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FUNGI AS BIO-INDICATORS OF AIR QUALITY

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ABSTRACT

Air is most vital component of environment without which nobody can survive. One can survive without food for weeks, for a few days without water, but hardly for few minutes without air. Today it is a well established fact that bacteria, viruses, fungi and pollen grains cause air pollution. These biological agents are called as Biopollutants and presence of biopollutants indicates the air quality. The plants, animals and human beings are affected by air-pollution including biopollution which is responsible for causing diseases besides being allergic to them. Among the Biopollutants, in India 90% of counts of air-borne biota belongs to fungi (Agraval and Shivpuri). With the above view the aeromycoflora of K.T.H.M. College campus, Nashik was carried out for six (6) consecutive months, using Rotorod Air Sampler during the period Aug.2004 - Feb. 2005. A total count of 25 fungal spore types and 4 other types were identified from samples obtained. The average percentage contribution of each spore group is Deuteromycotina (62.85%), Basidiomycotina (21.72%), other types (10.80%), Ascomycotina (2.94%) and Zygomycotina (1.69%). The pathogenic and allergic spores recorded are *Aspergillus, Cladospores ,Rhizopus,Alternaria,Helminthosporium* Smuts, pollen grains, etc.

Key words: Biopollutants, airospora, aeromycoflora.

INTRODUCTION

Nashik is a city of pilgrimage, situated on the banks of river Godavari. Nashik enjoys a very healthy and pleasant climate throughout the year. It is one of the fastest developing city in India. There is a boom of industrialization in Nashik leading to immigration. Increasing industries and population has resulted in environmental pollution. NAAMP (National Air Quality Monitoring Programme) measures the level of abiotic component of pollution. However, the biotic aspect of pollution is untouched. In the present studies an attempt has been made to measure biopollutants. An aerobiological survey of aerofungi has been done in this project. Aero fungi contribute up to 90% to the air-borne biota in India, (Agrawal and Shivpuri).

MATERIALS AND METHODS

Air sampling was carried out by using Rotorod Air Sampler of Parkins (1957). The sampler was operated in the campus of K.T.H.M. College, Nashik twice a week for half an hour at 4 p.m.. The sampling was carried out for a period of six (6) months (from 15th August 2004 to 15th Feb. 2005). The method of sampling, slide preparation and scanning was done as per the method described earlier (Tilak and Srinivasulu, 1967).

The different spore types were identified by comparing with the fungal collection reference books, comparison with standard slides and photographs and by visual identification.

RESULTS AND DISCUSSION

Altogether 25 fungal spore types and 4 other types were identified from samples obtained. Out of 25 spores, 12 spores belong to Deuteromycotina, 9 to Ascomycotina, 3 to Zygomycotina and 1 to Basidiomycotina. 4 other types included Pollen grains, hyphal fragments, insect scales and plant parts.

Table I indicates:-Total Concentration and Percentage Contribution of each Airborne Component.

Among all, *Aspergillus* has the maximum concentration of 29.69%, *Cladosporium* contributed 18.04% *Bispora* contributed 4.60%, *Nigrospora* contributed 2.61%, *Alternaria* 2.64%, Pollen Grains contributed 3.71% and hyphal filaments 2.82% to the total airspora.

Table – 1 : ***Total Concentration and percentage concentration of each airborne component***

	Name of Spore	Concentration	% Contribution
I	Zygomycotina		
	Circinella	550	0.79
	Cunninghamella	170	0.24
	Rhizopus	455	0.66
II	Ascomycotina		
	Bitrimonospora	295	0.42
	Didymosphaeria	120	0.17
	Hypoxolon	200	0.29
	Hysterium	260	0.37
	Leptosphaeria	125	0.18
	Lophiostoma	395	0.57
	Pleospora	155	0.22
	Teichospora	375	0.54
	Valsaria	115	0.17
III	Basidiomycotina		
	Smuts	15075	21.72
IV	Deuteromycotina		
	Alternaria	1830	2.64
	Aspergillus	20610	29.69
	Beltrania	225	0.32
	Bispora	3190	4.60
	Botrydiplodia	55	0.079
	Cladosporium	12525	18.04
	Curvularia	1090	1.57
	Epicocum	140	0.20
	Helminthosporiu	835	1.20
	Nigrospora	1810	2.61
	Pithomyces	725	1.04
	Torula	590	0.85
V	Other Types		
	Hyphal Filaments	1955	2.82
	Insect Scales	1470	2.12
	Pollen Grains	2575	3.71
	Plant Parts	1500	2.16
	Total	69415	100

