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STUDY OF INTRAMURAL AEROMYCOFLORA OF BANJARI TEMPLE

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ABSTRACT

The aeromycoflora depends on the surroundings and existing conditions such as- sources, relative humidity, light intensity, time of day, geographical location and season. A survey of intramural or indoor aeromycoflora of Banjari Temple, Pt. Ravishankar Shukla University campus, Raipur (Chhattisgarh) India, was carried out during summer season from March 2014 to June 2014. For this study gravity petri plate method was done for the isolation of aeromycoflora at monthly intervals. The aim of present study was to evaluate the aeromycoflora of intramural environment of Banjari Temple, Pt. Ravishankar Shukla University campus, Raipur (Chhattisgarh) India. During investigation period total 158 fungal colonies were isolated representing 11 fungal types and 6 genera. The maximum percentage contribution aeromycoflora was showed by *Aspergillus niger* (53.79%) followed by *Cladosporium cladosporioides* (15.18%), *Cladosporium* sp.-I (8.22%) *Aspergillus flavus* (5.69%), *Aspergillus sulphureus* (5.06%) and *Mycelia sterilia* (White) (5.06%).

KEYWORDS: Banjari Temple, Aeromycoflora, Intramural, Fungal spore, Summer season.

Aeromycoflora, defines with the study of airborne fungal spores prevailing throughout the air, and spreads from one place to another place by the mean of air. The massiveness and uniqueness of aeromycoflora depends on the climatic conditions, temperature, relative humidity, light intensity, availability of favorable sources and seasons. The diversification or varied forms of fungal spores leads to a potential health risk in order to respiratory and several other chronic diseases not only in human beings but also in other living entities such as plants, animals. Most of fungal species such as- *Aspergillus candidus*, *Aspergillus niger*, *Aspergillus versicolor, Cladosporium cladosporioides*, *Cladosporium herbarum*, *Penicillium brevicompactum* and *Penicillium chrysogenum* have potentiality to cause allergic reactions, general weakness, wooziness, severe asthma, sore throat, tiredness, headache, eye & sinus irritation in human [15, 3 and 6].

Banjari Temple is situated within the campus of Pt. Ravishankar Shukla University, Raipur. This Temple is famous for its religious importance. Therefore it attracts a huge amount of visitors during the festival time, especially during the Shardiya and Chaitra Navratra Parva. Thus, it becomes a most visited site of the Raipur city and that creates a situation like rush and pollution leading to fungal contamination and thus it affects human health. Therefore this study was taken up to investigate the intramural documentation of fungal species diversity and to aware the health hazard facilitated by airborne pathogenic fungal strains.

MATERIALS AND METHODS

A. Satellite map showing location of the Banjari Temple in Raipur

B. Banjari Temple

Figure1: Sampling site of Aeromycoflora

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Air sampling was done by using gravity petri plate method for the isolation of aeromycoflora [8, 20, 13 and 2]. Five sterilized petri plates containing Potato Dextrose Agar (PDA) media were exposed for 5 to 10 minutes in the sampling site at monthly intervals [17, 7, 9 and 18]. The exposed petri plates were brought into lab and incubated at room temperature for the incubation period. Fungal colonies were counted and identified with the help of morphological characters, microscopic slide and available literature [4, 1 and 19].

ECOLOGICAL STUDIES

The percentage frequency and percentage contribution of aeromycoflora was calculated by the following formula [20 and 6].

$$\text{Percentage frequency} = \frac{\text{Number of observations in which a species appeared}}{\text{Total number of observations}} \times 100$$

$$\text{Percentage contribution} = \frac{\text{Total number of colonies of individual species in all the plates}}{\text{Total number of colonies in all species}} \times 100$$

RESULTS AND DISCUSION

During the summer season, investigation for the intramural occurrence of fungal forms within Banjari Temple was done. Total 158 fungal colonies were recorded. Out of which 11 fungal species belonged to 6 genera. The maximum number of fungal colonies was observed for *Aspergillus niger* (85 colonies), followed by *Cladosporium cladosporioides* (24 colonies), *Cladosporium* sp.-I (13 colonies), *Aspergillus flavus* (09 colonies), *Aspergillus sulphureus* & *Mycelia sterilia* (White) (08 colonies). Maximum number of aeromycoflora or air borne fungal colonies were recorded in the month of March (52 colonies), while minimum number of air borne fungal colonies were observed in the month of June (24 colonies).

