

Airborne *Aspergillus* at some rural areas adjoining to Raipur city (C.G.) India

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Received : 15.09.2020; **Accepted** : 01.11.2020

ABSTRACT

Increased urbanization and industrialization in recent time has made a significant impact on air quality of the area. The atmosphere is rich in propagule of different fungal species. The investigation on airborne *Aspergillus* contribution was conducted in Periphery of Raipur city from February, 2018 to March, 2019 with the help of gravity petriplate containing PDA (Potato Dextrose Agar) medium. In this study, total 11 species of *Aspergillus* were recorded. The percentage frequency and percentage contribution of different *Aspergillus* species were different in different seasons. *Aspergillus niger* was most frequent throughout the year followed by *Aspergillus fumigatus*, *A. flavus*, and *A. nidulans* etc. While *Aspergillus clavatus*, and *A. versicolor*, *A. aculeatus* were the least frequent species. The result indicated the highest percentage contribution of *Aspergillus niger* (43.29 percent) followed by *A. fumigatus* (9.02percent), *A. flavus* (8.42 percent) while *A. clavatus* (0.21 percent). The objective of the studies was to determine a seasonal variation in concentrations of *Aspergillus* on the basis of meteorological parameters.

Figure : 00

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KEY WORDS : Airborne, *Aspergillus*, Raipur city, Rural Area.

Introduction

Fungal spores constitute a major component of air-spora. Qualitative and quantitative variations depend on the meteorological factors and geographical conditions. Fungal spores that are transported by air currents cause many plant diseases and knowledge of their periodicity is of great value in terms of predicting plant epidemics. *Aspergillus* is a universal fungus. The great majority of species are saprophytes, commonly or occasionally found in soil, decaying vegetation, seeds and grains. The aim of present work was to analyse the behaviour of *Aspergillus* spore type at some rural areas adjoining to Raipur city and to study the relationship between the fungal spore levels and the main environmental factors.

Materials and Methods

In present study, four different sites were selected for sampling Aeromycoflora Chandanidih, Zora, Boriakala, Dhaneli, Baronda, and Dumartarai. The study was carried out during March 2018 to February 2019. The culture plate exposure method was adopted for trapping the mycoflora. PDA (Potato, Dextrose and Agar) was used as culture medium. 10 ml of sterilized PDA medium was aseptically

poured in petriplates and allowed to solidify. Five petriplates containing potato dextrose agar (PDA) medium were exposed in the air for 5-10 minutes at 1 meter above the ground level at the above-mentioned sites. The study was conducted at interval of 15 days in every month. The exposed petridishes were sealed and brought to the laboratory and incubated for 3 to 6 days at $26 \pm 1^\circ\text{C}$. After incubation fungal colonies were counted, isolated and identified with the help of literature^{1,2}. The results were recorded separately for different sites / season. Percentage frequency and percentage contribution of the fungal flora will be calculated with the help of following formula³:-

% Contribution = Total No. of colonies of species in all the observations taken together / Total no. of colonies of all species X 100

Result and Discussion

The investigation of airborne *Aspergillus* concentration was conducted at some rural areas of adjoining to Raipur city. 2019. During present study 377 fungal colonies of 11 species of *Aspergillus* were recorded (Table -1).

TABLE-1 : Seasonal occurrence of Airborne *Aspergillus* at some rural areas adjoining to Raipur city (C.G.) India

S. N.	Name of Fungi	Summer season			Total	Rainy season			Total	Winter season			Total	% Contribution
		Mar	Apr	May		Jun	Jul	Aug		Sep	Oct	Nov		
1.	<i>Aspergillus niger</i>	27	20	19	13	79	15	30	12	20	20	10	60	43.29
2.	<i>A. flavus</i>	03	02	02	05	12	10	-	02	15	-	03	03	8.42
3.	<i>A. fumigatus</i>	03	01	10	-	14	-	-	-	-	10	11	31	9.02
4.	<i>A. oryzae</i>	02	01	-	-	03	02	-	-	-	-	-	-	1.01
5.	<i>A. sclerotiorum</i>	10	02	-	-	12	07	-	05	12	02	01	03	5.42
6.	<i>A. nidulans</i>	-	-	-	02	02	-	-	-	-	-	08	18	4.11
7.	<i>A. versicolor</i>	-	-	-	-	-	-	01	02	03	-	-	-	0.61
8.	<i>A. clavatus</i>	-	-	-	01	01	-	-	-	-	-	-	-	0.21
9.	<i>A. terreus</i>	-	02	02	-	04	02	-	-	02	-	01	03	1.81
10.	<i>A. aculeatus</i>	01	01	-	-	02	-	-	-	-	02	-	02	0.81
11.	<i>A. luchensis.</i>	-	-	-	03	03	-	-	-	-	01	-	02	1.01

(-) indicate absence of species.

The percentage frequency and percentage contribution of different *Aspergillus* species were different in different seasons. *Aspergillus niger* was most frequent throughout the year followed by *Aspergillus fumigatus*, *Aspergillus flavus*, *Aspergillus sclerotiorum* and *Aspergillus nidulans* etc. *Aspergillus clavatus*, *Aspergillus versicolor*, and *Aspergillus aculeatus* were the least frequent species. The result has indicated the highest percentage contribution of *Aspergillus niger* (43.29 %) followed by *Aspergillus fumigatus* (9.02%), *Aspergillus flavus* (8.42%) while *Aspergillus clavatus* (0.21%) and *Aspergillus versicolor* (0.61%) made the lowest contribution to the total species.

This is partly reported that *Aspergillus niger* and *Aspergillus fumigatus* were some of the most frequent fungi on the leaf surface mycoflora of *Oscimum sanctum*⁷. Similar observations were reported that *Aspergillus* were the most dominant saprophytes in the atmosphere¹². The

species of *Aspergillus* contributed highest to the total aerospora in Coastal belt of Orissa⁵. *Aspergillus* species were predominant component of the outdoor aerospora of Kuwait³. Maximum contribution of *Aspergillus* was also observed from different places like Aurangabad⁹, Kanpur⁶ and Raipur^{4,8,10}. *Aspergillus niger* was most dominant fungal spores from slum area of Raipur¹¹. Meteorological factors, such as local agricultural activities, biological sources should be considered in future studies to fully understand the behaviour of *Aspergillus*.

Conclusion

The initial study over the year gives qualitative and quantitative data on the airborne *Aspergillus* at some rural areas adjoining to Raipur city. A total of 11 species of *Aspergillus* were isolated and identified during the year and their occurrence with seasonal variation was noted. *Aspergillus niger* was dominant fungal species found all the season during the study period.

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