

## Diversity of Airborne Fungi in Kadegaon Tahsil, District Sangli, MS, India

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### Abstract

The present investigation deals with the study of aerospora at Kadegaon. The observations were done during the two years. Study of aerospora of Kadegaon at different sites has been done. During the investigation the aerospora of Kadegaon in December to January shows some common fungal aerospora at particular period of appearance in the air. Dominating fungi are of deuteromycetes about 25 species, phycomyces 6, ascomycetes 12 and basidiomycetes 5 species. Out of which some are pathogenic, some are saprophytic, some fruit rotting while *Aspergillus Micheli ex Link*, *Mucor Micheli ex.fr*, *Rhizopus Ehrenberg*, *Aspergillus Micheli ex Link* are highly allergenic causing diseases to human being and plants also. Appearance of these particles is characteristic and metrological useful factor. By knowing the period and allergenic characteristic one can prepare a personal calendar to avoid allergenic diseases as well as metrological forecasting the weather conditions and to control the plant diseases.

**Keywords:** Aerospora, pathogenic, allergic, meteorological.

### Introduction

Aerobiology is a scientific and multi disciplinary approach focused on the transport of organisms and biologically significant materials<sup>1</sup>. However term aerobiology came in to use since 1930 as a collective term for the studies of airborne fungal spores, pollen grains and other airborne microorganisms. Aerobiological research in its various aspects thus has opened almost new visits of investigations which for a rapid growth must be dealt with in co-coordinated manner involving, Agriculturists, plant pathologists, mycologist, Allergists, Entomologists and meteorologies from all institutes of the country.

### Material and Methods

It includes Air sampling – i. By Tilak Air sampler ii. Culture plate exposure method iii. Preparation of slides iii. Analysis of slide and Identification of slides.

**Study Area:** Satara Government Gazettes Kadegaon at glance describe Kadegaon as Village of 25000 (2011) people on the Karad -Bijapur road about a mile and half west of Kadepur and twenty miles east of Karad. It is well situated on the bank of stream forming part of the catchments of Chikhali Canal, with on its west a fine mango groove which is one of the favorite campus in the district.

It is rapidly growing city on account of trade and commerce located at 17.15 N. latitude and 74.15 E longitudes with an area over 174 hec. The sites selected are Market area, Clinical area, Industrial area (Sugar Mill, Spinning Mill), Poultry shed and Dairy farms.

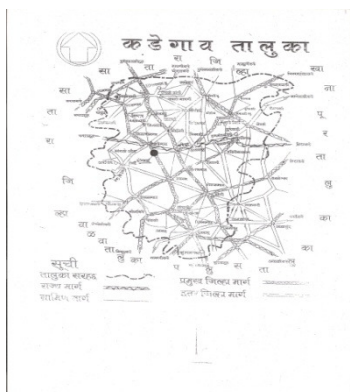
Accordingly collection of sample and analysis of the sample were done throughout the year. Figure- 1, 2, 3 Location map of Study Area.



Figure-1  
Maharashtra state



Figure-2  
Sangli District



**Figure-3**  
**Kadegaon Taluka**

## Results and Discussion

Result depicted in the table shows that fungal mycoflora is common and abundant in the areas of selected site. These are classified as fungal spore and hyphal fragments. Spores ranging from 3 to 100  $\mu$ diameter are found in the air. Spores of Phycomycetes e.g. *Albugo*, *Mucor*, *Rhizopus*, *Schlerospora* are encountered during rainy season followed by high humid conditions and low temperature, representing 6.1 to 8.25 of total airspora<sup>2</sup>. Tilak S.T. and M. Babu studied fungal spore concentration in the air at Tiruchirapalli and their seasonal and annual variations in incidence in the air are discussed and spore calendar for Tiruchirapalli is presented. H.S. Bhatia, R.D. Gaur<sup>3</sup> also studied Atmospheric fungal spores.

In many season during the month of July to September the occurrence and seasonal variation of ascospores has been observed. Following the rainfall the ascospores are released in the first three hours. Tilak S.T.<sup>4</sup> studied the relation between rainfall and release of ascospores. Generally concentration of ascospores gradually increases from June till of reaches maximum in August. Bijaykumar Nayak, Anima Nanda, Narayan Behera<sup>5</sup> studied the airborne fungal spores in Industrial area and there seasonal and diurnal periodicity. Spores of *Amphrsphaeria ces de Not*, *Ascotracha Berk*, *Bitrmonosprea Bombardra fr*, *Cladospora*, *Nischeke*, *Cheatomium kunz eg*, *Cucurbitaria Diatrypella cooke*, *Erysiphae Hedwing*, *Eurotium link*, *Melanospora*, *Lacacidion*, *Othia Nike*, *Meliola fr*, *Phyllachora Nib*, *Pleospora Rosllinia*, *Triblidara*, (*jacc*) *Rehm*, *Xylara Hill* etc are common ascospores found the airspora during rainy season. There contribution ranged form 0.4 to 4.6 % mainly during rang season during night and rarely day time. However detailed investigations about their concentration and seasonal periodicity count not be studied due to their rare and inconsistent presence in airspora classified ascospore as A, B, C and D type.

