

RESEARCH ARTICLE

AEROMYCOLOGICAL SURVEY OF PIMPRI-CHINCHWAD AREA, PUNE

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ABSTRACT:

Airborne particles of biological origin are mainly consisting of fungal spores, pollen, bacteria, viruses, algal filaments, epidermal hairs, plant fragments etc. Fungi are among the most important aero-allergens. Fungal spores constitute a significant fraction of air-borne particles. Extramural aerobiological research includes aeromicrobial survey at various places like College campus, Bus stand, Railway station, Garbage depot, crop fields etc.

The present study was carried out for a period of two years (2010-2012) to identify culturable fungi in urban environment and to study the variation in their concentration at four different sites. In the vegetable markets of metropolitan cities, rotten vegetables and fruits, gunny bags, paper bags, packing materials, straw, discarded leaves and stems forms the main substrates for the growth of airborne fungi. Hence petriplate exposure experiments were conducted in Pimpri vegetable market nearby slum for the afore-said period.

Volumetric information on the culturable molds present in the air of different sites was collected by exposing petriplates at four different sites in study area. Not all genera recorded on the cellotape were found growing on culture plates but only 26 culturable genera were recorded. The genera such as *Aspergillus*, *Penicillium*, and *Trichoderma* were precisely identified by their cultures. The maximum contributor of the aerospora in 2010-2012 was *Cladosporium* sp.1 with 8.79% contribution followed by *Aspergillus* sp.1 (6.15%) and *Helminthosporium* (5.79%). In second year, *Cladosporium* with 6.58% contribution tops the rank and it was followed by *Helminthosporium* (5.38), *Aspergillus* sp.1.(4.90) and *Alternaria* sp. 1with 4.47% contribution.

Key words: Aerospora, fungal spores, Pimpri-Chinchwad.

INTRODUCTION

Aerobiology is a scientific and multidisciplinary approach focused on the biodiversity of biologically significant materials. Airborne particles of biological origin are mainly consisting of fungal spores, pollen, bacteria, viruses, algal filaments, epidermal hairs, plant fragments etc. They occur in varying concentration in the atmosphere depending on climatic factors, location (Indoor or Outdoor), altitude and proximity to large or small waterbodies. When dispersed in air they are known as aerosols.

Extramural aerobiological research includes aeromicrobial survey at various places like College campus, Bus stand, Railway station, Garbage depot, crop fields etc. The present study was carried out to identify culturable fungi in urban environment and to study the variation in their concentration at four different sites. In the vegetable markets of metropolitan cities, rotten vegetables and fruits, gunny bags, paper bags, packing materials, straw, discarded leaves and stems forms the main substrates for the growth of airborne fungi.

A residential area having closely aggregated houses and a site in industrial area having food processing industries in the vicinity was also selected for trapping culturable fungi from the air.

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MATERIALS AND METHODS

As a part of extramural study, Petriplate exposure methods was used to know the status of culturable airborne fungi at different experimental sites in the study area.

Petriplates containing Potato Dextrose Agar as a culture medium (P.D.A.) were exposed at four different sites. The sites were Sector A., Sector B, Sector C and Sector D.

Petriplates containing Potato Dextrose Agar as a culture medium were exposed 1 m above the ground level once in a month for 15 minutes. The petriplates after exposure were incubated at laboratory temperature for 5-7 days till sporulation. The fungal forms were identified and isolated to obtain pure cultures. The fungal colonies were counted. Identification of fungal colonies up to generic level was done on the basis of colony characteristics, growth pattern and morphology of fungal spores and was subsequently confirmed with the help of relevant literature (Gilman 1957, Barnett 1991, Ellis 1971 and Subramanian 1971).

At the time of petriplate exposure, about 30 ml of sterilized medium was poured quickly under aseptic conditions in each petriplate (Size- Lid O.D.x height mm. 100 x 15 and Base O.D.x Total height mm 94 x 17.). Petriplates containing medium were covered with lid.

Occurrence of culturable fungal colonies was correlated with meteorological factors such as rainfall, relative humidity and temperature. Meteorological data for the period of study was collected from Meteorological Department, Simla office, Pune.

