Aeropalynological Effect on Environment of Murshidabad District, West Bengal

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Abstract: Aeropalynology is a scientific and multidisciplinary approach focused on the transport of organisms and biologically significant materials drawing information from palynology, ecology, mycology, plant pathology and also from biochemistry, immunology and clinical medicine etc. it is now well established fact that some pollen grains are responsible to cause human respiratory allergy. After maturity pollen grains are dispersed by wind or animal vectors to reach the ultimate destination to execute fertilization. The pre requisite for atmospheric pollen studies is a sound knowledge of the ground flora and a well stocked pollen herbarium. Primary classification of pollen morphotypes of allergenic plants is to be formulated in the form of pollination calendar and pollen calendar to render identification of air borne pollen grains. The atmospheric pollen grains are generally trapped by volumetric air sampler or occasionally by using gravity slide methods. Respiratory allergy being a very common disease all over the world, it is necessary to monitor long term pollen survey for preparing regression models of allergenic pollen grains. Respiratory allergy or asthma if caused by pollen grains can now be tackled through immunotherapy by using purified allergens following hyposensitization process.

Keywords: Pollen grains, allergy, environment.

INTRODUCTION

The term aerobiology come into use during 1930 for the studies of airspora like airborne fungal spores, pollen grains and other microorganisms. Jacobs (1951) elaborated the term to include dispersion of insect populations, fungal spores, pollen grains, bacteria and viruses. In fact, all forms of life belonging to both plants and animals which become airborne are transported partly or wholly in the atmosphere. Thus aerobiology is a scientific and multidisciplinary approach focused on the transport of organisms and biologically significant materials drawing information from palynology, ecology, mycology, plant pathology and also from biochemistry, immunology and chemical medicine etc.

Most of the aerobiological work is carried out with reference to the Arerobiological Triangle described by a pathway like Source – Release – Dispersion – Deposition and Impact where environmental factors affect at each state.

The district Murshidabad is located in 23°43' and 24°52', North latitude and 87°49' and 88°44' East longitude. The shape of the district resembles an isosceles triangle with its apex pointing towards NorthWest. It is bounded on the East by the river Padma; on South by the districts of Burdwan and Nadia and to its West lie the districts of Birbhum and Sauthalparganas. The town Berhampur is the headquarter of the district the river Bhagirathi, flowing through the district from North to South divides it into two more or less equal portion of contrasting physiography.

The tract to the West of Bhagirathi is locally referred to as Rarh and the tract of the East as Bagri. Bagri the Eastern tract is low lying alluvial plain occasionally getting flooded by the spill of Bhagirathi and other rivers, having a relatively humid climate and fertile soil. In the Western tract on the other hand the surface is high and undulating, the soil is haw clay and the climate is drier in the eastern tract. Being situated in the lower Gangetic valley, The overall inclination of the district is from North-West to South-East.

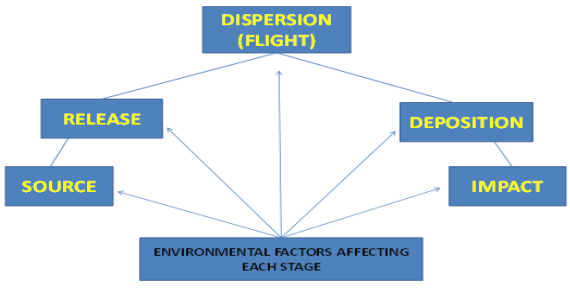

Fig :- Aerobilogical Triangle

The word 'allergy' is very much popular to us which is derived from two greek words : allos (means different or changed) and ergos (means work or action). The Iayman usually uses the word to mean intolerance.

Common pollen/ spore allergies:

Allergic disease may involve any part of the body, the most frequently involved being the nose, eye and chest with resultant symptoms of Hay fever, Rhinites, or Asthma. The skin and eyes also commonly show allergic symptoms. Some of the common pollen allergies are described below.

Hay fever :- This is a seasonal type of allergy. The pollen grains of certain grasses, weeds and trees are the main cause of this type of allergy, although mold spore can also cause the symptoms. Depending on where the patients live and the pollination period of a particular plant, attacks may occur seasonally either in spring, summer, winter or rainy season. Various symptoms may occur. The lining of the nose becomes swollen and exudes a runny discharge. Spells of sneezing and itchiness of the throat and palate also occur and the eyes may be similarly affected.

Rhinites :- It is a perennial type of allergy. The symptoms are similar to hay fever but appear all the year round. The condition is caused by non – seasonal allergens such as pollen grains of grasses and other plants which flower round the year. Sometimes house dust component is of itchiness of the eyes which are rubbed frequently.

