

INTRODUCTION

Air, which is so indispensable for our survival, contains innumerable bioparticles, which vary in number and type from time to time and from place to place depending on various factors. These bioparticles include fungi, bacteria, actinomycetes, algae, viruses, pollen grains, mites, insect scales and hairs, leaf hairs, small seeds and other plant fragments which are transported through air.

Antony van Leuwenhoek was the first to detect the presence of minute organisms in air, in 1680. The influence of these microbes upon human health, outbreak of diseases and other health hazards, has been established by the observation of Pasteur (1861), Blackley (1873), Cunningham (1873) and Tyndall (1881).

Aerobiology is the science which includes the studies on the biological particles in the air; their identity, sources, release, dispersion, deposition, survival and impaction on plants, animals and human beings living in the natural ecosystem. It is an important part of the environmental sciences, dealing with the biopollution, which are affected by various environmental factors. This aspect has received special attention of the scientists mainly for its bearing on human allergy and plant pathogenicity.

Fungal spores have already been implicated in respiratory allergic disorders in susceptible individuals such as allergic rhinitis, bronchial asthma, hay fever from normal everyday exposure and allergic alveolitis may occur to those while exposed heavily, particularly in the occupational environments. Apart from these, fungi may cause mycoses, fungal dermatitis, toxicoses to cattles and human beings.

Majority of the plant pathogens are airborne. They cause enormous damage to the important crops leading to heavy economic losses. Thus, the aerobiological approach in studying the pathogens, their source, dissemination, infective ability and seasonal variations will be helpful in reducing the crop losses. As plant pathogens, fungal spores are thus, very important since these are mainly airborne due to their active or passive mechanism of spore liberation in the air.

From phytopathological point of view, aerobiological studies start with the release of viable spores and end with their deposition on surfaces especially on the leaf surfaces. The study is thus helpful both to agriculturists and plant pathologists in their ultimate aim in protecting the crops.

Aerobiological studies are essential for understanding the distribution and deposition patterns of both pathogenic and non-pathogenic fungal spores carried away through the air from their respective sources. As air is the main agent, transporting these spores, periodical monitoring is required in order to predict the onset of the fungi inducing diseases. The monitoring of the airspora is therefore indispensable for a better understanding of the epidemiology of the plant diseases. According to Chanda (1992), air monitoring is necessary to determine the distribution of biota and their harmful effects on healthy environments. The use of airborne spore monitoring in a disease control strategy proved to be useful for certain pathogens (Ponti and Cavani 1992) as frequent application of fungicide is too much costly to the farmers and also harmful to the environment.

Hence, for these reasons aerobiological investigations were initiated over the important crops in West Bengal, which would ultimately be helpful to protect the crops losses and increase in yield.

SCOPE OF WORK

1. SURVEY OF AIR MYCOFLORA OF MAIN CROPS CULTIVATED IN WEST BENGAL

Aeromycological investigations of the crops cultivated in West Bengal viz. paddy (both "Aman" and "Boro" varieties), wheat, jute, mustard, winter vegetables, banana and potato, were performed to obtain the informations about the distribution of the various types of pathogenic and non-pathogenic fungal spores, their source, release, dissemination, seasonal variations and disease incidence in the vegetation.

2. TAXONOMIC STUDIES OF THE FUNGAL ISOLATES

Taxonomical studies were made to identify the fungal organisms by observing the colony characters as well as the microscopical characteristics.

3. PHYLLOPLANE STUDIES OF THE CROPS UNDER AIR SURVEY

To investigate the quality and quantity of the leaf surface mycoflora, and to detect the relationship with the corresponding airspora, phylloplane studies of the respective crops were initiated.

4. EFFECTS OF PESTICIDES ON THE FUNGI ISOLATED FROM THE PHYLLOPLANE OF DIFFERENT CROPS

Pesticides (mainly insecticides and fungicides) are applied frequently by the farmers to protect the crops from severe damages due to insect pests and fungal pathogens. Some of the widely used chemicals [viz. Cildon (85% phosphamidon), BHC (50%) and Bavistin] were screened under laboratory conditions regarding their effect on the phylloplane mycoflora.

5. BIOPOLLUTION OF ENVIRONMENTS DURING AGRICULTURAL PRACTICES

The effects of agricultural practices i.e. harvesting, threshing, shedding on air mycoflora were studied which resulted in an immediate local increase in airspora causing tremendous biopollution. The excessive exposure of these spores to farmers and farm animals may lead to serious health hazards.

6. PREPARATION OF ANTIGEN AND CLINICAL TEST TO EVALUATE THE ALLERGENIC POTENTIALITY

Three fungi were selected for the preparation of antigen for clinical testing to evaluate the allergenic potentiality since farm workers are heavily exposed to these spores during harvesting and threshing operations in the farm environment.