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INCIDENCE AND DIVERSITY OF SOIL MYCOFLORA OF WARDHA (M.S) AREA

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ABSTRACT

An experiment was conducted during the year 2011 to explore the different form of fungi. In present investigation and *Rhizopus stolonifers Aspergillus, Penicillium.* were found more prevalent in soil mycoflora of different areas of the city. A marked variation in soil mycoflora in different areas were also found in different seasons. Fungal species like *Aspergillus sp. Penicillium and Rhizopus stolonifers* were reported more prevalent in the seasons of 2011. Some fungi were more restricted and reported in particular environmental conditions like *Rhizopus species, Pyricularia and Aureobasidium sp, Phoma sp.,* were restricted in particular months of a year. It was also reported that some fungal species were less prevalent like *Curvularia lunata and Aureobasidium sp, and Helminthosporium sp.* In Present investigation it was reported that fungal species like *Aspergillus niger, Aspergillus flavus, Penicillium sp.* were more prominent in all types of environment of soil of Wardha City (M.S.) and shown biodiversity in fungal soil mycoflora.

Key words :- *Aspergillus sp., Penicillium sp., Mucor, Rhizopus stolonifer, Curvularia lunata, Helminthosporium,* Predominent, Soil, diversity.

INTRODUCTION

Aeromycoflora deposited on the leaf surfaces and some of on the ground and ultimately in the soils. These fungal spores germinates and causes the diseases to the plants. Soil also have a variety of fungi in her womb that reflects on plants in the forms of diseases. Many physical, chemical and biological factors brings about causative changes in composition of aeromycoflora of an area and different fungal species are restricted to that particular areas with specific environmental conditions (Bajwa, R., M.H. Shah., A. Javaid and Z. Tasneem. 1997; Verma, 1990). MD. Ashaduzzaman and M.A.Rahman.,(2000) isolated the fungi from heart rot affected *Melia azadirach*(L.). The dehiscence of their sporangia or cleistothecia, perithecia or apothecia or fruiting bodies spreads the spores in air and that are spread up through the air and falls on suitable substratum and again they continue their life cycle. Variations in composition of aeromycoflora of different areas has been reported by many workers (Barth, O.M,(1981); Pasanen, A.L, (1990). Shinde, P.V.,(2003) studied the grain mold fungi in relation to physical and nutritional parameters of Sorghum grains. Garud, T.B.,(1992) reported resistance sources, mechanisms and resistance screening techniques for grain molds. Magar, Sunita J., (2003) reported the occurrence of mold flora at different grain development stages in Sorghum. Smut spores of *Nigrospora, Cladosporium, Alternaria, Aspergillus*

from outdoor air. The human pathogenic fungal spores recorded in outdoor and indoor air are *Rhizopus, Mucor, Aspergillus, Alternaria, Cladosporium, and Diploidia.* The allergic fungal spore types recorded in both places are *Aspergillus, Alternaria, Chaetomium, Cladosporium, Curvularia, Dreshlera, Epicoccum, Helminthosporium, Mucor, and Rhizopus (*Kotwal, S.G., Gosavi, S.V., and Deore, K.D., 2010).

Spores present in air inhaled by various living beings like human beings, animals, birds, and also they settled on the plant surfaces, where they germinate and produce mycelia or they may produce toxins which are allergic in nature, sometimes they cause diseases of incurable forms to living beings. These fungal spores act as allergens to human beings and also the pollutant in air. They also associated with seeds, grains, fruits etc. (Sawant, 2000; and Magar, 2003). Studies conducted over past so many years indicates that *Curvularia* sp. and *Fusarium* sp. are principle fungi associated with grain mold problems. Increasing incidence reported from different safflower growing areas. Chakrabarti, D.K., and Basuchaudhary, K.C.,(1978) identified the wilt of safflower caused by *Fusarium oxysporum sp*. *carthami* and its relationship with age, host, soil and environmental factors. Deshpande, G.D.,(1991) studied the development of medium for selective expression of *Curvularia lunata (W)* Boj. in Sorghum seed health testing. Jadhav, S.K., and Lall, B.M.,(2011) reported the seasonal variation of Indoor Aeromycoflora of Dr. BhimRao Ambedkar Hospital, Raipur. More work is being done on the study of airborne and soil fungal spores and pollen grains and its impact on human health, animal beings and plants and other flora and fauna. The airborne fungal spores causes the respiratory disorders like asthma, allergic rhinitis, skin diseases, ear diseases etc. while soil borne fungi causes the diseases to the plants. Abundance of novel fungal lineages have been indicated by DNA sequencing of nuclear ribosomal ITS region from environmental samples such as soil and wood was reported by Wang et al., 2011. To view this type of study in our area and in the city, the present investigation was undertaken.