Out of total of 158 fungal colonies the Anamorphic group of fungi was found to be prominent as they contributed 142 fungal colony counts, followed by group Mycelia sterilia with 8 fungal colonies and Group Zygomycotina with 2 fungal colonies, the rest 6 fungal colonies were unidentified, which has been sent for identification to National Centre of Fungal Taxonomy (NCFT), New Delhi.

The maximum percentage contribution was showed by *Aspergillus niger* (53.79%) followed by *Cladosporium cladosporioides* (15.18%), *Cladosporium* sp.-I (8.22%), *Aspergillus flavus* (5.69%), *Aspergillus sulphureus* & *Mycelia sterilia* (White) (5.06%), Unidentified sp.-I & Unidentified sp.-II (1.89%), *Cladosporium* sp.-II & *Rhizopus* sp. (1.26%), Whereas *Aspergillus fumigatus* was least abundant with (0.63%).

The most frequent aeromycoflora was *Aspergillus niger* (100%) followed by *Aspergillus flavus*, *Cladosporium cladosporioides* & *Mycelia sterilia* (White) (75%), *Cladosporium* sp.-I (50%), While *Aspergillus fumigatus*, *Aspergillus sulphureus*, *Cladosporium* sp.-II, *Rhizopus* sp., Unidentified sp.-I & Unidentified sp.-II were least frequent (25%).

Aspergillus niger and *Cladosporium cladosporioides* were most dominant aeromycoflora of intramural or indoor of Banjari Temple, the same type of results were also reported by many aerobiological researchers [12, 11, 14].

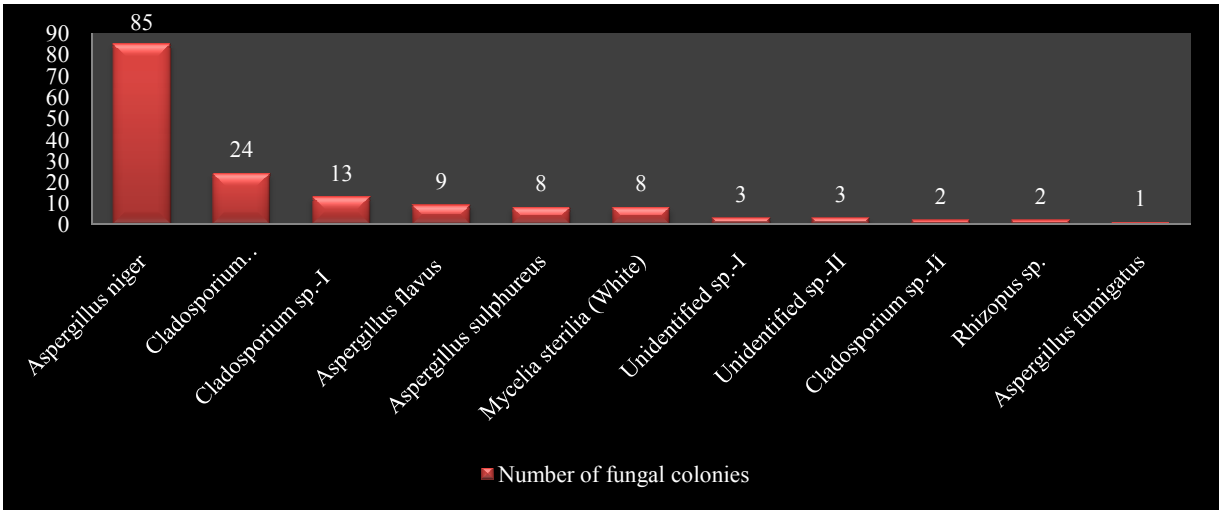
Hence, the most frequent aeromycoflora were *Aspergillus niger* and *Cladosporium cladosporioides* of indoor environment of Banjari Temple, the same type of results were also observed [10 and 21].