Some basidiomycetes also commonly prevalent during rainy season when fructifications are formed and these are release in air currents. Cadham F.T.<sup>6</sup> first time reported inhalant allergy

due to rust spores *Puccinia* is important genus also shows relevance as allergen and pathogen as well extensive aerial transport of this pathogen. Sreeramulu and Vittal studying periodicity of uredinospores above and within a sugarcane field recorded peak concentration in December to January. J. Morales etal<sup>7</sup> also reported the same during the study of airborne basidiospores spores in the atmosphere of Seville (south Spain). Some commonly encountered spores of basidiomycetes are *Agaricus*, *coprinus*, *Ganoderma*, *Melampora*, *Puccinia*, *Ravenalia*, *Sphecelotheca*, *Uromyces*, *Ustilago* etc.

Spores of Deuteromycotina are encountered more or less maximum spores are exported during the month of November, while lower is recorded in April -May in hot dry month. Rainfall influences the concentration of spores of *fusarium*, *Pithomyces*, *Torula*, *Periconia*, *Haplosporella*, higher prevalence wills begin of rainfall. Spores of *Nigrospora Beltraniella*, *Stemphylium* are abundant during morning when the rain was followed by dry day there was abundance of spores of *Alternaria*, *Helminthosporium*, *Curvularia*, *Cladosporium*, *Sadasivania*, *Heterospories*, *Epicocum*, *fusarrella* and *Bispora*. The spores of Deuteromycotina contribute almost up to 70% of total aerospora during November to December of which *Cladosporium* 30%, *Alternara* 5% and *Periconia* 4% *Helmenthosporium* 3%. S.J. Baitule and A.A. Saoji<sup>8</sup> studied textile deterioration activity of nine common airborne fungal out and found that growth rate of test fungi was recorded at 25 and 30c temperature and relative humidity 100, 80 and 60%. The growth rate in all test fungi was found to be affected by temperature and relative humidity. However while studying thermophilic actinomycetes in cane sugar mills. Z.U. Khan etal<sup>9</sup> reported clinically important thermophilic study actinomycetes are widely prevalent in sugarcane mills studies. fungal mycoflora has become interesting study in other areas like residential area, market area, museums or historical buildings, clinical areas dairy farms etc. Archana Manish Sawane and Aarti Ashok Saoji<sup>10</sup> reported a *Penicillium* in the intramural and extramural air of the residential areas of Nagpur city which was bound higher percentage in winter than other season. While Marcia A etal<sup>11</sup> studied fungal colonization and succession on newly painted buildings and effect of biocide. Arun Arya, A, R.Shaha and Satish Sadasiva<sup>12</sup> studied Indoor aeromycoflora of Baroda museum and deterioration of Egyptian mummy and reported a no. of a biotic and biotic agencies like pollution light, humidity, temperature. Actinomycetes, algae, fungi, bacteria, insect etc have deteriorating effect on museum materials. Greicy Kiel, Christine C., Gaylarde<sup>13</sup> studied diversity of salt tolerant culture able aerobic microorganism of historic building and also studied recovery and identification of fungal spores from nasal cavity, Which shows allergy. Chitra Arya and Arun Arya<sup>14</sup> studied aeromycoflora and associated disease of certain fruits of fruit market of Baroda (India) and found fungal organisms causes diseases in plants, animals and human beings. Direct correlation was found between percentage rot of fruits and occurrence of fungal spore in different month.