MATERIALS AND METHODS

Soil sample was collected from different stations of Wardha city (M.S) during the seasons of 2011. These soil samples was then spread in enamel tray and air dried in the laboratory. The soil particles were hammered into a fine particles, then this sample was mixed thoroughly and made into four parts on a paper. By dividing the samples in a cris-cross manner and two opposite sites samples were discarded and other two were selected, mixed and again same procedure was applied two to three times and finally selected samples were packed, labelled and stored in storage. The experiment was performed by Warcup method (1950). First a soil plate was prepared by transferring the small amount of soil into a sterile petri-plate, about 0.005-0.015 gm with the help of arrow headed needle. Then 10-15 ml of melted and cooled medium was added to a sterile petri-plate with a soil and shaked uniformly. To avoid the bacterial contamination antibiotic was added (Ambistrin). These plates were allowed to solidify and incubated for about 5-7 days at 26^0 C to grow the fungal colonies. The fungal colonies were start appearing after 5-7 days. These colonies were counted, recorded and observed under the compound microscopes. These colonies was identified, with the help of available literature from the college library of J.B. College of Science, Wardha (M.S). For staining, lacto-phenol and cotton blue were utilized. Similarly pure culture were obtained by serial dilution method and their sample incubation. For these experimentation Potato-Dextrose-Agar and Czepedox- Agar media were used.

Observation table: Table showing number of colonies and fungal species in different samples.

Station I-Sample A	No. of Colony	Name of Fungal Species
Plate I (5 mg)	07	*Penicillium sp., Aspergillus niger, Mucor sp.*
Plate II (10 mg)	08	*Chaetomium sp, Penicillium sp., Aspergillus niger.*
Plate III (15 mg)	13	*Aspergillus fumigates, A. niger, Rhizopus stolonifers.*
Station II-Sample B		
Plate I (5 mg)	14	*Chaetomium sp, Penicillium sp., Curvularia lunata.*
Plate II (10 mg)	02	*Helminthosporium sp., Aspergillus fumigates.*
Plate III (15 mg)	15	*Mucor sp., Fusarium sp., Rhizopus stolonifer, Penicillium sp.*
Station III-Sample C		
Plate I (5 mg)	09	*Aspergillus niger., Fusarium sp., Mucor sp.*
Plate II (10 mg)	07	*Aspergillus niger, Penicillium sp. ,Alternaria sp., Rhizopus stolonifer.*
Plate III (15 mg)	15	*Aureobasidium sp., Rhizopus stolonifer, Fusarium sp., Phoma sp., Chaetomium sp.*
Station IV-Sample D		
Plate I (5 mg)	08	*Mucor sp., Aspergillus niger, Curvularia lunata.*
Plate II (10 mg)	06	*Penicillium sp., Aspergillus fumigates, Fusarium sp, Alternaria sp.*
Plate III (15 mg)	13	*Rhizopus stolonifer, Mucor sp., Alternaria sp., Chaetomium sp.*
Station V-Sample E		
Plate I (5 mg)	06	*Mucor sp., Aspergillus niger, Fusarium sp., Penicillium sp.,*
Plate II (10 mg)	08	*Aureobasidium sp., Rhizopus stolonifer, Alternaria sp., Chaetomium sp., Aspergillus niger.*
Plate III (15 mg)	12	*Fusarium sp., Rhizopus stolonifer, Penicillium sp., Aureobasidium sp., Phoma sp., Curvularia lunata.*

