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A COMPARATIVE STUDY OF AEROMYCOFLORA IN THICKLY POPULATED AND LESS POPULATED AREAS OF RAWALPINDI

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Abstract

A comparative study of the aeromycoflora of thickly populasted and less populated areas of Rawalpindi were studied during Feb-April 2000.Agar plate method was used to trap fungal species. The investigation showed variations in number as well as in the composition of fungal species of these areas. Thirty one species belonging to twenty two genera were found in thickly populated areas and Twenty seven species belonging to twenty genera were isolated from less populated areas. Species of *Aspergillus, Alternaria, Curvularia, Cladosporium, Penicillium, Mucor, Rhizopus* and *Helminthosporium* were dominant in the air of both areas. The genera of *Acremonium, Arthobotrys,Geotrichum, Phytophthora, Trichocladium* were found only in the thickly populated areas whereas *Arthoderma, Hormodendrum, Epicocum, Trichothecium* and *Dreschlera* were only present in the less populated areas of Rawalpindi..

Introduction

The variations in composition of aeromycoflora of different areas has been reported by many workers (Barth,1981; Pasanen,1992). Fungal genera *Aspergillus,Alternaria,Curvularia, Fusarium,Helmithosporium,Mucor* and *Penicillium* were found more prevalent components of aeromycoflora of different regions(Samina,1975; Nair *et al.*,1986; Nautiyal and Midha,1978; Kumar,1984; Ali and Salma,1973). Many physical, chemical and biological factors bring about causative changes in composition of aeromycoflora of an area and different fungal species are restricted to that particular areas with specific environmental conditions (Verma,1990; Bajwa *et al.*,1997).

The present study was carried out to investigate the fluctuation in aeromycoflora of thickly and less populated areas of Rawalpindi. This study would help to evaluate the actual status of aeromycoflora of Rawalpindi and provide connective information in various localities within the city. This investigation shows the present situation of aeromycoflora with increased population and status of pollution in different parts of city.

The variations in aeromycoflora can be attributed to a number of factors like. The rapid changing environmental conditions, increasing population, sanitary conditions, local vegetation, industrialization and pollution. (Agarwal,1987; Edmonds et al;1973; Lacey,1990; Harris andBirch,1988).

The comparative study of aeromycoflora is also helpful in forecasting the occurrence of some plant and animal diseases. Many air borne fungi cause mycotic diseases in human beings (Tilak,1987; Edmonds and Benninghoot,1973;Feigin,1983).

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Materials and methods

For the present investigation three thickly populated and three less populated areas of Rawalpindi were selected to isolate the air borne fungi. During the selection of these areas local vegetation, population, number of passing vehicles and pollution in these areas were taken in consideration.

For isolation of aeromycoflora the settling plate method was used (Pleczar and Reid1986; Abro *et al*;1986).Malt extract agar was used as a medium to trap fungal species. The petriplates containing malt extract agar medium were exposed at a height of six feet for five minutes. Three petriplates were exposed at each site.

Exposed petriplates were incubated at 28 C for seven days. Colonies of fungi were counted, calculated and identified following Cook (1963) and Domsch et al;(1980). The various isolates were maintained in pure culture on MEA medium for detailed taxonomic studies.

Results and discussion

During the present investigation a well-marked variation in aeromycoflora of thickly and thinly populated areas of Rawalpindi was found. The species of *Aspergillus, Alternaria, Acremonium, Curvularia, Cladosporium, Penicillium, Mucor, Rhizopus* and *Helmithosporium* were dominant in the air of both areas .The species of *Aspergillus* and *Alternaria* were more prevalent than other genera. Certain fungal species were found restricted to only thickly or less populated areas of Rawalpindi. The fungal genera like *Acremoniun, Arthrobotrys, Geotrichum, Phytophthora* and *Trichocladium* were isolated only from air over thickly populated areas.The fungal genera like *Arthderma, Hormodandrum, Epicocum, Trichothecium* and *Dreschlera* were present only in the air of less populated areas (Table.1.).