**Table-1**  
**Shows some common Fungal Aerospora of Kadegaon and their period of appearance in the air**

Class of fungi	Sr. No	Name of fungi	Season	Month	Characters
<b>Phycomycetes</b>	1	<i>Albugo Pers.</i>	Rainy	July- Sept	Pathogenic
	2	<i>Cunninghamella e Matr.</i>	Rainy	Aug.	Saprophytic
	3	<i>Mucor Micheli ex.fr.</i>	Rainy	July- Aug.	Allergic
	4	<i>Phytophthora de Bary.</i>	Rainy&winter	July- Sept.	Pathogenic
	5	<i>Rhizopus Ehrenberg.</i>	Rainy	July- Aug.	Allergic
	6	<i>Sclerospora graminicola (Sacc.) Schroet</i>	Rainy	July- Aug.	Pathogenic
<b>Ascomycetes</b>	1	<i>Chatonium kunz ex.fr.</i>	Rainy- winter	July –Octo.	Saprophytic
	2	<i>Claviceps Tal.</i>	winter	Sept.	Pathogenic
	3	<i>Erysiphae Hedwig x Meerat</i>	winter	Aug. -Dec.	Pathogenic
	4	<i>Hypoxylon Bull ex.fr.</i>	Rainy	July -Sept	Saprophytic
	5	<i>Melanospira Corda</i>	Rainy- Winter	July -Sept	Saprophytic
	6	<i>Meliola Fr.</i>	Winter	Dec.	Pathogenic
	7	<i>Didymosphaeria Fuck.</i>	Rainy	Aug - Sept	Saprophytic
	8	<i>Phyllachora Nits</i>	Rainy- Winter	July -Sept	Pathogenic
	9	<i>Xylaria Hill Pre Grev</i>	Winter	Jan- Dec.	Saprophytic
	10	<i>Sporormia do not.</i>	Rainy	July –Aug.	Saprophytic
	12	<i>Sordaria ces&amp;de Not.</i>	Rainy	July	Saprophytic
	<b>Basidiomycetes</b>	1	<i>Puccinia sorghi Pers.</i>	Winter	Jan.
2		<i>Puccinia sacchari Pers.</i>	Winter	Jan.	Pathogenic
3		<i>Puccinia penniseti Pers.</i>	Winter	Sept.	Pathogenic
4		<i>Uredospores</i>	Winter	July- Dec.	Pathogenic
5		<i>Smuts-Ustilago scitaminae</i>	winter	July- Dec	Pathogenic
<b>Deuteromycetes</b>	1	<i>Bispora Corda</i>	Rainy	July –Aug.	Saprophytic
	2	<i>Botrytis Pres</i>	Rainy	July- Aug.	Pathogenic
	3	<i>CandidaBerkhout.</i>	winter	sept	Saprophytic
	4	<i>Alternaria sps.</i>	All season	Sept- oct	Pathogenic
	5	<i>Aspergillus Micheli ex Link</i>	Rainy - inter	Aug.- Sept.	Highly allergic
	6	<i>Cercospora personata Fr.</i>	winter	Oct. –Nov.	Pathogenic
	7	<i>Cercospora arachidicola</i>	winter	Oct. –Nov	Pathogenic
	8	<i>Cladosporium Link</i>	Rainy	July –Aug.	Pathogenic
	9	<i>Colletotrichum Corda</i>	Rainy	July- Aug.	Pathogenic
	10	<i>Curvularia Boed.</i>	winter	Sept	Pathogenic
	11	<i>Fusarium Link.</i>	Rainy	July	Pathogenic
	12	<i>Helminthosprrium Link.</i>	Winter	Sept- Oct.	Pathogenic
	13	<i>Oidium (Sacc) Link.</i>	Rainy- winter	Aug. –Dec.	Pathogenic
	14	<i>Penicillium Link.</i>	Rainy	July-Sept	Allergic
	15	<i>Verticillium Nees</i>	Winter	Nov. –Dec.	Pathogenic
	16	<i>Beltraniella Subram.</i>	winter	Sept.- Oct.	Pathogenic
	17	<i>GloeosporiumDesm. &amp;Mont.</i>	Rainy -winter	Aug – Oct.	Fruit rotting
	18	<i>Monilia Pers.</i>	All season		Red bread mold
	19	<i>Nigrospors zimm</i>	Rainy- Winter	July- Nov.	Saprophytic
	20	<i>Periconia Tode ex.Schw.</i>	winter	Nov. –Dec.	saprophytic
	21	<i>Pithomyces Berk.</i>	Rainy	Sept.- Oct	Saprophytic
	22	<i>Pseudptorula</i>	rainy	July- Aug.	Saprophytic
	23	<i>Spegazzinia sacc.</i>	Winter	Dec.	saprophytic
	24	<i>Torula (Pers ) Link.</i>	rainy	July- Aug.	saprophytic
	25	<i>Trichoderma Pers.ex Fr.</i>	Winter	Sept	saprophytic

## Conclusion

Some of these fungal spores are allergenic causing diseases to human and plant also while some pollen grains are also allergenic. Appearance of these particles is characteristic and metrological useful factor. By knowing the period and allergenic characteristic one can prepare a personal calendar to avoid allergenic diseases as well as meteorologically forecasting the weather conditions and to control the plant diseases.

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