RESULTS AND DISCUSSION

Data depicted in the table shown that Station-I Sample A Plate I (5mg) shown *Penicillium sp, Aspergillus niger, Mucor sp.* Station-I Sample A Plate II(10mg) shown the *Chaetomium sp, Penicillium sp, Aspergillus niger.* Station-I Sample A Plate III(15mg) shown the *Aspergillus fumigates, A. niger,* Rhizopus stolonifers. Station-II Sample B Plate I (5mg) shown the *Chaetomium sp, Penicillium sp, Curvularia lunata.* Station-II Sample B Plate II(10mg) shown the *Helminthosporium sp, Aspergillus fumigates.* Station-II Sample B Plate III (15mg) shown the *Mucor sp, Fusarium sp, Rhizopus stolonifer, Penicillium sp.* Station-III Sample C Plate I (5mg)shown the *Aspergillus niger, Fusarium sp, Mucor sp.* Station-III Sample C Plate II (10mg) shown the *Aspergillus niger, Penicillium sp ,Alternaria sp., Rhizopus stolonifer.* Station-III Sample C Plate III (15mg) shown the *Aureobasidium sp, Rhizopus stolonifer, Fusarium sp, Phoma sp., Chaetomium sp.* Station-IV Sample D Plate I (5mg)shown the *Mucor sp., Aspergillus niger, Curvularia lunata.* Station-IV Sample D Plate II (10mg)shown the *Penicillium , Aspergillus*

fumigates, Fusarium sp, Alternaria sp. Site D Plate III(15mg) shown the *Rhizopus stolonifer, Mucor sp., Alternaria sp., Chaetomium sp.* and Station-V Sample E Plate I (5mg)shown the *Mucor sp., Aspergillus niger, Fusarium sp, Penicillium sp.,* Station-V Sample E Plate II (10mg)shown the *Aureobasidium sp, Rhizopus stolonifer, Alternaria sp., Chaetomium sp. Aspergillus niger.* Station-V Sample E Plate III (15mg) shown the *Fusarium sp, Rhizopus stolonifer, Penicillium sp., Aureobasidium sp, Phoma sp., Curvularia lunata. It was reported that Aspergillus sp, Penicillium sp, and Rhizopus species w*ere most common in all sites of the samples. In all the stations, samples of Plate-II(10mg) samples have the *Aspergillus species.* Similarly 15 mg samples of all the stations recorded incidence of *Rhizopus stolonifer species.* It was reported that stations III, IV sample C and D have shown the incidence of common fungal species of *Aspergillus sp.,* while stations I, II, and V, samples A, B, and E have common incidence of species of *Penicillium sp.* In the present investigation a well-marked variation in soil mycoflora was found. *Aspergillus sp, Mucor sp, Curvularia sp, Helminthoporium sp, Fusarium sp. and Chaetomium sp.,* were found more prevalent in soil mycoflora of different areas of the city(Samina, 1975; Nair et al., 1986; Nautiyal and Midha, 1978; Kumar, 1984; Ali, and Salma, 1973). The species of *Aspergillus sp, Rhizopus sp, and Penicillium sp.,* were more prevalent than other genera. Well-marked variatiation in soil mycoflora in different areas were also found in different months. *Fusarium sp. Chaetomium sp.,* and *Aspergillus clavatum* were more prevalent in the months of 2011. Some fungi were more restricted and reported in the particular environmental conditions like *Rhizopus species, Pyricularia sp.* were restricted in the month of Nov. & Dec. 2010, and *Monilia sp.* were restricted in the month of Jan. & Feb. 2011(Dalal, L.P, and D.G.Bhadange., 2011). A marked variations in aeromycoflora of areas of Lahore was reported in the investigation of Bajwa et al.,(1995). Fungal genera like *Curvularia, Aspergillus, Mucor, Fusarium, Chaetomium, Alternaria and Helpminotosporium* were less prevalent in a particular months. The distinct variations in soil mycoflora of different residential environments was investigated by Pasanen in 1990, while Verma in 1990 found that composition of fungal flora was different in urban and rural areas of India. George, K., I.Phukan., M.R. Goswami, and A.K. Cas, (1994) reported common mould *Aspergillus flavus* Link. and other *Aspergilli* and *Pennicilli*a on made Tea in factory premises. The variation in composition of soil mycoflora in different areas of city probably attributes to co-existance on concentration of pollutants in the air along with the climatic variations. Presence of transportation, congested houses and decaying materials and waste are also affect the soil mycoflora. Persiani et al., 1998, observed the change in species diversity of fungi in soil fungi from disturbed tropical rain forest. Satish et al., 2007, reported the diversity of soil fungi in a tropical deciduous forest in Mudumalai, Southern India and observed *Fusarium and Penicillium* species were the most dominant genus. It may be concluded from present study that soil mycoflora was highly sensitive to environmental factors and physical factors. Soil mycoflora with a specific area quickly responds to change in the environmental conditions from physical and chemical nature of soil locality to locality.

