia* sp., *Cladosporium* sp. and *A.terreus* 20% frequency was recorded. Highest density was recorded of *A.flavus* and *R.solani* (7); *F.oxysporum*, *A.niger* (6); *A.ochraceous* (5); *F.roseum* and *C.globosum* (4); *T.viride*, *T.harzianum*, *P.citrinum*, *Dreschlera* sp., *Curvularia lunata* and *Cercospora* sp. (3). *Phoma* sp., *Monilia* sp., *Cladosporium* sp. and *A. terreus* (2); *A.alternata* and *A.tenuis* showed minimum density (1) only. Several other workers have also reported the rhizosphere mycoflora. (Singh *et al.*, 2006; Sooting and Dhkar, 2003; Wani *et al.*, 2006; Roy, 2006).

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