Table 1: Aeromycoflora of intramural environment of Banjari Temple, Pt. Ravishankar Shukla, University campus, Raipur (Chhattisgarh) India

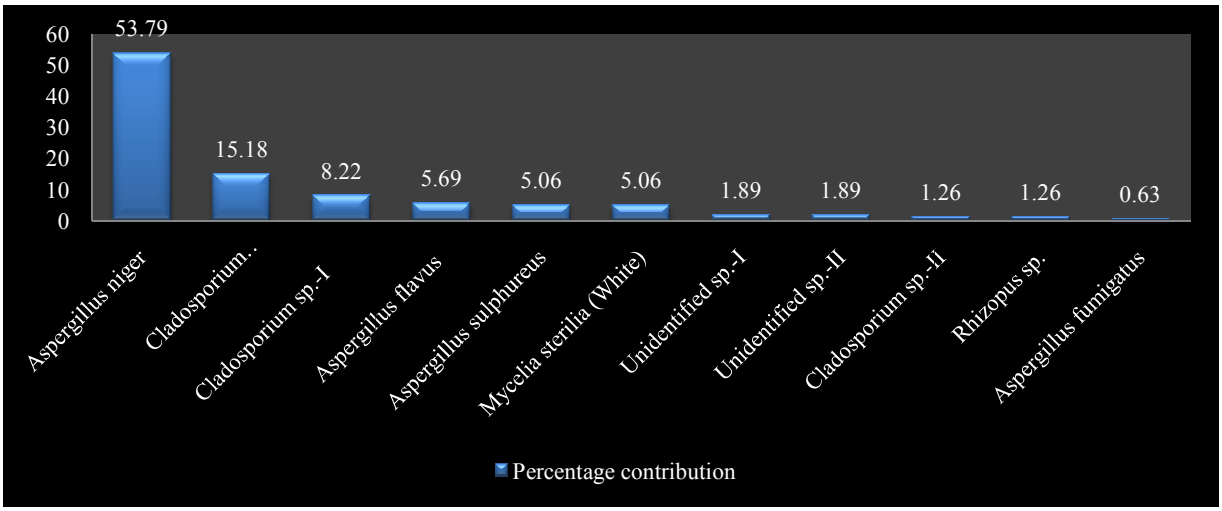
S. N.	Name of fungi	Months				Total Colonies	% contri-bution	% frequency
		March	April	May	June			
Zygomycotina								
1	*Rhizopus* sp.	-	-	2	-	02	1.26	25
Anamorphic fungi								
2.	*Aspergillus flavus*	4	2	3	-	09	5.69	75
3.	*Aspergillus fumigatus*	1	-	-	-	01	0.63	25
4.	*Aspergillus niger*	10	18	44	13	85	53.79	100
5.	*Aspergillus sulphureus*	8	-	-	-	08	5.06	25
6.	*Cladosporium cladosporioides*	14	6	-	4	24	15.18	75
7.	*Cladosporium* sp. –I	10	3	-	-	13	8.22	50
8.	*Cladosporium* sp. –II	-	-	-	2	02	1.26	25
Mycelia sterilia								
9.	*Mycelia sterilia* (White)	2	1	-	5	08	5.06	75
Unidentified fungi								
10.	Unidentified sp.- I	3	-	-	-	03	1.89	25
11.	Unidentified sp.- II	-	3	-	-	03	1.89	25
Total		52 **32.91**	33 **20.88**	49 **31.01**	24 **15.18**	158		

