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Aeromycoflora of Bus Stand Environment of Gondpipari Tehsil of Chandrapur District (MS), India

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ABSTRACT: The atmosphere contain various types of bio-particles which includes bacteria, viruses, insect debris, pollen grains, dust mites, epidermal parts of plants, trichomes and others, among all these airborne fungal spores are known to cause various types of allergic ailments of plants and animals, present study are therefore carried out to record airborne fungal spore of bus stand area of Gondpipari city of Chandrapur district since the bus stand is the area where the huge crowd gathered every single day. The aeromycological investigation was carried out from August 2023 to January 2024 by using Rotorod air sampler, the data was correlated with the atmospheric climatic condition. During the study dominant fungal spores was belongs to class Deuteromycotina (50.84%) followed by Basidiomycotina (7.93%) and Zygomycotina (7.6%). The percentage of dominant fungal spore is of *Aspergillus* (14.41%) followed by *Alternaria* (7.93%), *Cladosporium* (5.81%), *Biospora* (5.47%), *Rhizopus* (4.80%) and *Penicillium* (4.35%). Besides from these fungal spores other types of biocomponent are also recorded and apart from these many of the bioparticle remain unidentified. Present survey and the data collected of airborne fungal spore of Gondpipari city Bus stand area will be beneficial to allergic patient, pathologist, allergologist, researchers, and other people having interest in the related area.

KEYWORDS: Gondpipari, Aeromycological study, Climatic condition, Rotorod sampler, Allergic ailment.

I. INTRODUCTION

The origin of airborne bioparticles is correlated with the meteorological parameter and the study of these bioparticle of atmosphere like pollen grains, microbes, algal filaments, fungal spores, and other biocomponent and their occurrence, concentration, correlation with the climatic condition termed as aerobiology (Frankland, 1991). Such type of investigation is foremost crucial to check the release of diverse types of bioparticles in the environment which cause countless allergic disorders to common peoples, animals, and plants, specially fungal spores are key cause of allergic troubles (Gregory, 1973). Airborne fungal spores are cosmopolitan in nature and occur in various environment climatic condition and their concentration influence by meteorological parameter and change place to place according to their sessional variation. (Oneto et. al. 2020). These parameters can affect the quality and quantity of aeromycoflora of that area which include wind, temperature, rain fall, humidity and others (Onmek et.al. 2020).

Bus stand area of Gondpipari city is the place where huge crowd of people visit and can be affected by bio pollutant specially airborne fungal spores which is ubiquitous in nature and extremally pathogenic causes allergic rhinitis, atopic dermatitis, allergic sinusitis, asthma, aczema, aspergillosis, and others respiratory disorders. The present study will be helpful to such peoples and provides valuable data about the occurrence and composition of such bio pollutant at the bus stand area of Gondpipari city. The investigation will be going to be beneficial to allergologist, dermatologist and clinician for the treatment of allergic disorders and also people will avoid to exposure of fungal spore and other hazardous biocomponent present near concern area of investigation of bus stand.

II. MATERIAL AND METHOD

Gondpipari is tehsil place of district Chandrapur of Maharashtra, India, it has come under Nagpur division of Vidarbha having total area of 748.95 sq.km. and situated 193 meter above sea level with elevation 646 feet, 19.7 North latitude and 79.7 East longitude. The population density of Gondpipari is about 106 per sq.km. The sampling site for the study selected is Gondpipari bus stand which is the only area where thousands of people gathered and consummate their imperative to travel from one to another place effortlessly every day. An aeromycological investigation was done with

an objective to study composition and concentration of fungal spores accountable for allergic ailment of peoples of the area.

The sampling was done by using Rotorod air sampler (Perkins 1957) which was later modified by Harrington (1959). Sampler was run on daily basis at early morning (06:00-07:00am) and evening (05:00-05:30pm) from the month of August 2023 to January 2024. The sampler was kept at the height of 2-3 feet above the ground level and it is run for 30 minutes, for capturing the air bio component appropriate size cut cellophane tape was used coated with petroleum jelly which after exposur to air removed and mounted on clear glass slide using glycerine jelly. The slide was than observed under the light microscope and identification was done with the help of reference slide and standard literature (Barnett and Hunter, 1972).