RESULTS AND DISCUSSION

As a part of extramural aerobiological study, volumetric information on the culturable molds present in the air of different sites was collected by exposing petriplate at four different sites in study area. Not all genera recorded on the cellotape were found growing on culture plates but only 26 culturable genera were recorded. The genera such as *Aspergillus*, *Penicillium*, and *Trichoderma* were precisely identified

by their cultures which otherwise would have remained ignored or grouped under *Aspergilli*.

A group wise list of fungal taxa identified from the exposed petriplates at different sites has been mentioned in alphabetical order

Zygomycotina

1. *Cunninghamella sp.*
2. *Mucor sp.*
3. *Rhizopus sp-1*
4. *Rhizopus sp-2*
5. *Rhizopus sp-3*

Ascomycotina

6. *Chaetomium*

Deuteromycotina

7. *Alternaria sp- 1*
8. *Alternaria sp- 2*
9. *Alternaria sp- 3*
10. *Aspergillus sp- 1*
11. *Aspergillus sp- 2*
12. *Aspergillus sp- 3*
13. *Aspergillus sp- 4*
14. *Aspergillus sp- 5*
15. *Cercospora sp.*
16. *Chlamydomyces sp.*
17. *Cladosporium sp-1*
18. *Cladosporium sp -2*
19. *Curvularia sp -1*
20. *Curvularia sp -2*
21. *Drechslera sp -1*
22. *Drechslera sp -2*
23. *Epicoccum sp*
24. *Fusarium sp -1*
25. *Fusarium sp -2*
26. *Fusarium sp -3*
27. *Gleotrichum sp.*
28. *Helminthosporium sp*
29. *Heterosporium sp.*
30. *Humicola sp*
31. *Memnoniella sp.*
32. *Nigrospora sp.*
33. *Paecilomyces sp.*
34. *Papularia sp.*



Site wise 35. total colony count during petriplate exposure at four different sites in 2010-12 revealed that 36. highest colony count (680) was recorded at Sector A with 36.17% contribution followed by Sector B (545 colonies) with 28.98% contribution, Sector C (435 colonies) with 23.13% contribution. The least colony count (220) was recorded at Sector D with 11.17% contribution.

The maximum contributor of the aerospora in 2010-12 was *Cladosporium* sp.1 with 8.79% contribution followed by *Aspergillus* sp.1 (6.15%) and *Helminthosporium* (5.79%). In second year, *Cladosporium* with 6.58% contribution tops the rank and it was followed by *Helminthosporium* (5.38), *Aspergillus* sp.1 (4.90) and *Alternaria* sp. 1 with 4.47% contribution. *Humicola* (0.21%) and *Chlamydomyces* (0.30%) contribution registered as the lowest contributor of aerospora in respective years.

Maximum incidence of *Cladosporium* during monsoon was encountered at Sector B however its incidence during winter and summer season was maximum at Sector A. Maximum incidence of *Aspergillus* during all season was recorded at Sector A. Dominance of *Curvularia* during monsoon and winter was observed at Sector B, whereas during summer season its higher concentration was recorded at Sector A.

However *Aspergillus* sp.1 exhibited somewhat equal distribution in all seasons.

CONCLUSION

In both the years of investigation, the maximum fungal forms were observed at Sector A and minimum at Sector D.

Biocomponents like fungal spores and pollen grains may initiate allergic response to susceptible individuals. Allergic people have an altered capacity to react to potential allergens, being hypersensitive to them, causing several types of eye, skin and respiratory disorders. Airborne infections and the resulting diseases threaten the lives and productivity of human beings, animals and plants. Aerobiology thus not simply means the study of microorganisms in the

atmosphere, but it also take into consideration the allergic properties of various bioparticles like pollen and spores. The results of the present study will be valuable in providing insights to the afore mentioned problems.

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REFERENCES

- Barnett HL and Hunter BB(1972) Illustrated Genera of Imperfect Fungi. Burgess Publishing Company, Minnesota.
- Ellis MB(1971) Dematiaceous Hyphomycetes. *CMI*, Kew .pp: 707.
- Gilman JC(1957) A Manual of Soil Fungi (2nd Edn). The Iowa State College Press, Ames Iowa, pp:401.
- Subramanian CV(1971) Hyphomycetes: an account of Indian species except Cercospora. ICAR Publications, New Delhi, pp: 930.

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