



Study of Aeromycoflora of Hyderabad City, Telangana State

D. Narmada¹, Ruqya Banu²

^{1,2}Dr. B.R.R. Government Degree College(A), Jadcherla, Mahabubnagar (Dist), Tealangana.

ABSTRACT

Aeromycoflora in the atmosphere of Gowliguda, a bustling metropolitan locality of Hyderabad, Telangana State, India, is the subject of the current study. For 1 year, data from “January 2022 to December 2022” were used for air monitoring. Fungal spores constituted about 28.84% of total aerosporal components observed in study area. Fungal spores of 15 types that were discovered, *Alternaria* sp. (21.47%) was the most common, followed by *Cladosporium* sp. (12.28%). Other relevant spore kinds include *Cercospora* sp., *Curvularia* sp., and *Drechslera* sp. The months of September through December 2022 saw an increased incidents of fungal spores. Several highly allergenic spore types were alarmingly found in the study area throughout the year, including *Alternaria* sp., *Cladosporium* sp., *Curvularia* sp., *Drechslera* sp., and *Epicoccum* sp. Residents, especially those with allergies, would receive forecast services based on data on the prevalence of allergenic fungal spores.

Keywords: Aeromycoflora, Hyderabad city, Allergenic fungal spores, Allergy patients.

INTRODUCTION

One important component of aeroallergens, airborne fungal spores, varies greatly depending on seasonal and regional conditions (Pamela Singh *et al.*, 2025). According to research, these are major causes of Type I and Type II allergies, as well as allergenic illnesses such as severe asthma and rhinitis. Fungal respiratory allergies are thought to affect 20% to 30% of atopic patients, while the precise prevalence is unknown (Horner WE, *et al.*, 1995). Worldwide, aerobiological and clinical studies are being conducted to determine the frequency and severity of different airborne allergic fungal spores (Shivpuri and Singh, 1966). Because people must breathe, the function of fungi in causing respiratory tract disorders has grown (Ghiasian SA, *et al.*, 2016). The current study focuses on examining the aeromycoflora in the Gowliguda locality of Hyderabad. One of the most populated localities of city. Because it is a bustling urban centre with a constantly shifting population, it is a prime location for allergic disorders. Fungal spore data, especially allergenic ones, that are found in Hyderabad city's residential Gowliguda locality are presented in this study.



MATERIALS AND METHODS

Lakhanpal and Nair's Gravimetric Aeroscope model was used to monitor the air for a year, from January to December 2022 (Nair *et al.*, 1986). The aeroscope was situated thirty feet above the earth on the third-floor open terrace of a residential building. Slides smeared with “Glycerine jelly” were exposed to the air for 24 hours to perform daily census of “airborne fungal spores.” A rectangular coverslip has been used to mount the slides later, and an Olympus Trinocular Microscope was used to critically scan them for fungal spores. Spore types were identified based on existing literature (Ellis, M.B. 1976).

OBSERVATIONS

Aeromycoflora was the second most common aerosol component in the study area, after pollen grains. They accounted for about 28.84% of the total aerosol particles encountered during the study period. Qualitatively, fungal spores of about 15 types were being reported. *Alternaria sp.* (21.47%) was determined to be the most common type, after *Cladosporium sp.* (12.28%), *Cercospora sp.* (8.96%), and *Curvularia sp.* (8.84%). Spore types such as *Helminthosporium sp.* (4.71%), *Diplodia sp.* and *Drechslera sp.* (7.02%), *Bispora sp.* (6.79%), *Pithomyces sp.* (5.09%), and *Epicoccum sp.* (4.57%) are fairly well represented. But others, *Trichonis sp.* (3.89%), Yeast cells (3.58%), *Tetraploa sp.* (2.45%), *Torula sp.* (2.36%), and *Sporodesmium sp.* (3.28%), were moderately encountered (Table 1). *Alternaria*, *Cladosporium*, *Cercospora*, *Helminthosporium*, and other fungal spores were also reported from the atmosphere of Ratnagiri district, Maharashtra (Mahadeo and Kalpit 2017).

Similar findings were reported from Hyderabad City in 2015, but *Alternaria sp.* (19%) was followed by *Curvularia sp.* (12%) (Narmada and Ramakrishna 2018). Quantitatively incidence of *Alternaria sp.* has increased alarmingly from 19% to 21.47% within the span of seven years. Recently, out of 13 fungal genera encountered from Urban Parks of Bangalore, *Epicoccum sp.* was found to be predominant (Sunitha Rani .J and Praveen Kumar Nagadesi. 2024).