III. RESULT AND DISCUSSION

During the investigation period of aeromycological survey of bus stand area of Gondpipari of Chandrapur district total 4475 spore/m³ recorded. Total 18 fungal spore species were captured on cellophane tape of Rotorod sampler representing 3 group of sore type, Zygomycotina (7.6%), Basidiomycotina (7.93%), Deuteromycotina (50.84%) and other types (10.17%) apart from these several form of bioparticle remain unidentified (23.46%). Among all fungal spores deuteromycotina was dominant includes 13 types of fungal spores followed by Basidiomycotina representing 3 fungal species and Zygomycotina 2 fungal spore types. The dominant fungal spores recorded in the deuteromycotina group was Aspergillus (14.41%) followed by Alternaria (7.93%), Cladosporium (5.81%), Biospora (5.47%), Penicillium (4.35%), Curvularia (3.58%), Heterosporium (2.68%), Helminthosporium (2.45%), Sporidesmium and Trichoderma (1.01%). The least contribution of fungal spore of deuteromycotina represented by Trichothecium (0.89%), Fusarium (0.67% and Nigrospora (0.55%). Fungal spores of Zygomycotina are Rhizopus (4.8%) and Mucor (2.79%) whereas Basidiomycotina includes Smut spore (2.79%), Basidiospores (2.68%) and Rust spores (2.46%). (Table-1,2).

During the study other types of bioparticle recorded which is categorise as other types represented by Hyphal fragment (5.59%), Insect part (2.46%), Epidermal hair (1.01%), Pollen grain (0.45%) and Algal filament (0.7%) group of unidentified bio component contribute 23.46% out of total aeromycoflora recorded. Fungal spores are ubiquitous in nature both indoor and outdoor and about 10-15% of people have fungal spores allergenic symptoms (Burge, 2001), which is associated with chronic asthma and acute toxic effect (Su, H.J. et.al 2001, Bush and Portney, 2001). The Curvularia, Aspergillus, Alternaria recorded throughout the survey similar result observed by Singh et.al (1994), Arora and Jain (2003), Mishra et.al. (1991) and Tiwari et.al. (2006), also penicillium and aspergillus was predominant in coastal environment (Peppys 1969) Known to cause allergenic disorders (Khan et. al. 2012). These airborne fungal spores also termed as aero allergens (Sharma 2007, Mishra 1995).

The data of fungal aerospora revealed during the present survey definitely will be helpful to clinicians in proper treatment, diagnosis and management of fungal ailment and the people of Gondpipari will take care from the exposer and incidence of fungal spores in the crowd of peoples in the bus stand area of Gondpipari city.

Table 1: Aeromycofloral profile of bus stand area of Gondpipari city from August 2023 to January 2024.

Sr. No.	Spore type	Spore / Cubic meter of air	% of Individual aerospora from Aug.2023- Jan. 2024
I	Zygomycotina		
1	Rhizopus	215	4.80
2	Mucor	125	2.79
II	Basidiomycotina		
3	Rust spore	110	2.46
4	Smut spore	125	2.79
5	Basidiospore	120	2.68
III	Deuteromycotina		
6	Alternaria	355	7.93
7	Aspergillus	645	14.41

8	Cladosporium	260	5.81
9	Biospora	245	5.47
10	Fusarium	30	0.67
11	Penicillium	195	4.35
12	Nigrospora	25	0.55
13	Heterosporium	120	2.68
14	Helminthosporium	110	2.45
15	Sporidesmium	45	1.01
16	Curvularia	160	3.58
17	Trichoderma	45	1.01
18	Trichothecium	40	0.89
IV	Other Type		
19	Hyphal Fragment	250	5.59
20	Insect part	110	2.46
21	Epidermal hair	45	1.01
22	Pollen grain	20	0.45
23	Algal Filament	30	0.7
V	Unidentified	1050	23.46
Total		4475	100