Conjunctivitis :- The people are more likely to suffer from an allergic condition of the eyes as an adult. Allergic conjunctivitis is often associated with allergic Rhinites. A general complaint is of itchiness of the eyes which are rubbed frequently.

Asthma:- Asthma may be allergic or non- allergic in origin. In allergic asthma environmental allergen like pollen grains and spore trigger the disease when inhaled. The patient may suffer from attacks which obstruct the flow of air to the lungs due to the swollen mucous membrane. Breathing becomes difficult and forced breathing become necessary. A wheezing sound appears due to the rush of air through the narrowed airways. At the same time, a troublesome cough can develop. Asthma may begin at any age and if neglected trends to recur and become chronic.

Determination and quantification of aeroallergens:

It is now well established that pollen grains provide a good source of aeroallergens. The basic principle of pollen allergy is to identify the exact causative factor of allergen. So the identification of atmospheric allergic pollen and their chemical characterization are found to be very important for (a) evaluating the significance of an allergic sensitization, (b) prescribing adequate medication , and (c) judging the consisting of a allergens elimination programme.

The entire work is based on three aspects –

i) Sampling methods:- Trapping of atmospheric allergic pollen by the most suitable sampler. Sampling methods are very diverse and vary according to individual's interest in the components of airspora to be studied. So the sound and efficient techniques are essential to understand the composition of airspora. The early method of air sampling was summarized by Cunningham (1873). After a long gap the various methods of sampling have been summarized by the committee on Aerobiology of the National council, Washington (1941). Then the International Biological programme (1972) also provided data on the various air sampling techniques.

ii) Pollen calendar :- formulation of a pollen calendar of a particular area for identification of pollinosis causing species. It is also very important to make correlation between the onset of different airborne pollen seasons and the occurrence of a patient's symptom.

iii) Pollen -allergen standardization :- Identification of pollen allergens and diagnosis of allergic disorders by immunochemical methods.

COMMON POLLEN TYPES

Eastern Zone: *Acacia auriculiformis, Acacia catechu, Azadirachta indica, Bombax ceiba, Borassus flabelifer, Carica papaya, Cassia* sp., *Casuarina equisitifolia, Cocos nucifera, Dillenia indica, Eucalyptus* sp., *Mangifera indica, Morus* sp., *Phoenix sylvestris, Psidium guava, Ricinus communis, Terminalia* sp., and grass.

Western Zone: *Azadirachta indica, Parthenium hysterophorus, Moringa oleifera, casuarina equisetifolia , Eucalyptus* sp., *phoenix* sp., *Acacia* sp.

Northern Zone: *Azadirachta indica, Casuarina equisetifolia , Ailanthus* sp., *mimusops* sp., *Ricinus* sp.

Southern Zone: *Parthenium hysterophorus, Cocos nucifera, Eucalyptus* sp., *Casuarina* sp., *Ricinus* sp., *Cassia* , *Madhuca* sp., *Sizygium* sp., *Moringa* sp. and grass.

Diagram of common allergic pollen grains:

DIAGNOSES OF ALLERGY

In allergy diagnosis it is essential to determine which allergen is of the greatest significance for the course, and the degree of severity of the allergic disorders.

CASE HISTORY

The case history alone may give enough information to settle the diagnosis. However, further investigation has to be performed to get a final diagnosis.

SKIN TESTING

Skin testing is the primary tool of allergy diagnosis. This can be done either as a prick test or scratch test or as an intracutaneous test. The scratch testing has now largely been abandoned due to lack of precision.

1. Prick test
2. Intradermal (Intracutaneous) test
3. Provocation test

TREATMENT OF ALLERGY

There is no simple and effective way to cure allergy. With a combination of suitable measures, the symptoms of allergy can be relieved and even may be eliminated. It is suggested that sanitary measures must always be combined with suitable drug therapy and finally, in best cases can be eliminated by immunotherapy i.e. hyposensitization with vaccine.

CONCLUSION

It is now well established fact that some pollen grains are responsible to cause human respiratory allergy. After maturity pollen grains are dispersed by wind or animal vectors to rich the ultimate destination to execute fertilization. The atmospheric pollen grains are generally trapped by volumetric air sampler or occasionally by using gravity slide methods. Respiratory allergy being a very common disease all over the world, it is necessary to monitor long term pollen survey for preparing regression models of allergenic pollen grains. Respiratory allergy or asthma if caused by pollen grains , can now be tackled through immunotherapy by using purified allergens following hyposensitization process.

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