INTRODUCTION

I N T R O D U C T I O N

Aerobiology is the study of passively airborne organisms, their identity, behavior, movement and survival. It is mainly concerned with the distribution of the organisms in air. Thus aerobiology deals with the study of dispersal of fungal spores, pollen grains, insect scales, algal components etc. which are transported from place to place. The air we breath varies from place to place. This fact was recognised many centuries before industrialized man assume the right to pollute the atmosphere with poisonous chemicals and radioactive isotopes. Extensive data on the composition of the airspora has been accumulated during last fifty five years.

Such studies are broadly distinguished as out door or extramural aerobiology. Concerned with survey of biological material in open space like fields and forests. The intramural aerobiology is concerned with a closed system like buildings, hospitals, glass houses, library, godowns etc.

The importance of the study of airspora is realised during last 50 years and since then lot of

research work has been on their existence and their effect on plant and human beings. It was found to be useful in understanding the problems of airborne plant diseases as well as consequence on human health. At present there are number of investigators engaged with the study of airspora from different regions.

Most of the diseases of man are caused by bacteria and viruses while those of the plants are caused by fungi. The airborne pollen grains of different types of plants are allergenic in nature and cause various kinds of metabolic disorders in man. There are also number of fungal spores which cause different types of diseases like asthama, bronchia, hayfever etc..

The contamination of indoor environment with the presence of microbial population and other contaminant certainly constitute a major problem of hazards. The microbes constitute one of the major components of airspora inside caves, hospital, industries, libraries.

According to Gregory (1973) the microbial concentrations in indoor varies greatly with the amount of mechanical and human activity.

variations and the concentrations of various types of biodeteriorating organisms in the indoor air are gaining greater importance.

The biodeterioration not only include mildewing or rotting of substrate but also mechanical damage or fundamental impairment of materials, which are real manifestations of the interaction of organisms and materials.

Studies in the microbial population of air inside the warehouse were carried at Aurangabad to find out composition of airborne biopollutants, their seasonal variations and incidence of diseases of cereal grains in storage. The toxic and phytotoxic biopollutants had higher percentage during wet and dry season respectively in the diseased grains.

Another important investigation is the role of microbial organisms in deterioration of paintings of Ajantha caves. Airspora of caves was studied for the first time in India by Tilak and Kulkarni (1972). The world famous wall paintings at Ajantha showed signs of biodeterioration and sampling of air inside caves was carried out along with petriplate exposure. The data clearly shows a close relationship between occurrence

of fungal spores on paintings and in the air and thus indicates that fungal biopollutants were responsible for spoiling material inside during favourable meteorological factors.

The house dust has been under investigation mainly because of the allergenic constituents and their origin. It has been established long back that the inhalation of fungal spores and also of house dust causes acute symptoms in allergic individuals.

According to Flyate (1968), Gallow and Fusttal (1963) fungi, bacteria and actinomycetes were microorganisms which biodeteriorate the museum and library materials.

An entirely new field of the application of intramural studies has emerged in relation to biodeterioration of materials in stores, equipments, paintings and library materials.

Plumbe (1964) stated that the fungal spores are always present in the atmosphere of library. On getting favourable conditions they proliferates on the book covers and cause deterioration. Indoor air is usually exchanged fairly rapidly by ventilation with outdoor air.

The role of fungi associated with books or paper materials in library in bringing about their deterioration has been a subject of great interest. These organisms cause considerable damage by staining or foxing. Some fungi destroy cellulose, decomposing binding materials, leather and plastic materials. This investigation is carried out by Tilak and Vishwe (1975) by air sampling and exposing petridishes inside the library.

Much of the work done in Maharashtra is on extramural aerobiology, specially from Marathwada region. Sangli district is rather dry region with moderate humidity. Since no aerobiological investigations were carried out so far in this region. It was felt necessary that such investigation would be useful in understanding the composition of the airborne microbes, their seasonal variations and their correlation with meteorological conditions.

The aerobiological studies of Sangli city is a broad topic which can be studied from different point of view. The present dissertation forms part of the same and is based on intramural aerobiological studies of library building of Willingdon College, Sangli. The

work is in progress covering other aspects of aerospora of Sangli city.

The biological agents and their role in biodeterioration of library materials have been reviewed by several workers. No such type of studies are so far carried out from Sangli city. Hence the intramural studies of library building of willingdon college, Sangli is carried out to know the biopollutants inside library some of which are also responsible for deterioration of library materials.

Climate of Sangli district is variable in different seasons. Sangli is situated between $16^{o}53'$ north latitude and $74^{o}34'$ east longitude. The hight from main sea level (M.S.L.) is 549 meters. The average rainfall of Sangli city is 560 mm with maximum temperature $38^{o}C$ and minimum temperature $14^{o}C$ and area of Sangli city is 20.90 sq.Kms.

As Sangli is surrounded by the cultivated patches of the fields and factories, the atmosphere of this city is polluted. It is likely that the atmosphere within the library might have been equally contaminated with airborne microbes which may be harmful to human beings.

The Willingdon college is away from Sangli city and near to it there are no factories which may cause pollution. Only some patches of fields, other educational institutions and residential area are cited near the college. Taking this fact into consideration the study of airspora inside the library of Willingdon College, Sangli was under taken. The detail observations on the presence of different air pollutants such as fungal spores, pollen, hyphal fragments, algal filaments, xylem fibers and insect parts form the present piece of work with special emphasis on allergic fungi and fungi responsible for deterioration of library material. The library being the place visited very often by different persons the study of aeroflora inside library has got special importance.

In the first chapter a brief review of literature and aerobiological studies in general and that from inside the library building from India and Maharashtra has been discussed.

The second chapter give brief description of site selected for investigation and methodology used for collecting airspora inside the library.

In third chapter month wise data of airspora, fungal spores from library of Willingdon College, Sangli for the period October 1992 to September 1993 is given in detail.

The fourth chapter includes the discussion of probable effect of biopollutants and fungal spores on books, papers etc. inside the library and allergenic effect on human beings.

The summary of work done is given in chapter fifth.

The references cited are listed in the Bibliography given at the end of the dissertation.