Table 2: Total number of spores found in each group type

Sr. No.	Spore type	Total no. of spore	Spore/m ³	% of Contribution
1	Zygomycotina	2	340	7.6
2	Basidiomycotina	3	355	7.93
3	Deuteromycotina	13	2275	50.84
4	Other type	5	455	10.17
5	Unidentified	1	1050	23.46
Total		24	4475	100

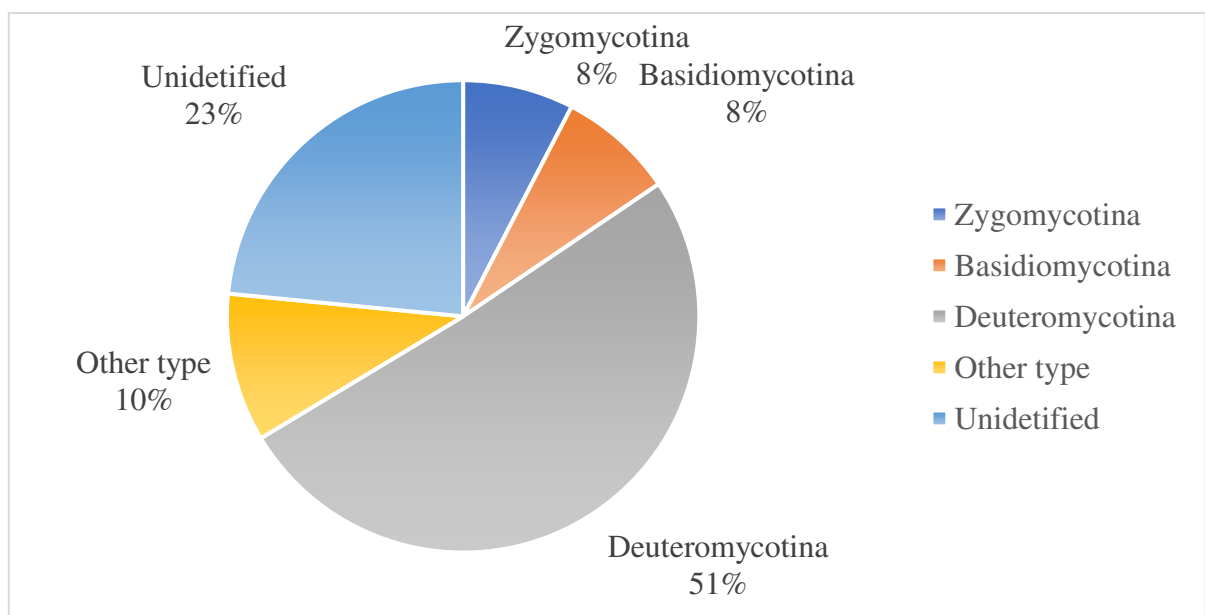


Figure 1: Percentage of contribution of spore type.

IV. CONCLUSION

The present investigation of aeromycoflora reveals that the occurrence and composition of airborne fungal spores are quite high and variable according to meteorological parameters and unhygienically condition in the bus stand area of Gondpipari city. The pathogenic fungal spore like *Aspergillus*, *Alternaria*, *Cladosporium*, *Penicillium*, *Biospora* and *Curvularia* were occur predominantly their concentration and occurrence are highly influence by vegetation, insanitary nearby area of bus stand and climatic fluctuation of temperature, relative humidity and rain fall and others meteorological parameter which directly altered the occurrence of aeromycoflora indoor and outdoor environment.

The present study and the recorded data will provide sufficient information to the people of Gondpipari who travel frequently or weekly at least to take proper remedy and treatment to control their fungal related allergenic ailment, and also research will help the pathologist, clinician, researchers, and other people of related interest.

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