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RESEARCH ARTICLE

DIVERSITY OF RHIZPSPHERE MYCOFLORA OF *CANNA INDICA* L.

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ABSTRACT

A total 9 species belonging to 5 genera of fungi were isolated from rhizospheric soil of *Canna indica* L. from botanical garden of Yeshwant Mahavidalaya, Nanded during December 2017. The mycoflora were isolated by using soil dilution method on Potato Dextrose Agar medium supplemented by suitable antibiotics such as streptomycin. The identification and characterization of the mycoflora were completed with the help of authentic manuals of fungi. The most common fungi among them viz; *Aspergillus niger, Aspergillus flavus, Aspergillus nidulans, Penicillium frequentans, Penicillium chrysogenum, Trichoderma viride, Fusarium oxysporum* and *Fusarium solani* were isolated and characterized. The *Aspergillus niger* and *Aspergillus flavus* has dominant fungal species. The percentage frequency of the mycoflora was analyzed.

Key words: Mycoflora, Rhizosphere, *Canna indica, Aspergillus niger,A. flavus.*

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INTRODUCTION

Soil micro flora plays a essential role in evaluation of soil conditions and in stimulating plant growth (Kiran, *et al.,* 1999) Microorganisms are helpful in increasing the soil fertility and plant growth as they are involved in several biochemical transformation and mineralization activities in soils. The quantities of organic and inorganic materials present in the soil have a direct effect on the fungal population of the soil. In addition to chemical fertilizers and wide range of pesticides shows adverse effect on mycoflora which are much useful to maintain soil fertility and eco balance in the soil atmosphere. Fungi are essential for soil ecosystem functioning (Warcup *et al.,* 1951). Fungi are an important component of the soil micro biota (Ainsworth, G.C et.al 1955). Micro fungi play a important role in nutrient cycling by regulating soil biological activity. (Arunachalam, *et al.,* 1997). Soil is a medium for the growth of fungi because the fungal growths are extremely limited for most of the time and readily available are present for short periods in a limited zone. Fungus also protects plants by supplying a protective health to supply both water and phosphorus to the plant roots during droughts (Magdoff and VanEs, 2009). The occurrence of organic and inorganic materials present in the soil has a direct result on the fungal population of the soil. Biological control of plant disease especially soil-borne pathogens by microorganisms has been considered as a good environmentally different to the chemical treatment methods (Eziashi *et al.*, 2007).

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These microbial populations around the root region make use of these organic substances for their energy requirements. In plants, exudates can be a healing and defensive response to repel insect attack, or it can be an offensive habit to repel other incompatible or competitive plants (Ford *et al,* 2009).

MATERIALS AND METHODS

Study site

The rhizospheric soil sample was collected from the Botanical garden of Yeshwant Mahavidalaya, Nanded. Soil samples were collected during December 2017.

Collection of soil sample

The soil sample was collected from *Canna indica* L. The rhizosphere sample was collected from up to 15 cm depth into a sterilized polythene bags and brought to laboratory for further studies.

Isolation and identification of fungal species

Soil dilution plate method

The 1 gm of soil sample was suspended in 10 ml of distilled water to make serial microbial dilution 10^{-2} to 10^{-6} were used to isolate fungi. 100 µl of microbial suspension of each concentration was added to sterile Petri dishes. The experiment was done by triplicate of each dilution containing 15 ml of sterile Potato Dextrose Agar plate. One percent streptomycin solution was added to the medium before

pouring into petriplates for prevented bacterial growth. The Petri dishes were incubated at room temperature in inverted position at dark condition. The plates were observed everyday and fungal colonies were recorded up to three days (Aneja, 2003).

Staining and Mounting

The mycelia, conidia can be stained by using Lacto phenol and cotton blue was used. The Cotton blue were stained cytoplasm and results in light blue background. Lacto phenol acts as a cleaning agent. The specimens were observed under the Olympus Dig cam Microscope for identification and microphotograph was taken under 10 X × 40 X magnifications.

Identification of the soil fungi

The isolated rhizospheric fungi were identified on the basis of macro morphological colonies were examined for slow or for rapid growth, topography, texture and micro morphological like hyphae, macro conidia, micro conidia. Fungal morphology were studied macroscopically by observing colony features Color and Texture and microscopically by staining with lacto phenol cotton blue and observe under compound microscope for the conidia, Conidiophores and arrangement of spores. The fungi were identified with the help of literature and microphotograph.

