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SHORT COMMUNICATION

Biodiversity of geofungi recorded from Thirukalapatti village spinach cultivating field, Sivagangai, Tamil Nadu

S.UMA* AND P.JEEVAN

P.G. and Research Department of Microbiology,J. J. College of Arts and Science, (Autonomous),Pudukkottai, Affiliated to Bharathidasan University, Thiruchirapalli- 622422, Tamil Nadu

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Spinach is one of the favourite food among Indians. Marginal and small farmers belonging to the village "Thirukalapatti", Sivagangai district in Tamil Nadu cultivate spinach widely. Though the village reported is to be a rainfed region, the farmers of this village cultivate the spinach by "farm pond" method. Apart from water scarcity, yield of spinach is reduced due to the plant diseases too. To overcome this situation biodiversity of soil microbes and their effects should be identified. Thus, the soil samples were collected from the spinach cultivating field of village Thirukalapatti, Sivagangai district, Tamil Nadu and analysed for the Diversity of geofungi colonizing the soil and their distribution was determined. Total of eighteen species of geofungi were recorded. Among these,fifteenfungal species observed to be "pathogenic fungi" and three species were observed to be "antagonistic fungi".

Key words: Spinach, geofungi, pathogenic , antagonistic fungi

INTRODUCTION

Fungi are very successive soil inhabitants, with high plasticity and capacity to adopt to adverse condition.(Sun *et al.,*2005).Soil fungi play important role as major decomposers in the soil ecosystem. They decompose the soil components by producing a wide variety of extracellular enzymes. (Zifcakova*et al*.,2016).There are about 75000 species of soil fungi in the world. Fungi are one of the dominant groups present in soil, which strongly influence ecosystem structure and functioning and thus play a key role in many ecological services.Soil borne plant "Pathogenic fungi" cause a variety of disease such as rot(stem,root,crown),damping-off and wilts. Therefore, there is a growing interest in accessing soil biodiversity and its biological functioning to overcome the crop diseases and also an integrated disease management approach, including the use of disease-resistant cultivars,crop rotation, careful irrigation and organic fungicides to produce a high-quality product of crop. Integrating chemicals resistance strains has an important in the framework of integrated disease management (Kumar *et al*.,2018). Spinach, *Spinacea oleracea* L. is a leafy vegetable that grown in most parts of the world. Spinach are rich in chlorophyll, vitamins and minerals. (Gaekwad*et al.,*2010). Hence, this study was conducted to determine the diversity of geofungi of this plant, in order to formulate better cultivation techniques.

*Correspondence: umasivagurunathan@gmail.com

MATERIALS AND METHODS

Collection of soil sample from field

The soil samples for our study was collected from the same places of "Spinach Cultivating Field" of "Thirukalapatty"(Village). The soil samples were collected from rhizosphere zone which contains enormous microbial community and microbial activity. Soil samples about 5g were collected in sterile poly bags by using sterile spatula. The collected soil samples were preserved in the laboratory for further experimental studies.

Isolation of fungi from samples

The fungus was isolated both from soil samples by "Serial Dilution Techinque". One ml of sample from

Table 1: Total number of fungi isolated from the soil sample of spinach cultivating field

Name of the Isolate	Taxonomic Classification	Pathogenic/ Beneficial fungi
Aspergillus oryzae	Ascomycotina	Pathogenic /Beneficial
A.candidus	Ascomycotina	Pathogenic
A.flavus	Ascomycotina	Pathogenic
A.fumigatus	Ascomycotina	Pathogenic(Black rot)
A.niger	Ascomycotina	Pathogenic(Black rot)
A.luchensis	Ascomycotina	PathogenicFungi
A.terrreus	Ascomycotina	Pathogenic
Aspergillus awamori	Ascomycotina	Pathogenic
Aspergillus sp.	Ascomycotina	Pathogenic /Beneficial
Alternaria alternata	Ascomycotina	Pathogenic
Trichoderma sp.	Ascomycotina	Antagonistic
Trichoderma viride	Ascomycotina	Antagonistic
Fusarium sp.	Ascomycotina	Pathogenic
Fusarium solani	Ascomycotina	Pathogenic
Fusarium oxysporum	Ascomycotina	Pathogenic

the dilution of $10^{-3}$and $10^{-4}$was aseptically added to sterile Petri Plates containing solidified "Potato dextrose agar medium" of twenty ml. Spread plate technique was used for the isolation of microorganisms. The plates were incubated for three days at 37^{0} C.

Identification of fungi

Staining Method (Lacto phenol Cotton Blue)

A drop of 70% alcohol was placed on a clean microscopic slide and the fungus specimen obtained from cultured petri plates were immersed in the drop of alcohol on the microscopic slide. Add one, or two drops of the lacto phenol cotton blue stain. Place a sterile coverslip above the preparation by avoiding air bubbles formation for microscopic observation. Identification of fungal taxa was based on illustrated Genera of imperfect fungi (Barbett, 1965),Micro fungi on land plants(Ellis and Ellis,1985).

RESULT

During the study period, a total of 18 fungal species were enumerated by spread plate techniques. In this study, 15 species of fungi were observed to be come under the category of "Pathogenic fungi" which can cause disease in the crop of spinach and 3 species of fungi come under the category of "Antagonistic fungi".

DISCUSSION

Soil quality and fertility is considered as one of the most important characteristics of soil ecosystems. Soil health is connected with the production of healthy food which impacts public and animal health. In this study, we isolated eighteen fungi species from the spinach cultivating field. It was observed that wide range of fungi belonged to three groups namely Ascomycotina, Zygomycotina and Agaricomycetes. Ascomycotina were the most prevalent group of fungi. The identification of these fungi was confirmed by macroscopic observation and microscopic observation by a compound microscope with a digital camera using a lactophenol staining method.The fungi species include both pathogenic and beneficial communities. Besides morphological characteristics, molecular identification of microorganisms from different rhizospheres and under different environmental conditions have also been reported by several authors (Rebecca *et al*. 2012; Maheswari and Komalavalli, 2013; Alsohaili and Bani-Hasan,2018)

This survey of fungal diversity may help us to overcome the pathogenic fungi and moreover required to find the best way to maintain the beneficial fungal biodiversity in the spinach field to overcome the yield loss and promote high yield of spinach by the farmers.

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