RESEARCH ARTICLE

Preliminary Aerospora survey at outdoor and indoor environment in western part of Nagpur region

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ABSTRACT

Preliminary aerospora survey at outdoor and indoor environment in western part of Nagpur region was carried out for the period of three months viz, August 2013 to October 2013. The survey was conducted using rotorod air sampler. Data was analysed and identified qualitatively by using standard literature. Fungal spores viz. *Alternaria, Aspergillus ,Curvularia, Helminthosporium*, *Nigrospora, Cladosporium* uredospores, smut spores and pollen grains belonging to families like Poaceae, Asteraceae, Amaranthaceae, Mimosaceae were prominently observed along with other types. Further identification and quantitative analysis is in progress.

Key words: aerospora, outdoor environment, indoor environment, qualitative analysis.

INTRODUCTION

Aerobiology is a branch of biology that studies organic particles, such as bacteria, fungal spores, very small insects, pollen grains and viruses, which are passively transported by the air (Spieksma, 1995). Aerobiologists have traditionally been involved in the measurement and reporting of airborne pollen and fungal spores as a service to allergy sufferers (Larsson, 1993). The importance of biopollutants as a major cause of outdoor and indoor air has been recognised. Much work is being done on the study of airborne fungal spores and pollen grains and its impact. The airborne fungal spores are important in the etiology of respiratory disorders (Bajaj, 1998; Durham, 1998; Verma and George, 1997). They have been recognized to cause asthma, allergic rhinitis, skin disorders, and other allergic diseases. The airborne fungal spore shows great variation in composition and concentration from place to place and from time to time. Hence aeromycological study with different views is being continued (Khilare and Chitnavis , 2002; Agashe.*et.al* 2002, Tilak , 2009).The present outdoor and indoor investigation was undertaken to study the extramural and intramural aerobiopartical of western part of Nagpur city. This will render valuable information regarding the concentration and composition of the bioparticales in the air.

MATERIAL AND METHODS

The air monitoring was carried out for a period of three months viz. August 2013 to October 2013 in western part of Nagpur city by using "Rotorod Air

Sampler" outdoor and indoor samples were collected daily for the said period from morning 7 a.m. to evening 6 p.m. for 30 minutes each. Slides were prepared and scanned and spores were identified qualitatively. Daily temperature, humidity and rainfall were recorded during the survey.

RESULT AND DISCUSSION

The present outdoor and indoor aeromycological survey carried out for three month by using rotorod air sampler. Data was analysed qualitatively by using standard literature (Barnett, 1960; Tilak, 1989). Fungal spores viz. *Alternaria*, *Aspergillus, Curvularia, Helminthosporium*, *Nigrospora,* uredospores, smut spores and pollen grains belonging to families like Poaceae, Asteraceae, Amarantaceae, Mimosaceae were prominently observed along with other types. Preliminary aerospora survey in which the most common fungi identified in indoor and outdoor environments include *Aspergillus, Penicillium, Cladosporium, Aureobasidium* and Basidiomycete species and these have seasonal spore releasing patterns (Bush and Portnoy, 2001). Most of the studies have shown that the most common spores belong to *Cladosporium, Botrytis, Ustilago, Alternaria, Epicoccum, Erysiphe, Entomophthora, Torula, Stemphylium* and *Polythrincium* species and peak spore counts range anywhere between 1 000 – 10 000 000 spores per m-3 (Nikkels *et al.,* 1996). The most dominant fungus identified with the highest airborne concentrations in the majority of other studies include *Cladosporium* species during the spring and summer months (Comtois and Mandrioli, 1996; Nikkels *et al.,* 1996; Pelizzari, 1996), however during the winter months *Penicillium* and *Aspergillus* species were often predominant indoors (Cosentino and Palmas, 1996; Meriggi *et al.,* 1996; Pasanen *et al.,* 1997; Katz *et al*., 1999). Furthermore, a number of these genera, in particular *Cladosporium*, *Penicillium* and *Alternaria* have also been shown by a number of investigators to settle in high concentrations in mattresses, carpet, the bedroom, and living areas of indoor environments (Benguin, 1995; Benguin and Nolard, 1996; Cosentino and Palmas, 1996; Pasanen *et al.,* 1997). The most abundant fungi that are reflected in spore counts include *Cladosporium, Penicillium, Aspergillus, Paecilomyces, Alternaria, Trichoderma, Ulocladium, Stachybotrys, Fusarium, Aureobasidium,* Phialophora, Wallemia, Acremonium and Rhodotorula species (Levetin *et al*., 1995; Cole *et al*., 1999; Wedner *et al*., 1999; Ren *et al*., 2001).

