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ATMOSPHERIC FUNGAL SPORES AT RAIPUR IN THE CONTEXT OF RESPIRATORY ALLERGY

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ABSTRACT

The incidence of fungal spores and hyphal fragments in the atmosphere of Raipur at Shankar nagar was monitored for a year from November 2012 – October 2013. Vertical cylinder trap method was employed for monitoring. Based on analysis of the catches over the year, a total of 27, 046 fungal spores/sq cm of trap surface was obtained. Altogether 20 spore types were recognized whose numbers formed 89% of the total catch, of which *Cladosporium, 'aspergilli', Nigrospora, Alternaria, Periconia, Curvularia,* 'urediniospores', 'ascospores', *Neovossia,* 'smut spores', *Tetraploa* were the significant types. There was greater incidence during January-March, with a peak in February. Most of the dominant spore types as well as hyphal fragments occurred in quantity during this period.

KEYWORDS: Raipur atmosphere, Fungal spores, Respiratory allergy.

The emanations of fungi form a major component of the bioparticles in the air. In a comprehensive review, Agarwal and Shivpuri (1974) discussed the maladies of human being that may result from the inhalation of the airborne fungal emanations. Sreeramulu (1967) and Chanda and mandal (1978) reviewed the available literature and showed the diversity and richness of airborne fungal spores in Indian environment. The allergenicity of fungal spores encountered in the atmosphere of Pune was studied by Yeole *et al.* (1984). Nair *et al.* (1986) included the information obtained on the airborne fungal spores of different regions of India. Evidently the information on the local atmospheric fungal spores forms a baseline data for the diagnosis and treatment of allergic diseases that occur in that region. In the present investigation the mycoflora in the air of Raipur was monitored for a year and the observations on the relative abundance and seasonal occurrence of different fungal spore types are presented.

MATERIALS AND METHODS

Air monitoring was carried out during November, 2012 October 2013 with vertical cylinders. The methods developed by Ramalingam (1968) and Subba Reddi (1970) were followed in the preparation and exposure of cylinders. A glass cylinder of 0.53 cm diameter carrying 18 mm sticky cellophane strip was exposed daily at about 1600 hour in a holder protected from rain by a circular galvanized plate (Fig. 1). The sampling unit was installed on the roof of a residential building 10 m high in the Shankar nagar colony. The cellophane strip exposed for 24houred was mounted on a microscope slide and scanned across the stagnation line. The spores encountered were indentified on the basis of such characters as colour, shape, septation, ornamentation, appendages, etc. following the standard descriptions given by Ellis (1971 & 76) and Subramanian (1971) and counted. The spore counts were expressed as number per square cm of the trap surface.

The monthly data of temperature and rainfall were collected from Meteorological M.E.T. observatory, Raipur located a km away from the west of the study site.

RESULTS AND DISCUSSION

The prevailing temperature at Raipur varied between 18 and 36^0C and there was rainfall in most of the months (Fig. 2). The fairly high temperature prevailing throughout the year coupled with rainfall naturally promoted a good growth of vegetation and the accumulation of organic matter supporting luxuriant growth of fungi. Trapping through vertical cylinders over 12-month period, an estimated total of 27, 146 fungal spores per sq cm was obtained. It was possible to identify as accurately as possible 89% of the total catch, most of which belonging to Deuteromycetes. Among the 22 spore types identified, *Cladosporium* a ubiquitous saprophytic fungus, came out as the principal type with a contribution of 27.16% to the total spore catch (Table). The second dominant type was 'aspergilli' with a contribution of 13.00%. The other spore types that occurred in quantity included *Nigrospora* (11.4%). *Alternaria* (7.53%), *Periconia* (6.15%), *Curvularia* (5.14%), *Drechslera* (3.6%) 'uredinispores' (2.79%),

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'ascospores' (2.18%), *Neovossia* (2.18%), 'smut spores' (1.86%), *Tetraploa* (1.61%). etc.