Statistical analysis

The number of fungal colonies per plate in 1g of soil was calculated. The percent contribution of each isolated colony was calculated by using the following formula,

$$\% \text{ contribution } = \frac{\text{Total no.of CFU of an individual specie}}{\text{Total no.of CFU of all species}} \times 100$$

CFU-Colony Forming Unit

RESULTS AND DISCUSSION

In my investigation total of 9 fungal species belonging to 5 genera were isolated by serial dilution technique on Potato Dextrose Agar medium supplemented by suitable antibiotics such as streptomycin. The identification and characterization of fungi. The most common fungi among them viz; *Aspergillus niger, Aspergillus flavus, Aspergillus nidulans, Penicillium frequentans, Penicillium chrysogenum, Trichoderma viride, Fusarium oxysporum* and *Fusarium solani* were isolated and characterized. The *Aspergillus niger* and *Aspergillus flavus* has dominant fungal species. The percentage frequency of the mycoflora was analyzed. Abdel–Hafez (1982) isolated fungal mycoflora in the rhizosphere than in the rhizoplane and attributed this to the fact that the rhizoplane is a more selective substratum for micro-organisms than the rhizosphere. Many fungi were observed in the rhizosphere but not in the rhizoplane in this study include *C. lunata, T. basicola*, *G. albidum and B. cinera.* The microfloral organisms associated with plant roots are affected either directly or indirectly by a number of factors such as soil type and pH. Ferreira *et al*. (2009) isolated *Debaromyces hansenii, Kodamaea ohmeri,Candida glabrata, Candida haemulonii* and *Pichia gullhermondii* (yeast microflora) from Brazilian Cassava roots. Peterson (1971) isolated microflora of the root zone changes as the plant grows with some organisms assuming predominance. Among the isolates the genera *Aspergillus* and *Penicillium* were dominant. Arotupin and Akinyosoye (2006) worked on the microbiological and physicochemical characteristics of cassava cultivated soils and isolated *Aspergillus flavus*, *A. fumigatus, A. niger, A. repens, Botrytis cinerea, Neuspora sitophila, Varicosporium elodea* from the soil samples. Oyeyiola (2009) worked on the rhizosphere mycoflora of Okro (*Hibiscus esculentus*) and isolated the following fungi species: *Rhizopus stolonifer, R. oligosporus, R. oryzae, Aspergillus niger, A. fumigatus, A. japonicas, A. clavatus, Mucor hiemalis, M. racemosus, Alternaria herbarum* and *A. triticina.*

Table 1. Isolation of rhizosphere mycoflora and its percentage contributed

Sr. no	Name of Isolated fungi	No of colonies	% of contributed of fungi
1	*Aspergillus niger*	19	29.68
2	*Aspergillus flavus*	13	21.31
3	*Aspergillus nidulans*	04	6.25
4	*Penicillium frequentans*	11	17.18
5	*Penicillium chrysogenum*	03	4.68
6	*Trichoderma viride*	04	6.25
7	*Fusarium oxysporum*	07	10.93
8	*Fusarium solani*	03	4.68
Total no of fungal colonies present			64

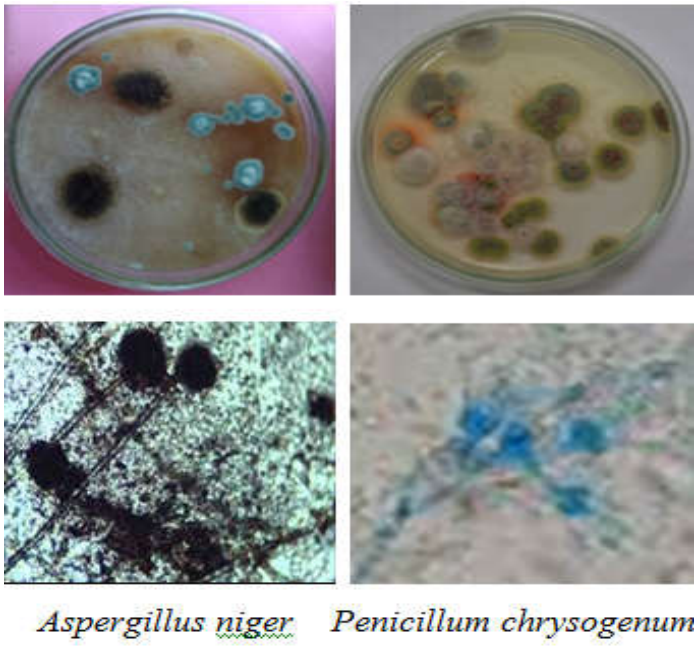

Fig. Fungal Culture plates and microscopic photographs

Conclusion

This is the first report of fungal diversity in the rhizosphere of *Canna indica* L. which seens to similar as in the case of rhizosphere of other plants. The mist frequently species were of species *Aspergillus niger* and fallowed by *Aspergillus flavus* which were observed. The *Penicillium chrysogenum* and *Fusarium solani* which is rarely present in rhizosphere soil.

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