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Assessment of the Airborne Fungi in Rainy Season from some Schools of Amravati City.

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ABSTRACT

Fungi are widely spread and play a vital role in human everyday life. The microflora of any habitat varies with host type, seasonal variations in climatic conditions and relations among them. Thus, the diversity of microflora differs from time to time and place to place. Fungi had a capacity to grow on mostly all natural and synthetic materials, especially if they are wet or hygroscopic. In this study the fungal contribution in indoor environment of threeschools of Shivaji Education Society Amravati was carried out during rainy season. For this study, settle plate method was used for the isolation of fungi. Sampling site-1 were isolated highest number of fungi (2737 cfu/m^3), the second number highest was isolated from Sampling site -2 (2642 cfu/m^3) & Sampling site -3 (2406 cfu/m^3) were found to be least in number. During the investigation period of rainy season. *Aspergillus* sp., *Alternaria* sp., *Cladosporium* sp, *Penicillium* sp. prominently isolated from school.

Keywords: *Indoor and outdoor school environment; fungal distribution.*

INTRODUCTION

The atmosphere is made up of gaseous layer that play an important role to protect the existing all form of the life present on the earth, which is persistent by the sun, soil, water, air, various flora, fauna and microorganism. Air is a fundamental medium for distribution and identification of various microorganisms, inhabiting mid-air surfaces. Fungal spores are more predominating than the other bio-particles present in the air. The various local sources of outdoor air pollution, such as soil, water, open sewage, sanitation, open drainage system, solid waste & municipal dustbin.

Major emission sources of indoor air pollutants are biological agents and hazardous, non-biological agents, such as animals, plants, air conditioning systems & ventilation rates, building materials, furnishings & most harmful sources of pollution are man itself, household pets. Because of them viruses and allergens, bacteria, dust mites, and mold (fungal spores) are also spreading through our houses.

Fungi had a capacity to grow on all natural and synthetic materials, mostly if they are wet. The climate, season, temperatures, indoor humidity, different local factors and meteorology are the main factors affecting outdoor & indoor air pollution levels (Deshmukh, *et al.,* 2018). Outdoor microbial concentrations varied according to the season and time of day, and these variations were also affected to indoor air. School are the facilities for educational pursuits hence, children also spend more time in school other than in any indoor environment. In school, student exposure to bio-aerosols, containing airborne microorganisms & there result in respiratory disorders and other allergic health effects such as infection, hypersensitivity, impair lung function and neuro development (Gorny *et al.,* 2002). The quantity of the microbial content in the indoor and outdoor air of school, at it has a right away touch with the mental health, body performance and development of the students.

According to World Health Organization (WHO) studies, nearly 6 lakh children under the age of 15 died due to the effects of outside and household ambient air pollution in 2016 in global Air pollution has a range of negative impacts, including food crops, damage to ecosystems, human health and the environment.

The aim of this study was to identify fungal contribution in rainy season of some schools of Shivaji education society of Amravati city.

MATERIALS & METHOD

Sampling Sites:

For this study, three schools of Shivaji Education Society Amravati was selected, Sampling site 1 (S-1) was Shri Shivaji Maratha High School, St.Br. Amravati, Sampling site 2 (S-2) was Kasturba Kanya School & Sampling site 3(S-3) was Shri Shivaji Multipurpose Higher Sec School Amravati. the fungal contribution was carried out from indoor & outdoor environment of school during rainy season.

In the present investigation, settle plate method was used for sampling of aeromycoflora (fungi) (Jadhav and Tiwari 1994). Potato dextrose agar (Himedia) medium was used for the sampling and cultivation of fungi. During the sampling the petri plate with media workplace at a height of 1.0-1.5m above the floor for time 15 minutes. After incubation, count fungal colonies, observing culture growth with morphological and cultural characteristics. For species identification microscopic slides were prepared using lactophenol cotton blue stain. Colonies were identified with the help of literature

CFU/m^3 contribution of fungal flora was calculated by the following formula.

$$CFU/m^3 = \frac{a \times 10000}{p \times t \times 0.2}$$

Where
a - The number of colonies on the petriplates,
p - Surface of the petriplates,
t - The time of petriplates exposure

RESULTS AND DISCUSSION

In the present study, fungal species like *Aspergillus* sp., *Alternaria* sp., *Rhizopus* sp. *Cladosporium* sp., *Mucor* sp., are show dominant altogether sampling sites. Whereas low density of *Penicillium* sp., *Fusarium* sp., *Curvularia sp., Drechslera* sp*., Candida* sp*., Nigrospora* sp*., Trichoderma* sp*, were* recorded throughout the season.

CFU/m^3 Contribution of fungal colonies of Sampling site-1 were isolated highest number of fungi (2737 cfu/m^3), the second number highest was isolated from Sampling site -2 (2642 cfu/m^3) & Sampling site -3 (2406 cfu/m^3) were found to be least in number. Fig. 1.1.

