RESEARCH ARTICLE

PRELIMINARY SURVEY OF OTHER AEROBIOCOMPONENTS AT PUNE MAHARASHTRA, INDIA

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ABSTRACT:

Survey of aerobiocomponents except fungal spores have been carried in the intramural environment of printing press using Tilak air sampler and library using Rotorod air sampler from January 2013 to May 2013 simultaneously. Some interesting findings have been recorded. Quantitative estimation revealed 06 other types of aerobiocomponants except fungal spores in the order of dominance i.e. fungal hyphae (30%), cellulose fibres (24%), epidermal hair (23%), insect scales/wings (17%), pollen grains (05%) and algal filament (01%).

Monthly percentage contributions of these other biocomponents in the intramural air of Pune revealed highest catches of fungal hyphae during January (33%), February (29%), April (31%), May(32%) while March represented second rank in the order of dominance i.e. after insect scale/wings (27%). Followed by cellulose fibres highest in April (26%), February (25%), January and May (24% each) and March (22%). Algal components have been recorded least i.e. 1% during January, April and May each and zero per cent during February and March 2013.

While Rotorod air sampling in college library revealed cellulose fibres (28%), epidermal hair (25%), insect scale/wings (22%), fungal hyphae (20%), pollen grains (0.4%) and algal filament (0.1%). In order of dominance during study period. Monthly percentage contribution of cellulose fibres is the highest during May (39%), April (33%), March (30%) February (30%) and ranked second during January (25%) after insect scales/ wings (28%) and least incidence was of algal filaments i.e. during January (0.2%), February (0.1%), May (0.1%) and zero per cent during March and April. Other types were found in between. These aerobiocomponants have been found to be common allergens and particularly higher c catches and fungal hyphae and insect parts usually coincide with higher wind velocities or storms.

Key words: Aeromicrobiocomponants, Air Sampling, Allergy, Allergens, college library, Printing press.

INTRODUCTION

Aerobiologists so far focused their attention on investigations of fungal spores, pollen grains or mites as allergens. Krishnamurthi and Vittal (1983), Tilak and Quazi (1985), Tilak and Rao (1987), Tilak and Jogdand (1987). However, little work has been done on hyphal fragments (Tilak and Bhalke 1981) and other types which have been also proved to be potential allergens. Hence this topic has been selected for the study to explore, qualitative and quantitative analysis of role of other types of aerospora in allergic manifestation in relation to meteorological parameters and workers, handlers, students in the library and printing press, where cellulose material is present in the form of papers , binding materials, glue, gum, wooden racks etc. These materials have been found oftenly affected by cellulytic and other fungi in addition to termites, mites and other types of aerospora damaging the valuable ancient rare printed literature causing severe loss of such literature which will be never found thereafter

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MATERIALS AND METHODS

Material for the experiment is the intramural aeromicrobiota which is studied by air sampling method using electrically operated volumetric continuous Tilak air samplerwas set in the printing press at 1 meter height from ground level, from 1st January 2013 to 31st May 2013 in the B. V. D. U., Erandawne, Pune.Petroleum jelly coated cello fane tape was fixed around the drum in the center for every week in the beginning. Starting point was coincided with inlet orifice tube of the sampler and the sampler was started in the evening continuously for seven days. At the end of the week 14 slides were prepared after cutting loaded (deposited) cello tape with a blade in 14 segments each represented twelve hours aerospora, using melted glycerin jelly in the laboratory. These slides have been scanned under Japanese Nikon steriobinoculer research microscope using 10x X 40x.

While other material for the experiment is the intramural aeromicrobiota which is studied by air sampling method using Rotorod air sampler. The Rotorod air sampler was fully described by Perkins (1957)and modified by Harrington (1959). It consists of battery operated motor which rotates at 2300rpm coated sticky tape on brass rods around its axis at a constant high speed. The rods have been oriented at right angles to high velocity of air dashing on the rods. Petroleum jelly coated cello fane tape was fixed on the two arms of the sampler. Rotorod air sampler which have been operated daily for half an hour (between 2pm and 2.30 pm), in the YMC library at 1 meter height from ground level, from 1st January 2013 to 31st May2013.The two strips of loaded (deposited) cello fane tape from Rotorod sampler was mounted on a clean slide using melted glycerin jelly in the laboratory. The total number of spore/m3 of air at that particular site and height of that time was obtained by multiplying each spore types by its conversion factor (5). Identification of aerobiocomponents by using authentic literature, reference slides and expertise.