CONCLUSIONS

From the above observations and results it was concluded that the site samples have a diverstity in soil mycoflora in which some species of *Aspergillus, Rhizopus, and Penicillium* was the most predominant species in all the site samples, other species like *Aspergillus niger, Aspergillus flavus, Penicillium sp, Curvularia sp, and Helminthoporium sp, Fusarium sp. Chaetomium sp.,* were less predominent in all types of environment of soil and *Aureobasidium sp, and Phoma sp.,*were less frequent depending on environmental conditions. Therefore, it is concluded that the soils of different sites had diversified mycoflora.

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REFERENCES

1. Ali, M.T. and Salma, A. M. (1973). Studies on air fungal flora of Egypt. I. Effect of some environmental factors on the frequency of occurrence. *Egypt. J. Microbiology*, 8(1-2): 113-124.
2. Arya, A., Shah, A.R., and Sadasivan, S. 2001. Indoor aeromycoflora of Baroda museum and deterioration of Egyptian mummy. Current Science, Vol. 81, No. 7 : 793-798.
3. Bagwan, N.B. 2010. Aeromycoflora of store house and incidence of post-harvest diseases of mango (*Mangifera indica (L.)* at Udgir, Maharashtra. Internatioinal Journal of Plant Protection, Vol.3, No.1: 94-98.
4. Barth, O.M. 1981. Air fungal flora and working environment, some medical aspects. International Aerobiology Newsletter, 14: 8-11.
5. Bajwa, R., Shah, M.H, Javaid, A. and Tasneem, Z. 1997. of Lahore. I. Seasonal variation in air mycoflora of highly commercialized, thickly populated areas. *Pak. J. Pl. Sci.*, 3(1): 17-24.
6. Chakrabarti, D.K., and Basuchaudhary, K.C. 1978 incidence of wilt of safflower caused by *Fusarium oxysporum f. sp. carthami*, and its relationship with the age, host, soil and enviromental factors. PL. Dis. Reptr. 62(9):276-78.
7. Dalal, L.P, and Bhadange, D.G. 2011.Diversity of fungal forms of Wardha city-A case study. Asiatic Journal of Biotechnology Resources. Vol. 2(07), pp.898-903.
8. Deshpande, G.D. 1991. Boj. in Sorghaum seed health testing. J.Maharashtra agriculture University. 18:142-143.
9. Dutta, S., Dutta, B.K., and Nath, P.K. 2009. Some Observation on the Aeromycoflora of Tea Factory in Cachar, District, Assam. Assam University Journal of Science and Technology: Biological Sciences. Vol 4, No. 1: 13-19.
10. Garud, T.B. 1992. Resistance sources, mechanisms and resistance screening techniques for grain molds.
11. Proceedings of XXII Annual Sorghum Workshop, Surat, Gujarat, India, 2-4 Apr. 1992:26.
12. George, K., Phukan, I., Goswami, M.R. and Cas, A.K. 1994. Microorganisms in made Tea : Change in chemical components and quality. Proceedings of the 32nd tocklai Conference (16-17 Dec. 1994)pp. 300-307.
13. Ghosh, G.R, and Dutta, B.G. 1960.Soilfungi from Orissa(India)-I. Mycologia, Vol. 52, No.6, pp.915-918.
14. Ianovici, N., and Tudorica, D. 2009. Aeromycoflora in Outdoor Environment of Timosoara City (Romania). Notuloc Scientia Biologicae, Vol.1, No.1:21-28.
1. Jadhav. S. K. and Lall, B. M. 2011.Seasonal variation of indoor Aeromycoflora of Dr. Bhimrao Ambedkar Hospital, Raipur. Advances in Plant Sciences. Vol.24. No. 01. PP 101-107.
15. Kotwal, S.G., Gosavi, S.V., and Deore, K.D. 2010. Aeromycoflora of Outdoor and Indoor Air of Residential Area in Nashik. Asian J. Exp. Biol. Sci. Spl: 24-30.
16. Kumar, R. 1984. Studies of aeromycoflora of Dehradun city. *J. Indian Bot. Soc*., 63: 277-291.
17. Magar, S. J. 2003 Occurrence of mold flora at different grain development stages in sorghum. M.Sc. (Agri.) dissertation submitted to Marathwada Agriculture University, P arbhani (M.S.) PP: 85