The similar result found in government schools of Visakhapatnam city Naga Madhan Mohan (2014) recorded dominant species like *Aspergillus* sp. (*Aspergillus flavus*), *Mucor* sp., *Rhizopus* sp., *Alternaria* sp., *Penicillium* sp. and *Cladosporium* sp. *Aspergillus niger, Aspergillus flavus, Cladosporium, Fusarium oxysporum* and *Aspergillus nidulans, Aspergillus terreus* were common aeromycoflora, found in Arey lake, Mumbai reported by Bhagat *et al.* (2014).

The dominance of *Aspergillus* sp. and *Cladosporium* sp. was similar results with investigation of several other scientists, i.e. Beata *et al.* (2014). Dahiya & Gupta (2003) recorded, Aspergillus sp., *Cladosporium* sp., *Alternaria* sp. were dominant in Rohtak city which was similar result to present study.

Table 1 : Showing CFU/m³ Contribution of Fungal Colonies of sampling school during Rainy season

Sr. No.	Name of Microorganism isolated (Fungi)	CFU/m³ Contributions of fungi in each School		
		S-1	S-2	S-3
1.	*Alternaria* sp	424.6	660.5	424.6
2.	*Aspergillus* sp	613.4	94.3	424.6
3.	*Aspergillus flavus*	188.7	471.8	471.8
4.	*Aspergillus fumigatus*	188.7	519	47.1
5.	*Aspergillus niger*	47.1	235.9	-
6.	*Candida* sp.	47.1	-	47.1
7.	*Curvularia lunata*	188.7	47.1	94.3
8.	*Curvularia* sp.	-	47.1	-
9.	*Cladosporium* sp.	94.3	47.1	188.7
10.	*Drechslera* sp	47.1	94.3	-
11.	*Fusarium* sp	188.7	47.1	94.3
12.	*Helminthosporium* sp	94.3	141.5	94.3
13.	*Mucor* sp.	330.2	188.7	188.7
14.	*Nigrospora* sp	-	47.1	-
15.	*Penicillium* sp	-	-	94.3
16.	*Rhizopus* sp	235.9	-	235.9
17.	*Trichoderma* sp.	47.1	-	-
	Total	**2737**	**2642**	**2406**

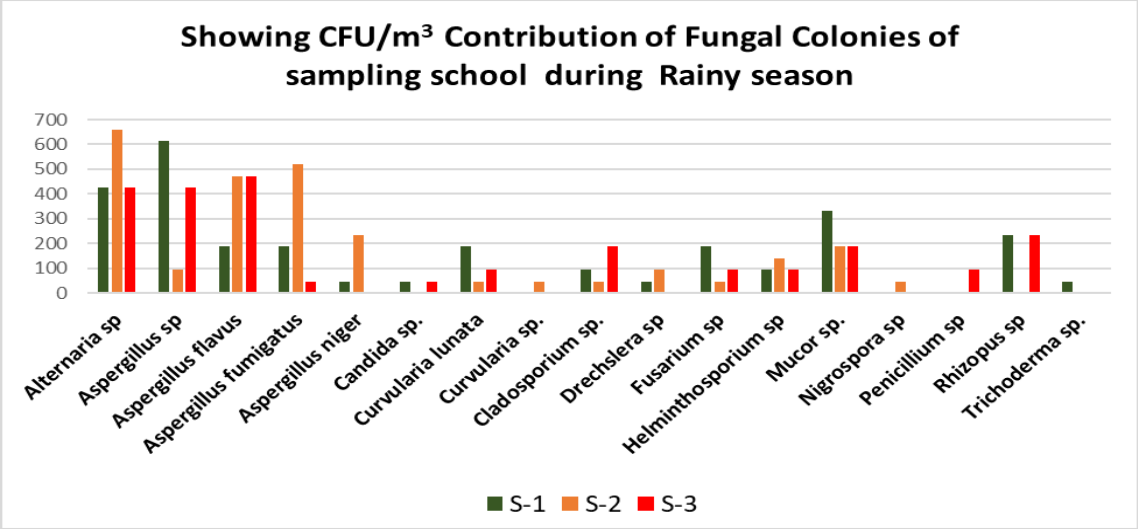

Fig. 1.2 : Showing CFU/m³ Contribution of Fungal Colonies of sampling school during Rainy season

In many schools, Pollutant emissions can occur from poor ventilation, cafeterias, wood furniture, sports equipment, library books, swimming pools, science labs, teaching tools, computer rooms, arts and crafts rooms (Godwin *et al.*, 2007). Wu *et al.* (2004) reported the, when dust winds flow in air it increased, where increased atmospheric fungal spores concentration in ambient air.

CONCLUSION

From the result and discussion, it was concluded that contribution of a largest number of fungi during monsoon season, this may have developed due to the favorable conditions available for the growth of fungous spores like rainfall with high relative humidity, enough availability of dead and decaying matter and deficiency of cleanliness. Study of fungi in school of Shivaji Education Society, Amravati city would be helpful for the right assessment of fungal flora present in air of experimental sites.

Conflicts of interest: The authors stated that no conflicts of interest.

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