Aeroallergen Survey of the Texas Panhandle Using a Burkard Volumetric Spore Trap

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Abstract

Our objective is to survey the type and concentration of pollen and spores on a daily basis and correlate these concentrations with both the weather on a particular day and the incidence of allergic reactions. Aeroallergens are often the cause of serious allergic and asthmatic reactions, affecting millions of people each year. The analysis of air was performed through the collection of pollen and spores using a Burkard Volumetric Spore Trap. We mounted the trap on the flat roof of the Agriculture and Natural Sciences building of West Texas AM University in Canyon, Texas. This area has adequate exposure to the prevailing winds of West Texas, and is above the trees of the surrounding community. Collection and transfer of the pollen sampling tape takes place at the same time, 9:00 a.m. CDT, on a daily basis. Tapes are analyzed with a minimum of five latitudinal traverses, and daily concentration is assessed. The most significant aeroallergens present during these summer months were fungal spores such as Alternaria, ascospores, Cladosporium, Drechslera, Curvularia, and pollen like short ascospores (Helianthus ciliaris), Helianthus annuus, Helianthus hirsutus, from Solanaceous plants (Solanum rostratum, Solanum elaeagnifolium) and from Chenopodiaceae (Chenopodium album), from Asteraceae (Ambrosia artemisiifolia), Pine (Pinus) (Figures 1 A−F), Pollens (Figures 1 A−F), their concentrations. The number of reported cases of allergic rhinitis with increases in precipitation bringing subsequent higher mold spore concentrations. Rainfall was found to affect the mold count directly, with mold spores. Temperature was found to have an inverse relationship with increases in mold and daily concentration is assessed. Daily mean concentrations are multiplied by a correction factor. Samples were examined, counted, and photographed using a BX−40 Olympus microscope attached to a DVC Camera. To enable correlation of concentrations to meteorological conditions, weather data were recorded corresponding to the 24-hour period analyzed. Also, information of number of patient cases per day was compiled by the allergy research clinic for correlation with daily concurrent rations.

Materials & Methods

The analysis of air was performed through the collection of pollen and spores through the use of the Burkard Volumetric Spore Trap. Set up of the spore trap involves the removal of the collection drum from the collector and application of Melinex tape. The spore tape captures the aeroallergens on the Melinex tape coated with paraffin wax by outgassing air at a rate of 10 liters per minute. Hourly observations can be made because the drum will rotate at a standard rate of 2 mm per hour.

Mounting of the tape on a layer of water on a microscopic slide is then accomplished. A drop of Safranin with Gelvatol is placed upon the cover glass to stain the mold spores. In the case of airborne mold spores, the mount is photographed using a BX−40 Olympus microscope attached to a DVC Camera. To enable correlation of concentrations to meteorological conditions, weather data were recorded corresponding to the 24-hour interval analyzed. Also, information of number of patient cases per day was compiled by the allergy research clinic for correlation with daily concurrent rations.

Results & Discussion

The most significant allergens present during the period of June through December were Alternaria (Fig. 1A), ascosporae, Cladosporium (Fig. 1B), Drechslera (Fig. 1C), grass (Poaceae) pollen, ragweed (Ambrosia artemisiifolia) (Fig. 1E), pollen and Pine (Pinus) (Fig. 1F), pollens. In all cases present to the clinic as pollen (Fig. 1F). The future objective is to develop methods for forecasting pollen levels and to develop an allergy index specific for the Texas High Plains region.

Introduction

The purpose of our analysis of pollen data is to aid in the diagnosis of rhinosinusitis and to survey the type and concentration of pollen and spores on a daily basis and correlates these concentrations with both the weather on a particular day and the incidence of allergic reactions. Weather conditions and diurnal cycles play an integral role in the passive and active discharge of spore and pollen. Warm dry weather conditions promote the active dispersal of moist air spora, including Alternaria, Cladosporium, Curvularia, Pithomyces and many smut teliospores. Most weather conditions promote passive dispersal of dry air spora, including Alternaria, Cladosporium, Curvularia, Pithomyces and many smut teliospores. Most weather conditions promote passive dispersal of dry air spora, including Alternaria, Cladosporium, Curvularia, Pithomyces and many smut teliospores. The most important aeroallergens present during these summer months were fungal spores such as Alternaria, ascospores, Cladosporium, Drechslera, Curvularia, and pollen like short ascospores (Helianthus ciliaris), Helianthus annuus, Helianthus hirsutus, from Solanaceous plants (Solanum rostratum, Solanum elaeagnifolium) and from Chenopodiaceae (Chenopodium album). These asexual spores may be present throughout the year; however, major releases are often triggered by weather conditions such as the explosive release of ascospores from Ascomycetes, and the active discharge of spore and pollen. Warm dry weather conditions promote passive dispersal of dry air spora, including Alternaria, Cladosporium, Curvularia, Pithomyces and many smut teliospores.

References