Table 2: Fungal species and genera of Aeromycoflora of Banjari, Temple

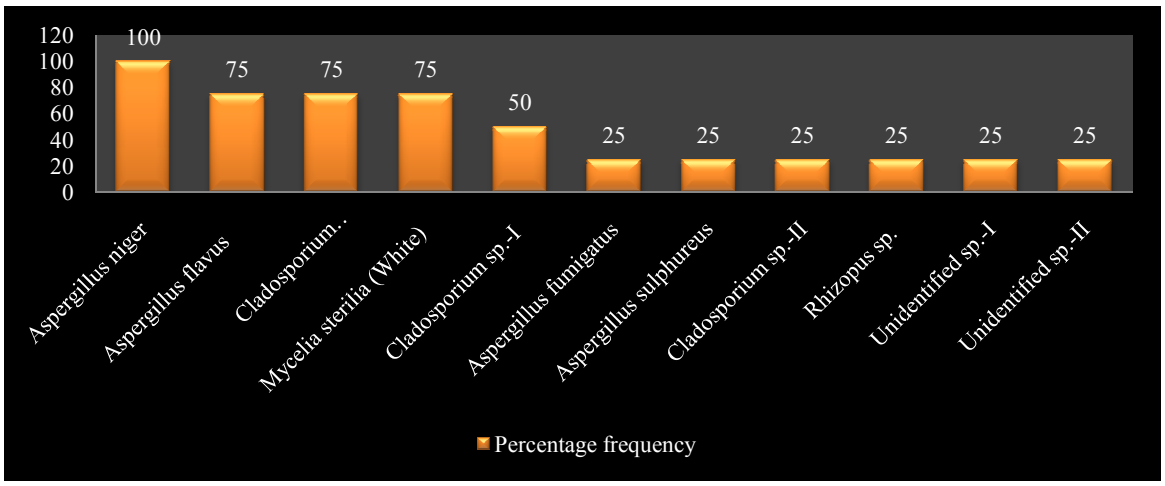
S. N.	Name of Class	Number of fungal colonies	Number of fungal species	Number of genera	Percentage Contribution
1.	Anamorphic fungi	142	7	2	89.87
2.	Mycelia sterilia	08	1	1	5.06
3.	Zygomycotina	02	1	1	1.26
4.	Unidentified fungi	06	2	2	3.79
Total		158	11	6	



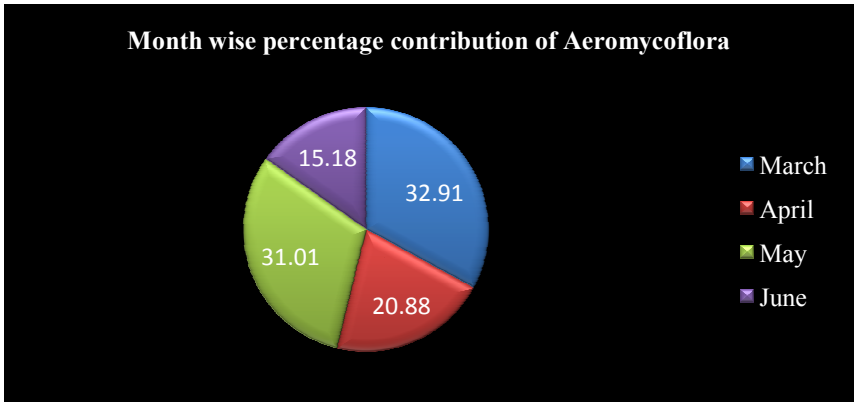
Graph 1: Number of fungal colonies of different species



Graph 2: Percentage contribution of isolated fungal species



Graph 3: Percentage frequency of isolated fungal species



Graph 4: Month wise percentage contribution of total aeromycoflora

Aspergillus flavus *Aspergillus niger* *Rhizopus* sp.

Figure 2: Microscopic Photographs of Aeromycoflora

CONCLUSION

Most of the fungal spores are allergenic causing diseases to human and plants. Awareness of the incubation period and infectious property help to prepare a personal calendar to stay away from allergenic diseases. Therefore, it can be concluded that proper maintenance in Banjari Temple is required with respect to hygiene and various fungal originated health issues as it is a very frequently visited site for the devotees.