Table 1- Monthly incidence of various airborne fungal spores at Gowliguda 2022

S.No	Fungal spore types	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total	%
I.	<i>Alternaria sp.</i>	63	65	68	72	78	55	84	86	90	98	70	82	911	21.47
II.	<i>Bispora sp.</i>	18	22	16	14	12	10	12	32	38	40	36	38	288	6.79
III.	<i>Cercospora sp.</i>	32	36	47	55	48	10	6	12	36	24	28	46	380	8.96
IV.	<i>Cladosporium sp.</i>	26	28	6	11	15	10	73	78	84	86	48	56	521	12.28
V.	<i>Curvularia sp.</i>	28	32	38	40	32	21	8	10	46	50	32	38	375	8.84
VI.	<i>Diplodia sp.</i>	12	20	9	0	0	8	12	13	33	12	45	36	200	4.71
VII.	<i>Drechslera sp.</i>	22	26	28	30	22	12	18	12	36	24	38	30	298	7.02
VIII.	<i>Epicoccum sp.</i>	20	16	8	8	9	4	7	11	29	20	32	30	194	4.57



IX.	<i>Helminthosporium</i> sp.	12	18	12	0	0	8	10	16	38	32	28	26	200	4.71
X.	<i>Pithomyces</i> sp.	18	16	12	0	0	20	18	24	26	27	30	25	216	5.09
XI.	<i>Sporodesmium</i> sp.	10	12	13	4	5	4	6	10	18	14	12	31	139	3.28
XII.	<i>Tetraploa</i> sp.	12	14	8	4	0	0	3	8	10	11	14	20	104	2.45
XIII.	<i>Torula</i> sp.	6	12	10	12	0	0	6	10	14	12	10	8	100	2.36
XIV.	<i>Trichonis</i> sp.	12	10	9	8	4	12	10	14	18	20	16	32	165	3.89
XV.	Yeast cells	16	12	10	0	0	8	8	12	15	22	24	25	152	3.58
	Total	307	339	294	258	225	182	281	348	531	492	463	523	4243	100

While few types of fungal spores, such as *Cladosporium* sp., *Alternaria* sp., *Cercospora* sp., *Curvularia* sp., *Drechslera* sp., *Bispora* sp., as well as *Epicoccum* sp., were found all year round, others, such as *Diplodia* sp., *Helminthosporium* sp., *Pithomyces* sp., and yeast cells, were only found during the winter and rainfall. The peak representation for most of the fungal spore types was seen during the winter (Fig 1). Similar findings were reported by earlier workers (Jyothi Nayar 1993, Reddy and Reddy, 1996; Narmada and Ramakrishna, 2018).

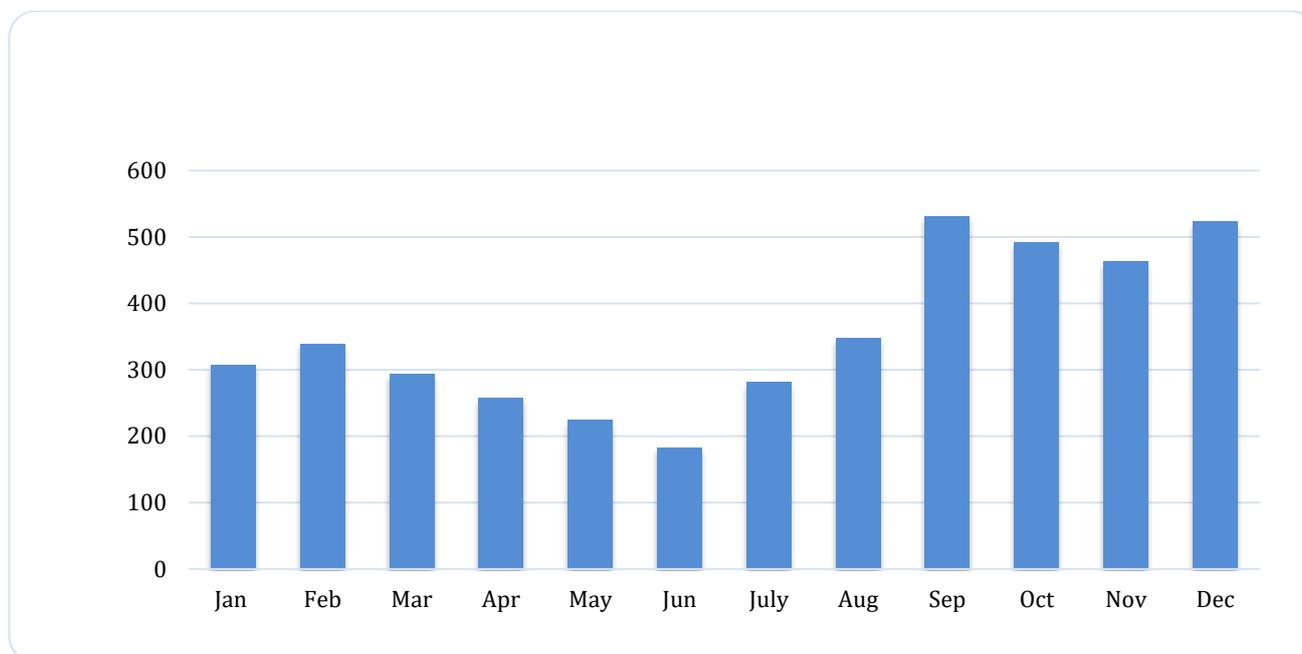


Fig 1- Graph showing monthly incidents of fungal spores in aerospora of Gowliguda area, 2022.

