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Aerofloral Studies and Allergenicity Potentials of Dominant Atmospheric Pollen Types at Some Locations in Northwestern Nigeria

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Abstract : Pollen and spores have been identified as major airborne bio-particles inducing respiratory disorders such as asthma, allergic rhinitis and atopic dermatitis among hypersensitive individuals. An aeropalynological study was conducted within a one year sampling period with a view to investigating the monthly depositional rate of atmospheric pollen and spores; influence of the immediate vegetation on airborne pollen distribution; allergenic potentials of dominant atmospheric pollen types at selected study locations in Bauchi and Taraba states, Northwestern Nigeria. A tauber-like pollen trap was employed in aerosampling with the sampler positioned at a height of 5 feet above the ground, followed by a monthly collection of the recipient solution for the sampling period. The collected samples were subjected to acetolysis treatment, examined microscopically with the identification of pollen grains and spores using reference materials and published photomicrographs. Plants within the surrounding vegetation were enumerated. Crude protein contents extracted from pollen types found to be commonly dominant at both study locations; Senna siamea, Terminalia cattapa, Panicum maximum and Zea mays were used to sensitize Musmusculus. Histopathological studies of bronchi and lung sections from certain dead M.musculus in the test groups was conducted. Blood samples were collected from the pre-orbital vein of M.musculus and processed for serological and haematological (differential and total white blood cell counts) studies. ELISA was used in determining the levels of serological parameters: IgE and cytokines (TNF-, IL-5, and IL-13). Statistical significance was observed in the correlation between the levels of serological and haematological parameters elicited by each test group, differences between the levels of serological and haematological parameters elicited by each test group and those of the control, as well as at varying sensitization periods. The results from this study revealed dominant airborne pollen types across the study locations; Syzygiumguineense, Tridaxprocumbens, Elaeisguineensis, Mimosa sp., Borreria sp., Terminalia sp., Senna sp. and Poaceae. Nephrolepis sp., Pteris sp. and a trilete fern also produced spores. This study also revealed that some of the airborne pollen types were produced by local plants at the study locations. Bronchi sections of M.musculus after first and second sensitizations, as well as lung section after first sensitization with Senna siamea, showed areas of necrosis. Statistical significance was recorded in the correlation between the levels of some serological and haematological parameters produced by each test group and those of the control, as well as at certain sensitization periods. The study revealed some candidate pollen allergens at the study locations allergy sufferers and also established a complexity of interaction between immune cells, IgE and cytokines at varied periods of mice sensitization and forming a paradigm of human immune response to different pollen allergens. However, it is expedient that further studies should be conducted on these candidate pollen allergens for their allergenicity potential in humans within their immediate environment.

Keywords : airborne, hypersensitive, mus musculus, pollen allergens, respiratory, tauber-like
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