Such well marked variations in aeromycoflora of thickly and thinly populated areas of Lahore was also found in the investigation of Bajwa et al; (1995).Fungal genera *Dematium, Epicocum,, Geotrichum,* and *Phytophthora* were isolated from air over less populated areas of Lahore whereas *Candida, Zygorynchus, Trichothecium* were present only in the air of thickly populated areas of Lahore. These variation in components of aeromycoflora of different areas were seem to be due to specific characteristics of these localities regarding local vegetation, population, passing vehicles, air pollution and amount of waste and decaying material present in and around these localities which may directly or indirectly affect the composition of aeromycoflra of an area.

The distinct variations in aeromycoflora of different residential environments was investigated by Pasanen in 1990 while Verma in1990 found that composition of fungal flora was different in urban and rural areas of India. He also observed differences in the outside and inside environments. The studies of many workers revealed that air pollution also affect the aeromycoflra of a locality (Treshow, 1980; Agarwal, 1987).

The variations in composition of aeromycoflora of thickly and thinly populated areas of Rawalpindi could probably attributed to co-existence of concentration of pollutants in the air along with the climatic variations in both areas. Presence of heavy transportation, congested houses and waste and decaying materials in thickly populated areas of Rawalpindi also affect the aeromycoflora. It

could be concluded from present study that aeromycoflora is highly sensitive to environmental factors. Aeromycoflora with a specific urban area quickly responds to change in environmental conditions from locality to locality. The presence of some genera in thickly populated areas of Rawalpindi reveals that these species are highly sensitive to air borne pollutants, therefore unable to survive in commercial areas.

The excessive occurrence of some fungal genera such as *Aspergillus, Alternaria* and *Candida* appears to be cause of allergies and mycotic diseases which have generally increased in the city of Rawalpindi.

***Aeromycoflora* isolated from thickly populated and thinly populated areas of Rawalpindi.**

Fungal species	Number of colonies isolated from thickly populated areas			Number of colonies isolated from less populated areas			Total number of colonies	% Occurance
	RajaBazar	Ratta Amaral	Dhok e hasu	Faisal colony	Valley road	Harley street		
Alternaria alternata	16	12	10	12	8	7	65	11.14
A.brassicae	12	10	7	7	6	4	46	7.89
A.solani	14	8	66	5	2	---	35	6.0
Alternaria spp	10	2	2	4	4	3	25	4.28
Aspergillus alutaceus	12	9	7	4	3	2	37	6.34
A.candidus	10	3	2	3	4	2	24	4.11
A.fumigatus	8	2	4	4	2	2	22	3.77
A.niger	5	4	3	2	1	---	15	2.57
Acremonium	4	3	3	---	---	---	10	1.71
Arthobotrys	2	2	3	---	---	---	7	1.20
Artoderma	---	---	---	2	3	3	8	1.37
Cladosporium	7	6	4	3	3	2	25	4.28
Curvularia palesence	3	4	4	2	2	1	16	2.74
Curvularia spp	4	2	2	---	1	2	11	1.88
Cochliobolus spicifer	2	---	3	---	2	1	8	1.37
Cochliobolus spp	---	3	1	1	2	---	7	1.20
Candida	5	4	3	2	1	2	17	2.91
Denatium	3	2	2	1	2	---	10	1.71
Dreschlera	---	---	---	3	1	2	6	1.02
Epicocum	---	---	---	4	3	---	7	1.20
Fusarium	4	3	2	1	2	2	14	2.40
Geotrichum	4	3	2	---	---	---	9	1.54
Helminthosporium	5	4	3	3	2	3	20	3.43
Humicola	4	3	3	2	---	2	14	2.40
Hormodendrum	---	---	---	2	2	4	8	1.37
Mucor hienalis	6	4	3	3	2	—	18	3.08

Mucor spp	4	2	--	2	3	---	11	1.88
Phoma	2	1	2	--	1	---	6	1.02
Pencillium crysogenum	6	5	4	2	2	3	22	3.77
Pencillium spp	2	1	---	3	1	---	7	1.20
Phytophthora	5	2	2	---	---	---	9	1.54
Rhizopus oryzae	5	4	3	2	---	2	16	2.74
Rhizopus spp	4	2	1	2	3	---	12	2.05
Streptomyces	3	2	---	2	1	---	8	1.37
Trichocladium	2	1	1	---	---	---	4	0.68
Trichothecium	---	---	---	2	---	2	4	0.68
Total	173	113	92	85	69	51	583	

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