18. MD. Ashadu zzaman and Rahman, M. A. 2000. Isolation of fungifrom heart not affected *Melia azadirach*, Linn., In Bangladesh. The Indian forester. Vol. 136.No.9 PP 1164- 1173. Reported the *Acremonium sp*. from heart rot affected *Melia azedarch. Phialophora sp. Penicillium sp. and fusarium sp. etc.*MD. Farooq., Ayub, N. and Kishwar, N. 2001. A Comparative Study Of Aeromycoflora In Thickly Populated Areas Of Rawalpindi. Pak. J. Bot, Vol. 33(Special issue); 733-736.
19. Nair, P.K.K., Joshi, A.P. and Gangal, S.V. 1986. *Air borne pollen spores and other plant materials of India*. A survey. CSIR centre for Biochemical and NBIR, Lucknow.
20. Nautiyal, D.D. and Midha, M. 1978. *Studies on air borne pollen and spores at Allahabad, India.* Proc. 65th Indian Sci. Cong. Part III.
21. Pasanen, A.L. 1990. Air borne mesophilic fungal spores in various residential environments. Atmosheric Environment. Part A. Genral Topics, 26(16): 2681-2868.
22. Persiani, A.M., Maggi, O., Casado, M.A, and Pineda, F.D. 1998. Diversity and Variability in soil Fungi from a Distributed Tropical Rain Forest. Mycologia. Vol. 90. No. 2, pp 206-214.
23. Samina, M. 1975. *The studies of air spora over Lahore.* M.Sc. Thesis, Punjab University, Lahore.
24. Satish, N., and Sultana, S. and Najundiah, V. 2007. In: Current Science, 93(5), pp. 669-677.
25. Sawant, L. V. 2000. Effect of grain mold fungi on physical and nutritional qualities of grain in Sorghum. M.Sc. (Agri.) thesis submitted to Marathwada Agriculture University, Parbhani.-431402 (M.S.)PP:59
26. Sharma, K. 2010. Seasonal Variation of Aeromycoflora over *Ocimum Sanctum* Plant With Special Reference to Winter Season. Journal of Phytology, Vol.2, No.8:01-05.
27. Sharma.K. 2011. Comparative Study Of Aeromycoflora In Relation To Soil Mycoflora Of Dargiling Tea Garden, India. Recent Research in Science and Technology, Vol.3, No.5:84-86.
28. Shinde, P. V. 2003. Studies on grain mold fungi in relation to physical and nutritional parameters of Sorghum grains. M.Sc. (Agric) dissertation submitted to Maharashtra Agric. University. Parbhani (M.S).PP: 51.
29. Verma, K.S. 1990. *Ind.J. Aerobial.,* 3(1): 79-82.Wang, Z., Nilson, R.H., Lopez-Giraldez, F., Zhuang W-y, Dai Y-c, et al. 2011. Tasting Soil Fungal Diversity with Earth Tongues : Phylogenetic
30. Test of SAT, Alignments for Environmental ITS Data. PLOS ONE 6(4) : e19039. doi : 10.1371/journal.pone.0019039.