The spore type *Cladosporium* has been reported repeatedly as the most common constituent of the airspora in different parts of the world including India, and has earned the status of 'Universal dominant' to use the expression of Prince and Meyer (1976). The second dominant type was 'aspergilli' which mostly consisted of the genera *Aspergillus* and *Penicillium.* In India, few studies which attempted to delineate the two genera in the aeromycoflora showed that *Aspergillus* is more prevalent than *Penicillum* (Rati and Ramalingam 1976, Subba *et al.* 1964, Agrawal *et al.* 1969). It is therefore presumed that a similar situation may occur at Raipur. This type is also known to be more frequent in urban areas than in rural areas (Richardes 1956, Subba Reddi 1970, Bajaj 1978). *Nigrospora,* third in abudance order, is a fairly common fungus in the tropis and has been found growing profusely on senescent and decaying leaves of Poaceae species. The spores are violently and effectively discharged into the ambient air (Webster 1952, Meredith 1961). Atluri *et al.* (1987) reported this fungus as being dominant over rice fields. Since rice is the major crop grown in both kharif and rabi season around Raipur, the relatively high incidence of *Nigrospora* can be expected. *Alternaria,* fourth in order of abundance, has been reported as number one in the United States of America (Morrow *et al.* 1964). In India, its frequency is rather high in Northern parts then in the South (Nait *et al.* 1986). A simultaneous survey using both cultural and visual means, may throw light on this differential frequencies of *Alternaria.*

Table: Prevalence order and percentage contribution of fungal spore types of the total spore flora

S.No.	Spore type	Yearly total	% contribution
1.	Cladosporium	7374	27.16
2.	Aspergilli	3529	13.00
3.	Nigrospora	3056	11.40
4.	Alternaria	2043	7.53
5.	Periconia	1669	6.15
6.	Curvularia	1394	5.14
7.	Drechslera	979	3.60
8.	Urediniospores	757	2.79
9.	Ascospores	592	2.18
10.	Neovossia	591	2.18
11.	Smut spores	506	1.86
12.	Tetraploa	436	1.16
13.	Corynespora	252	0.93
14.	Pleospora	151	0.56
15.	Basidiospores	150	0.55
16.	Chaetomium	143	0.53
17.	Albugo	122	0.45
18.	Bispora	111	0.41
19.	Cordana	61	0.22
20.	Beltrania	21	0.08
	Unidentified	3065	11.29
	Total	27146	100.00
	Hyphal fragments	965	

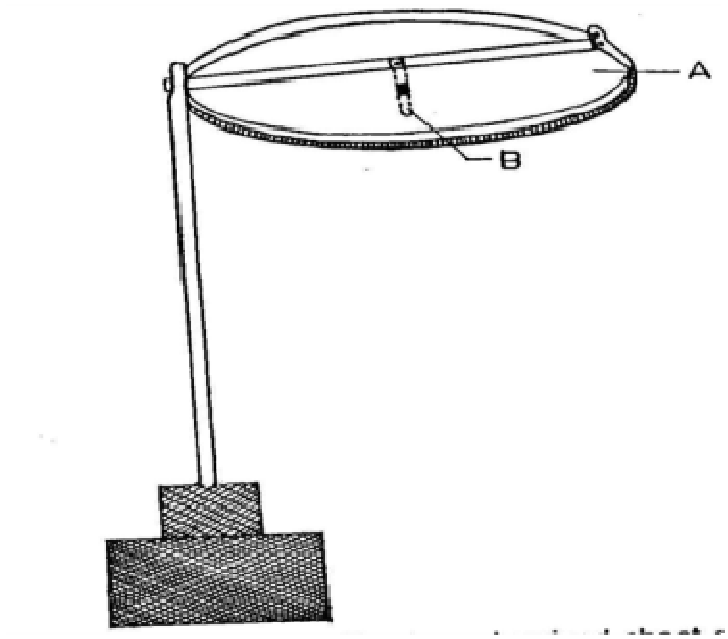

Figure 1: Spore trapping device. A=Circular galvanised sheet acting as a shelter for glass rod; B=0.53cm diam glass rod arranged vertically beneath the circular sheet.

