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***Research Article***

# A COMPARATIVE STUDY OF AEROMYCOFLORA IN DIFFERENT LOCALITIES OF TIRUPATI, ANDHRA PRADESH

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## ABSTRACT
An aeromycological study was conducted from three different localities of Tirupati. A total of 14 genera and 26 species were observed from all localities. *Aspergillus* species were dominant fungal species in all three localities. A site wise analysis has shown that *Aspergillus fumigatus, Aspergillus flavus*, *Alternaria alternata* and *Curvularia lunata* were common species observed at all localities. A maximum number of aeromycoflora (18 species) were identified in Tirupati market area followed by Tirupati bus stand area (14 fungal species) and Sri Venkateswara University campus (9 species). A higher number of fungi was recorded during monsoon season when compared to the summer and winter seasons.

***Key Words****: Aeromicroflora, Seasonal Variations*

## INTRODUCTION
In view of increasing environmental pollution the surveys of the airmicroflora of cities have assumed great significance. Recent scientific reports indicated that the environment is full of variety of dangerous fungal propagules comprising allergens, phytopathogens and saprophytes (Chaubal and Kotmire, 1985; Bajaj, 1978 and Mishra and Bhandari, 2006) Airborne fungi are considered to act as indicator of the level of atmospheric bio-pollution. The presence of fungal spora, volatile and mycotoxins in the air can cause health hazards in all segments of the population (Kakde*et al*., 2001) Airborne fungal spores are ubiquitous in nature. Much of our knowledge on the behavior of airborne spores comes is gained from various studies on the epidemiology of plants, animals and human diseases, especially infections of the respiratory tract and allergy. More than 80 genera of fungi have been associated with respiratory tract allergy (Horner *et al.,* 1995). Most of the allergenic fungi are classified under Ascomycetes and Dueteromycetes and a few in Basidiomycetes (Kurup *et al*., 2000). Some genera of airborne fungal spores such as *Alternaria, Aspergillus* and *Cladosporium* are found throughout the world. Number and type of fungi vary with time of day, weather and seasonal fluctuations, condition of the surrounding areas, climatic conditions and the presence of a local source of spores (Pepeljnjak and Segvic Klaric , 2003).
Concentration of airborne fungi has been studied in the extramural and indoor environments in India and abroad (Vittal and Krishnamurti, 1988). It is noteworthy that information on their occurrence in crowded places is not much available. The places which are inhabited by a large number of human beings and where vegetables, fruits, cosmetics and grocery items are accumulated contain enormous numbers of fungi. Spoilage of stored vegetables and food materials play an important role in determining the number and nature of fungi present in the air. The relationship between occurrence of fungi and the place buzzing with human activities has already been established by Sullia and Khan (1980).Therefore a study on the occurrence of aeromycroflora of Tirupati market area, Tirupati bus stand and SV University campus.

## MATERIALS AND METHODS
In the present study, for analysis of the aeromycoflora, three different localities were selected, viz., SVU Campus, Tirupat market area and Tirupati bus stand area and. The study was carried out in spring (March-May), monsoon (August- October) and winter seasons (November -January) in 2009.The cultural plate exposure method was adopted for trapping the mycoflora. Rose Bengal Agar (Martin, 1950) was used as cultural medium. 10 ml of sterilized medium was aseptically poured in petridish (10 cm diam.)

and allowed to jellify. These petri dishes were then exposed for five minutes at 6mtrs above the ground level at above mentioned sites. The study was conducted two times in a day, i.e. 6.00 A.M and 6.00 P.M and three times in each season at an interval of 15 days period. The exposed petri dishes were incubated in the laboratory for one week at $28^0$C. Three replicates were maintained for each experiment. The fungal flora was isolated and identified. The results were recorded separately for different localities and seasons.

## RESULTS AND DISCUSSION

A total of 14 genera and 26 species were observed from all localities (Table- 1). *Aspergillus species* were dominant when compared to other fungal species. A majority of these fungi were members of Deuteromycotina and only three were identified as Mucorales( *Mucor recemosus, Rhizopus stolonifer* and *Rhizopus oryzae* ). A site wise analysis of Tirupati (Table -1) has revealed commonality of viz. *Aspergillus fumigatus , Aspergillus flavus, Alternaria alternata and Curvularialunata* at all localities. A maximum number of aeromycoflora (21 species) were observed in Tirupati market area, 15 fungal species in Tirupati bus stand area and lowest number (11species) in SVU campus.