DISCUSSION

During research interval, the Gowliguda area's environment was not free throughout the year of fungal spores, especially allergenic species such as *Alternaria sp.*, *Cladosporium sp.*, *Curvularia sp.*, *Drechslera sp.*, and *Epicoccum sp.*, according to the findings from the current survey. Fungal spore incidence was found to be highest in the months of September through December, both quantitatively and qualitatively, while it was lowest in June. Results from Vikarabad by Reddy and Reddy (1996) and Safilguda by Jyothi Nayar (1993) were nearly same.

Temperature, wind speed, rainfall, relative humidity, and other meteorological variables all have a major impact on the qualitative and quantitative changes in spore incidence that are seen in the study region throughout the year. The mean temperature gradually increased from 23.5 to 28.7 degrees Celsius, which is why there was a progressive increase in the prevalence of spores from January to April. However, the concentration of spores has dropped in May and June, possibly as a result of the extremely high temperature (34.30°C). The majority of airborne spores are washed down by heavy rains, which is why there is relatively little fungal spore incidence during the rainy season. However, spores proliferated considerably after heavy rains on days with strong sunlight and high wind speeds. This matches Narmada and Ramakrishna (2018) and Agarwal *et al.* (1969). Aerospora data from spiderwebs in Gowliguda showed that fungal spores outnumbered pollen grains in the air, in addition to the presence of numerous spores and allergenic pollen (Narmada *et al.*, 2016). Allergic problems that are common in the area may be linked to the concerning high prevalence of allergic airborne fungi in the study area's atmosphere, both qualitatively and quantitatively. Clinical evidence has demonstrated that in individuals with respiratory allergy conditions, such as rhinitis and asthma. Aeroallergens are responsible for the



majority of respiratory illnesses and mortality. Accurate diagnosis and successful treatment depend on an understanding of the prevalence of local aeroallergens. These results emphasize the need for both targeted allergen assessment and ongoing air quality monitoring in order to better understand how fungal spores affect respiratory allergy diseases. (Pamela Singh *et al.*, 2025). The information gleaned from this study is useful in understanding the prevalence of allergic disorders in the study area. Clinical professionals would undoubtedly benefit from the identification of these airborne allergenic mycoflora in order to diagnose and treat residents' allergic disorders in an efficient and appropriate manner. Therefore, the current study is essential in providing sufficient safety and health precautions to local people.

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REFERENCES

1. Agarwal .M.K., Shivpuri D.N., and Mukerji K.G ,1969.Studies on the allergenic fungal spores of the Delhi, India, metropolitan area. The Journal of Allergy.44(4);193-203.
2. Ellis. M.B 1971.Dermatous Hyphomycetes .Common wealth Mycological Institute,Kew Surrey, England.
3. Ghiasian SA ,Maghsood A H .and Aghamirian M R.,2016,Aeromycological analysis of allergenic airborne fungi in Qazvin, Iran. Curr Med Mycol.2(3):5-9.
4. Horner WE, Helbling A, Salvaggio JE, Lehrer SB. Fungal allergens. Clin Microbiol Rev. 1995;8(2):161–179.
5. Jyothi Nayar.1993.Aeromycological Survey of a semi urban area in Secunderabad.,Ind.J.Aerobiol.,6:33-35.
6. Mahadeo Badge and Kalpit Mhatre . 2017.Aeromycological studies over some paddy fields in the Ratnagiri district of Maharashtra state,Int.J.Curr Research.9(6):52441-52444.
7. Nair, P.K.K., Joshi, A.P. and Gangal,S.V.1986.Airborne pollen ,spores and other plant materials of India-A survey., CSIR Centre for Biochemicals and NBRI, Lucknow.
8. Narmada,D., Ramakrishna,H., Seetharam ,D.S.and Prabhaker ,R.,2016.Allergenic pollen in the spider webs of Gowliguda locality in Hyderabad city of Telangana state. Adv in Plant Sciences 29(II):225-230.
9. Narmada,D.and Ramakrishna.H 2018.Aeromycological Survey of Gowliguda Locality in Hyderabad,Telangana State.Adv in Plant Sciences 31(II):123-125.



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10. Pamela Singh , Varun Anand, Shubhankar Singh, Sunanda Sharma, Vipul Chaudhary , Nandani Goswami 2025. Aeromycological Survey of Delhi: Significance in Management of Respiratory Allergic Patients. Journal of Clinical and Diagnostic Research DOI: 10.7860/JCDR/2025/77153.21908
11. Reddy ,R.R. and Reddy,P.R.1996. Aero mycological Survey at Vikarabad. Ind.J.Aerobiol.9(1and2):9-13
12. Shivpuri, D. N., and Singh, K.1966 : Studies in local allergens in 324 patients with bronchial asthma and rhinitis in New Delhi/Delhi-India, in. Proc. Twenty-first Tuberculosis and Chest Disease Workers' Conference., Calcutta, Feb.,1966, p. 189.
13. Sunitha Rani .J and Praveen Kumar Nagadesi2024. Aeromycoflora of Urban Parks of Bangalore, Karnataka ,India Annals of Biology 40(2):225-228.