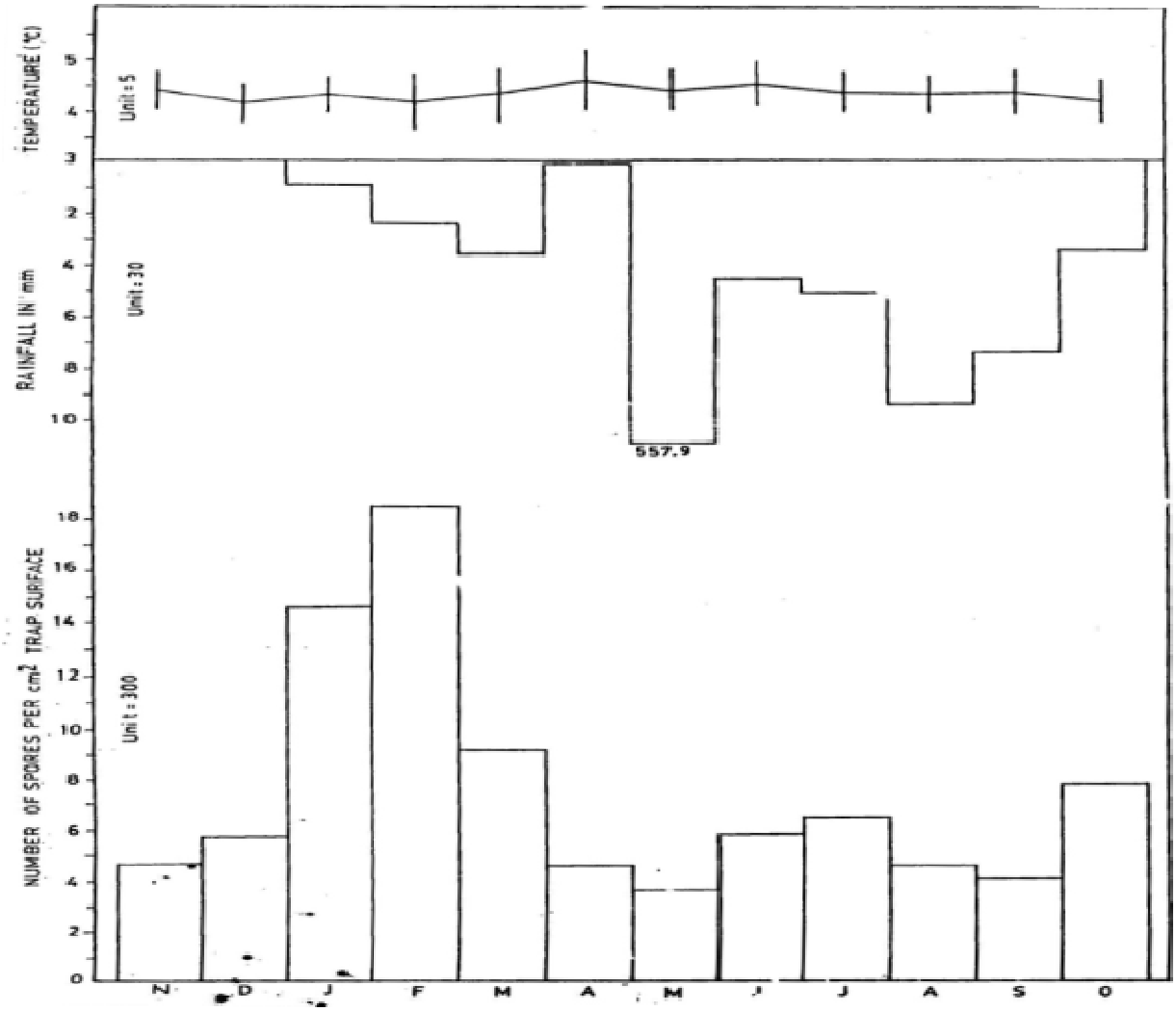

Figure 2: Monthly distribution of weather parameters

REFERENCES

Bajaj A., 1978. Study of viable spores in air at two different sites of Nagpur. J. Palynol., **14:** 136-149.

Chanda S. and Mandal S., 1978. Aerobiology in India with reference to respiratory allergy. International Aerobiology News Letter (Special Issue), November **8**:7-13.

Ellis M.B., 1976. Dematiaceous Hyphomycetes, Commonwealth Mycological institute, Kew, England.

Meredith D.S., 1961. Atmospheric content of *Nigrospora* spores in Jamaican banana plantations, J.gen. Microbiol., **26:**343-349.

Nair P.K.K., Joshi A.P. and Gangal S.V., 1986. Airborne pollen spores and other plant materials of India – A survey, CSIR Centre for Biochemicals, Delhi.

Prince H.E. and Meyer G.H., 1976. An up-to-date look at the mold allergy. Ann. Allergy, **37:**18-25.

Rati E. and Ramalingam A., 1976. Airborne aspergilla at Mysore. Aspect of Allergy and Applied Immunology, **9:**139-149.

Srivastava S.K. and Shukla D.S., 1970. A volumetric investigation of airspora of Balrampur city. Ind. J. Aerobiol., **3:**26-31.

Yeole T.Y., Sarnaik S. and Godbole S.H., 1984. Allergenicity of fungal spores found in Pune atmospheric. Biovigyanam, **10:**7-12.