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REFERENCES

Bernett H.L. and Hunter B.B., 1972. Illustrated genera of Imperfecti fungi, Burgess. Co. Minneapolis, Minnesota, U.S.A., 332.

Bhagat S., Singh A. and Bhalerao A., 2014. Study of aeromycoflora of Aarey Lake in Mumbai. Ind. J. of Appl. Resear., **4**(3): 192-195.

Buttner M.P., Cruz-Perez P. and Stetzenbach L.D., 2001. Enhanced detection of surface associated bacteria in indoor environments by quantitative PCR. Appl. Environ. Microbiol., **67**(6): 2564-2570.

Cooke W.B., 1963. A laboratory guide to fungi in polluted waters, sewage, and sewage treatment system; their identification and culture. PHS Publ., 999-WP-I., Cincinnati.

Dalal L., Bhowal M. and Kalbende S., 2011. Incidence of deteriorating fungi in the air

inside the college libraries of Wardha city. Scholars Research Library, Arch. Appl. Sci.Res., **3**(5):479-485.

Denning D.W., O'driscoll B.R., Hogaboam C.M., Bowyer P. and Niven R.M., 2006. The link between fungi and severe asthma: a summary of the evidence. Eur. Respir. J., **27**(3): 615-626.

Devi J., Medhi S. and Sarma T.C., 2010. Aeromycological study of store houses of onion and ginger in Guwahati. J. of Life Sci., **2**:547-552.

Jadhav S.K. and Tiwari K.L., 1994. Aeromycoflora of Ravan village. Ind. Bot. Report., **1**(1&2): 33-36.

Kalbende S., Dalal L. and Bhowal M., 2012. The monitoring of airborne mycoflora in the indoor air quality of library. Scholars Research Library, J. Nat. Prod. Plant Resour., **2**(6): 675-679.

Kulkarni P., 2011. Aeromycological profile of the public parks of Bhilai Township, Chhattisgarh, India. Ind. J. of Sci. and Technol., **4**(5): 558-560.

Saluja P.K., Lall B.M. and Dewangan P., 2011. Aeromycological survey of outdoor environment in school premises at Raipur. Abst. Nat. Sem. Ambikapur, 13.

Shabir A., Khan M.A., Khan A.M., Iqbal M. and Ahmad F., 2007. Fungal biode-terioration: a case study in the Zoological museum of the punjab university. J. Anim. Pl. Sci., **17**(3-4): 90-92.

Sharma K., 2011. Concentration and species diversity of airborne fungi of Dongargarh. Int. Multidiscipli. Research J., **1**(9):34-36.

Shukla S. and Shukla R.V., 2011. Air borne fungal spores in the atmosphere of industrial town Korba-Chhattisgarh, India. Microbiol. J., **1**:33-39.

Simeray J., Mandin D. and Chaumont J.P., 1995. Variations in the distribution of fungal spores in the atmosphere of bakehouses. Impact on the study of allergies. Grana, **34**(4):269-274.

Singh N.B., 2006. Studies of aeromycoflora in relation to leaf surface mycoflora of Mentha Arvensis Linn. Ph.D. Thesis, Pt. R.S.U. Raipur (C.G.).

Suerdem T.B. and Yildirim I., 2009. Fungi in the atmospheric air of Çanakkale province in Turkey. African J. of Biotechnol., **8**(18): 4450-4458.

Thirumala S. and Nathu M.P., 2013. Study of fungal spores diversity, in Malebenur region of Karnataka, India. Int. J. Curr. Microbiol. App. Sci., **2**(3): 44-48.

Tilak S.T., 1989. Air borne pollen and fungal spores, Vaijanti Prakashan, Aurangabad, 187.

Tiwari P., 1999. Aerobiological studies of Raipur with special reference to fungal spores. Ph.D. Thesis, Pt. R.S.U. Raipur (M.P.).

Tiwari P., 2014. Ecological study of fungal spora at different height. Ind.J.Sci.Res., **4**(1):15-21.