**Table 1: Occurrence of fungi on different localities and seasons in Tirupati**

| S. NO. | Name of the fungi | SVU campus | | | Tirupati Market area | | | Tirupati bus stand area | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | S | M | W | S | M | W | S | M | W |
| 1 | ***Aspergillus candidus*** | - | - | - | + | + | + | - | - | - |
| 2 | ***Aspergillus fumigatus*** | - | + | - | + | + | + | - | + | - |
| 3 | ***Asperigillus niger*** | - | - | - | + | + | + | + | + | + |
| 4 | ***Aspergillus parasiticus*** | - | - | - | + | + | - | + | + | + |
| 5 | ***Aspergillus sydowi*** | - | - | - | - | + | - | + | + | - |
| 6 | ***Aspergillus flavus*** | + | + | - | - | + | - | + | - | - |
| 7 | ***Alternaria alternata*** | + | + | + | + | + | - | + | + | + |
| 8 | ***Absidia glauca*** | - | + | - | - | + | - | - | - | - |
| 9 | ***Alternaria spp.*** | - | - | - | + | + | + | - | + | - |
| 10 | ***Cephalosporium spp.*** | - | - | - | - | - | + | - | - | + |
| 11 | ***Chaetomium globosum*** | - | - | - | - | - | - | - | + | - |
| 12 | ***Cladosporium herbarum*** | + | + | + | - | + | - | - | - | - |
| 13 | ***Cladosporium oxysporum*** | - | - | - | + | + | - | - | + | - |
| 14 | ***Cunninghamella spp.*** | + | + | - | - | + | - | - | - | - |
| 15 | ***Curvularia geniculata*** | - | + | - | - | + | - | - | - | - |
| 16 | ***Cuvularia lunata*** | + | + | + | + | + | - | - | + | - |
| 17 | ***Drechslera specifera*** | - | - | - | + | + | + | - | - | - |
| 18 | ***Drechslera rostrata*** | - | - | - | - | - | - | - | + | - |
| 19 | ***Fusarium oxysporum*** | - | + | - | - | - | - | - | - | - |
| 20 | ***Fusarium solani*** | - | - | + | - | - | - | - | - | - |
| 21 | ***Fusarium moniliformae*** | - | - | - | - | - | - | - | + | - |
| 22 | ***Helementhosporium spp.*** | - | - | - | + | + | + | + | - | - |
| 23 | ***Mucor racemosus*** | - | - | - | - | + | - | - | + | - |
| 24 | ***Penicillium nigricans*** | - | - | - | - | + | - | - | - | - |
| 25 | ***Rhizopus stolonifer*** | - | - | - | + | + | + | - | - | - |
| 26 | ***Rhizopus oryzae*** | - | + | - | - | + | - | - | - | - |

*S = Indicates Summer season; M= Indicates Mansoon; W=Indicates Winter season.*
*+ =Indicates Presence of species; - =Indicates Absence of species*

The seasonal variation in the aeromycoflora (Table-1) has shown that fungal species *Aspergillus candidus, Aspergillus fumigatus , Aspergillus flavus, Aspergillus parasiticus, Aspergillus niger, Alternaria alternata, Curvularialunata, Cladosporiumoxysporum Drechsleraspecifera, Heleminthosporiumsp* and *Rhizopus stolonifer etc.,* were identified throughout the year but *Cephalosporium* spp. was recorded only in winter season.

Occurrence of a largest number of fungi during monsoon period has also been observed in the past (Ramalingam, 1971; Bhati and Gaur, 1979; Rajivekumar; 1984 and Chauhan *et al.,* 1992). This is may be due to the increase in humidity and other favourable conditions for fungal multiplication growth and development during the rainy seasons. A higher count of most of the fungal spores in the market area may be because of availability of decaying and rotting vegetables and other food materials. Garbage heaps also provide a safe breeding ground for various fungi. Consequently these fungal spores are translocated to the air. Main sources of fungal spores are the market and surrounding area, where the food material and vegetable matters and other garbage are thrown by the visitors. The vegetative population around and the leaf litters accumulated beneath could functions as host for the plant pathogenic and saprobic fungi. Impact of airborne fungal spores including their release, dissemination, deposition and effect is of great significance to identify the health hazards and physiological disorders in living beings.The allergenic nature of *Aspergillus, Alternaria, Cladosporium, Curvularia and Penicillium* , etc., has already been established. Effective disposal of solid waste may improve the air quantity of the market area. The air current plays an important role in sweeping the aeromicroflora and making them more pure. The spores of deuteromycetes were the largest contributors of the total airborne fungal spores. Monitoring of airborne fungi can be helpful in prevention of fungal allergic diseases. Presence of less number of aeromycoflora isolated from the air at bus stand and SVU campus may be attributed to the fast air current all the time and absence of decaying food and vegetables and other organic matters.

***Conclusion***

Study of this kind is interdisciplinary in nature and has tremendous scope to find the significant application in human health. The spores in air are the representatives of the members of microorganisms growing in that habitat. In this context, this study shall certainly enlighten the scientists and planners to make a better environment. Some pathogenic and harmful microorganisms can be detected through this study and methods may be developed to eradicate them.

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