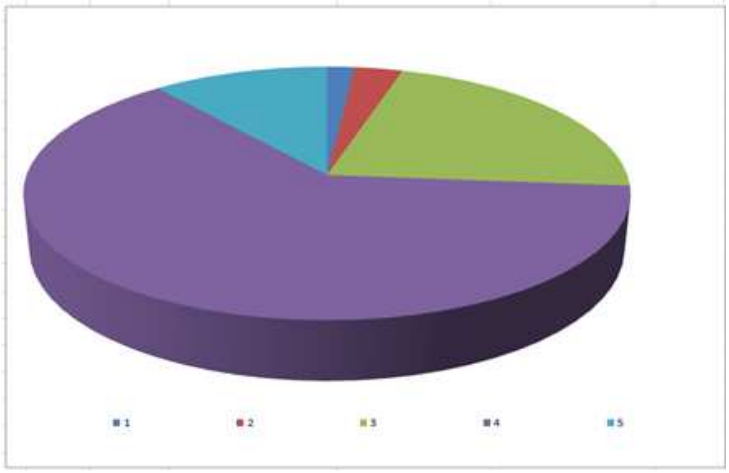
Table II indicates: - Average Percentage Contribution of each spore group.

In this, Deuteromycotina contributed highest percentage (62.85%) to the total airspora followed by Basidiomycotina (21.72%), other types (10.80%), Ascomycotina (2.94) and Zygomycotina (1.69%). It also found that different meterological parameters such as Relative humidity, Temperature and rain fall have performed impact on incidence of aero-fungi. Most of the fungal forms and pollen reported were formed to be allergenic. Prominent among them are *Aspergillus*, *Cladosporium*, *Rhizopus*, *Alternaria*, *Nigrospora* and pollen grains causing aerobiolopollution, hence presence of above spores and pollen grains are the bioindicators of air quality (E.Bricchi, G.Mincigrucci, G.Frenguelli, O. Lannotti).

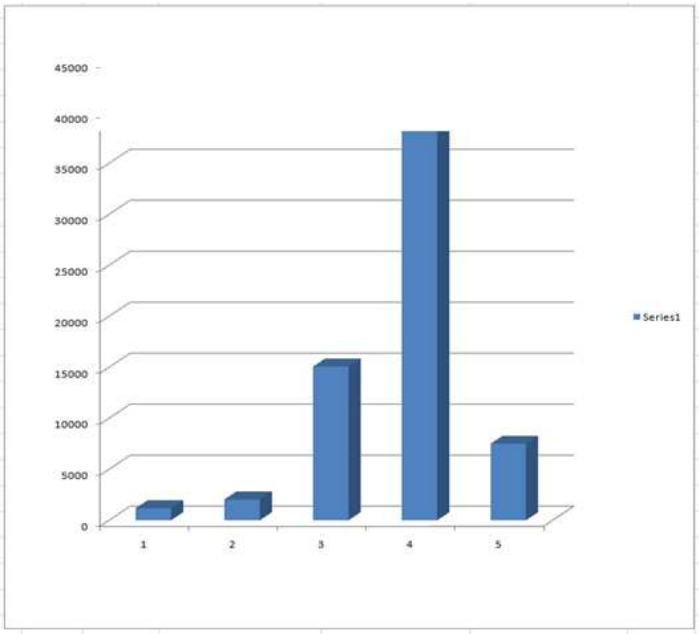
Table – II : ***Percentage Contribution of each airborne component***

I	Zygomycotina	1175	1.69
II	Ascomycotina	2040	2.94
III	Basidiomycotina	15075	21.72
IV	Deuteromycotina	43625	62.85
V	Other Types	7500	10.80
	Total	69415	100

Thus it may be concluded that the ambient air of Nashik unknowingly has plenty of bio-particles with distinct morphological and seasonal variations. Some of them are reported as allergens and pathogens to plants, animals and human beings. Hence, the pace of deterioration of our environment is breath taking and the science of survival is trying hard to awaken mankind to face future challenges.



Percentage Contribution of each spore group to the total airspora.



Histogram Indicating Percentage Contribution of each spore group to the total airspora.

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