CHAPTER - VI

SUMMARY
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1. The study was conducted during the period from June 2005 to May 2007 at the Dept. of Botany, Atarra P.G.College, Atarra district Banda (U.P.) and the study site is Chitrakoot dham district Chitrakoot (U.P.). Chitrakoot is located between $25^0-13^\circ$N latitude and $80^0-45^0E$ longitude. It has luxuriant vegetation and has not yet been surveyed for its airspora.

2. Chitrakoot has tropical climate. The temperature data for the two year 2005-06, 2006-07 during summer, the mean maximum and minimum temperature recorded was, $40.05^0C/23.53^0C$ and $40.0^0C/23.23^0C$ respectively. Similarly in winter the mean maximum and minimum temperature was $24.6^0C/12.03^0C$ and $25.06^0C/12.26^0C$ respectively. In the same manner the rainy season has mean maximum and mean minimum temperature was $36.53^0C/27.7^0C$ and $33.4^0C/23.6^0C$ respectively. Similarly in post monsoon the mean maximum and mean minimum temperature was $31.2^0C/20.5^0C$ and $31.2^0C/21.5^0C$. The mean daily maximum temperature during 2005-06 and 2006-07 was $30.09^0C$ and $32.4^0C$. The total rain fall recorded was 765.29mm and 794.43 mm respectively.

3. There was slight variation in the relative humidity in two years. In 2005-06, it starts increasing from June (57%) and reach maximum during August (87%) followed by September 80%. In 2006-07 increasing from June (55%) and reach maximum during July(84%) followed by August (83%). After reaching the maximum it started decreasing and again increased during the winter months specially during December 2005-06 and January 2006-07 i.e. 35% and 37%. The minimum relative humidity was recorded during April (35%) 2005-06 followed by May (37%). In 2006-07 this is 38% in both the month.
4. The survey to estimate the outdoor (extramural) airspora was carried out by installing rotorod air sampler and by petridish exposure method (passive air sampling).

5. Five different sites were selected for air sampling. The distance among the sites ranged between 5 to 12 km. Site I (Ramghat Chitrakoot) has less vegetation and is densely populated. Site II (Lord Kamadgiri Site Chitrakoot) is moderately populated with dense and luxuriant vegetation; Site III (Chitrakoot District Hospital, Karvi) is densely populated and least vegetation. Site IV (Jankikund Site Chitrakoot has least vegetation and Site V (Sabzi mandi site Chitrakoot) is densely populated with enriched vegetation.

6. Rotorod air sampler were installed at site I. II. III. IV and V. All at a height of 45 feet and 15 feet from ground level. The glycerine jelly coated cellotape were exposed in the morning at 10.00 a.m. The sampler has been used in a variety of airborne particles. After the jelly or vaseline sets the edges of cellotape are trimmed back to the width of the rods with glycerin jelly. The petridishes having P.D.A. medium were exposed fortnightly at 10.00 a.m. for 10 minutes at all the sites beside, rotorod air sampler.

7. The atmospheric survey revealed and estimate of 106 types of aerospores trapped from all the sites (using rotorod air sampler).

8. The identified 106 fungal spore types are grouped into 4 categories. Zygomycotina (03 types), Ascomycotina (36 types), Basidiomycotina (5 types) and Deuteromycotina (62 types). The average percentage contribution was maximum of Deuteromycotina (92.74%) followed Basidiomycotina (5.66%), Ascomycotina (1.31%) and Zygomycotina (0.28%).

9. The dominant types of fungal spores were Aspergilli-Penicilli, Alternaria, Basidiospores, Cladosporium, Curvularia, Fusarium,
Helminthosporium, Nigrospora, Periconia, Pithomyces and Smut spores.

10. The fungal spores were trapped in high number in October at all the sites, in the year 2005-06, were in 2006-07 it is January except site I (Ramghat Chitrakoot) where November and site II (Lord Kamdagiri) where March showed maximum spores. In general moderate range of temperature (30 ± 2°C) and relative humidity (60-70%) were favourable for the occurrence of fungi in the air. Minimum number of spores were trapped in July at all the sites except at site IV (Jankikund site Chitrakoot) where September has minimum number. Thus, it is seen that very hot (38 ± 2°C) and dry condition (40-60%) did not favour fungi in air.

11. The comparative study on the basis of rotorod air sampler revealed that fungal spores were caught in high numbers at site IV (Jankikund site Chitrakoot) followed by site III (District Hospital Karwi) and site V (Sabzi Mandi Site Chitrakoot). The similarity index showed that the composition of fungal spores trapped at different sites was quite similar to each other. The highest degree of similarity 97.1% was obtained between samples of site IV (Jankikund Site Chitrakoot) and site V (Sabzi Mandi Site Chitrakoot) while maximum dissimilarity 17.8 % was found between site II (Lord Kamdagiri site Chitrakoot) and site III (District hospital Karwi).

12. The total concentration of fungal spore in both the year (group wise), of air at all the sampling sites were observed as Zygomycotina shows minimum concentration at site II (Lord Kamdagiri) were 142.42 No/m³ air and maximum concentration at site IV (Jankikund site Chitrakoot) were 492.56 No./m³ air. Similarly Ascomycotina shows minimum concentration at site III (District hospital Karwi) were 1283.56 No/m³ air and maximum
concentration at site II (Lord Kamdgiri) were 1948.42 No./m$^3$ air. In the same manner Basidiomycotina shows minimum concentration at site I (Ramghat Chitrakoot) were 527.94 No./m$^3$ air and maximum concentration at site II (Lord Kamadgiri) were 12334.88 No./m$^3$ air. The total fungal spore concentration belonging to the group Deuteromycotina were found minimum at site I (Ramghat Chitrakoot) i.e. 12480.20 No./m$^3$ air and maximum concentration at site III (District hospital Karwi) i.e. 128412.31 No./m$^3$ air.

13. On the petridish exposure method 2700 colonies were observed of which 1718 colonies were during 2005-06 and 982 in 2006-07. Altogether, 33 fungal species were identified belonging to 16 genera.

14. The dominant isolate belonged to the genera *Aspergillus* species (40.68%), *Penicillium* spp. (22.93%). *Cladosporium* species (13.15%), *Helminthosporium* sp. (2.55%) and *Curvularia* spp. (2.45%)

15. The application of Karl Peasson coefficient of correlation for group showed that climatic factors does influence the fungal spores and hence exhibit seasonal fluctuations or variations. Other local and biological factors also integrate to influenced their occurrence in the atmosphere. Hence, different seasons influenced the nature of fungal spore by the changes in temperature, moisture and wind velocity. Since temperature, moisture and food supply affect the microbial activity of the substrates, the nature and species. variations of fungal spore also closely follow a seasonal trend.

16. The fungal calendar prepared revealed that the fungal spores were trapped in high numbers during October and minimum in June and July. It also revealed that some fungal spore types were
trapped in high numbers after rains such as *Aspergillus*-Pencilli, *Cladosporium, Curvularia, Gonoderma* and *Nigrospora*. While some were caught in high numbers during dry condition like *Alternaria, Epicoccum*. Smut spores. *Torula* etc.