However, numerous other fungal spore types, such as those belonging to Basidiomycetes are also abundant (Kramer *et al*., 1959). In a survey of airborne fungal spores at Dehra Dun, India, Singh and co-workers (1987) demonstrated that the most prevalent fungi belong to *Cladosporium, Alternaria, Curvularia,*

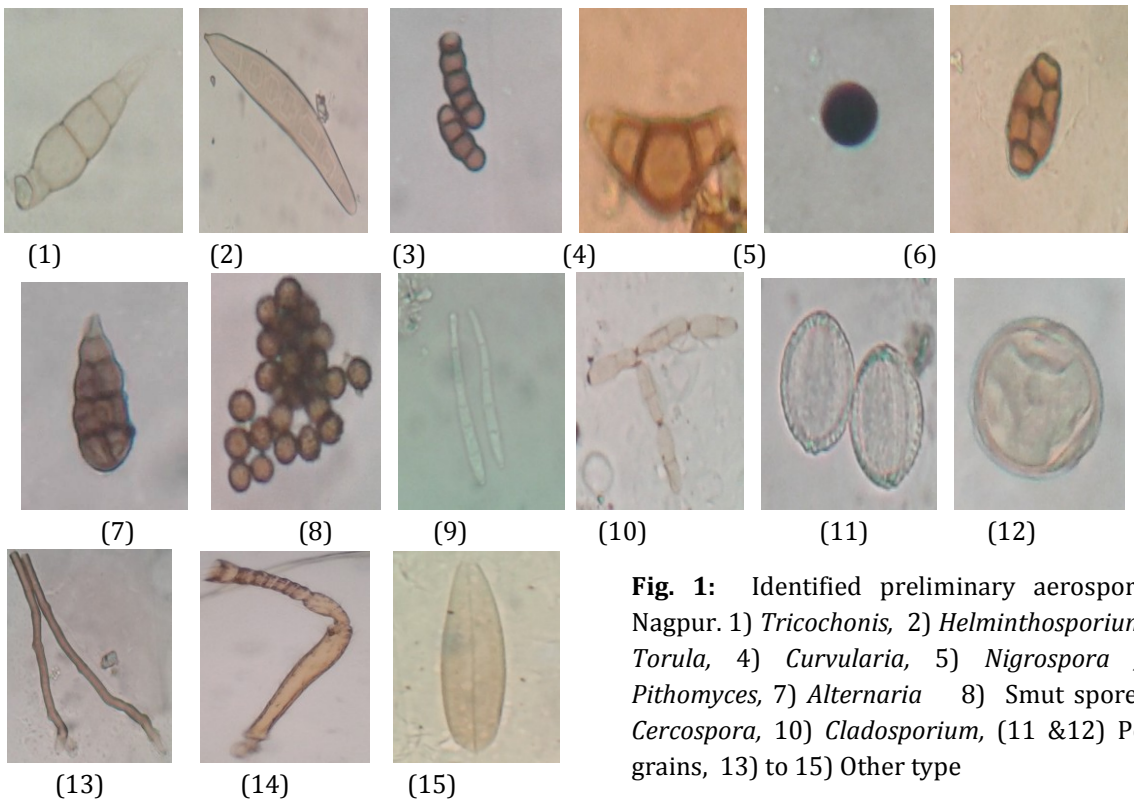

Fig. 1: Identified preliminary aerospora of Nagpur. 1) *Tricochonis,* 2) *Helminthosporium,* 3) *Torula,* 4) *Curvularia,* 5) *Nigrospora* , 6) *Pithomyces,* 7) *Alternaria* 8) Smut spores, 9) *Cercospora,* 10) *Cladosporium,* (11 &12) Pollen grains, 13) to 15) Other type

Aspergillus, Penicillium, Dreschera, Chaetomium and *Epicoccum* species with July through to October identified as the period of greatest spore concentrations. However, in Taiwan and Japan, the predominant fungal genera are restricted to only a handful of fungal spore types including *Cladosporium, Aspergillus, Penicillium* and *Alternaria* species (Su *et al*., 2001; Ara *et al*., 2004). Other common outdoor genera that have been identified include *Alternaria, Ustilago*, *Epicoccum,* and Botrytis species (Hasnain *et al*., 1985; Bass and Morgan, 1997; Mitakakis *et al.,* 1997; Rutherford *et al*., 1997; Mitakakis and Guest, 2001).

CONCLUSION

Aerobiological survey for the period of Aug 2013 to Oct 2013 month recorded fungal spores viz. *Alternaria, Aspergillus, Curvularia, Helminthosporium, Nigrospora, cercospora, cladosporium,* uredospores, smut spores and pollen grains belonging to families like Poaceae, Asteraceae, Amaranthaceae, Mimosaceae were predominantly found in the air with other forms. Such studies where carried out continuously and will also be helpful for allergy patients, allergologist, agriculturist, plant pathologist and related worker in the field. Further continuous air sampling and studies are in progress.

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