RESULTS AND DISCUSSION

Preliminarysurvey of other aerobiocomponents except fungal spores at Pune, during study period (1st January to 31st May 2013) revealed incidence and varying percentage contribution from printing press and library of six types i.e. algal filaments (0.62% and 0.7 %), cellulose fibres (24.49 % and 28.36%), epidermal hairs (23.11% and 25.26%), fungal hyphae (30.41% and 19.40%), Insect wings and scales (16.71% and 22.30%), and pollen grains (4.63%and 3.91%). The study in the printing press revealed highest percentage contribution of fungal hyphae (30.41%) as compared to remaining components and was also higher than that of library (19.4%) followed by cellulose fibres in the press (24.49%) which was less than that of library (28.36%).While lowest percentage contribution was recorded in the case of algal filaments in the press (0.62%) as compared to remaining five types and also less than that of library (0.74%).

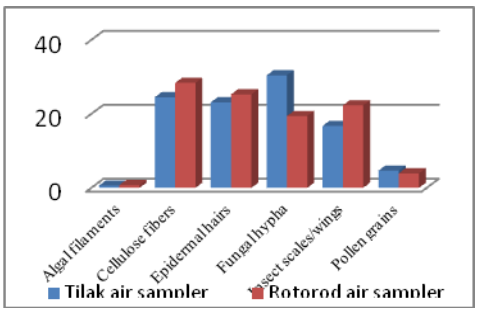

Fig. 1: Comparitive analysis of other aerobiocomponents during study period (from 1st january to 31st May 2013)

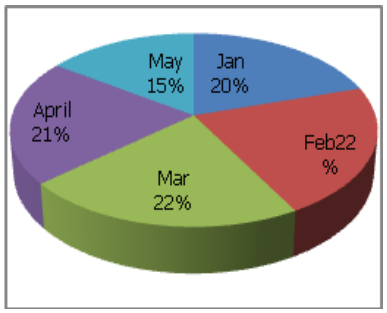

Fig 1. monthly percentage contribustion of aerobiocompo- nents from printing press during study period (i.e. january to May 2013).

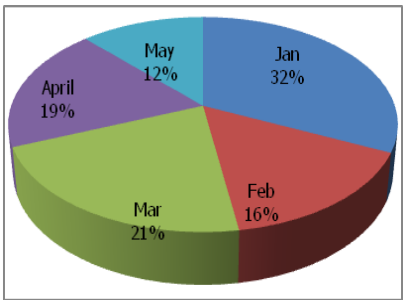

Fig 2. monthly percentage contribution of aerobiocompo- nents from library during study period (January to May 2013)

Monthly percentage contributions of these other biocomponents in the intramural air of Pune revealed highest catches of fungal hyphae during January (33%), February (29%), April (31%), May(32% while March represented second rank in the order of dominance i.e. after insect scale/ wings (27%). Followed by cellulose fibres highest in April (26%) February (25%) January and May (24% each) and March (22%). Algal components have been recorded least i.e. 1% during January, April and May each and zero per cent during February and March 2013.While Rotorod air sampling in college library revealed cellulose fibres (28%), epidermal hair (25%), insect scale/ wings (22%), fungal hyphae (20%), pollen grains (04%) and algal filament (01%). In order of dominance during study period.

However, increase load of fungal hyphae and insect scales and wings have been found to act as bioindicators of high wind velocity (wind air) and dry weather. They have been found to cause severe allergy in sensitive victims. Abundant occurrence of hyphal fragment in the aerospora was found to be mainly due to dry weather conditions and strong wind current, spores catches on windy days were usually dominated by hyphal fragments similar findings were recorded by Patil (1985). AlsoTilak and Bhalke (1981) reported high concentration of hyphal fragment on windy days.

In present study at college library have been revealed the highest percentage contribution of hyphal fragments (33%) in month of January whileHarvey (1970) at Cardiff observed the highest concentration of hyphal fragment in August, Talde (1969) reported 12.2% at Parbhani, Wankede (1983) reported 0.52% , Arun et al (2001) reported concentration of hyphal fragment (5.5%), Swapna et al (2012) reported other types (4.26%), Lalchand et al (2011) reported other types (3.4%), M. Saibaba (1984), Pollen grains (other biocomponents) and fungal spores are among the most abundant airborne bioparticles (Agashe et al. 2002). etc. All the six components have been reported persistently during five months of the study period but varied in percentage contribution in printing press as well as library.

CONCLUSION

Aerobiocomponents have been found to be common allergens and particularly higher catches and fungal hyphae and insect parts usually coincide with higher wind velocities or storms.

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