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Intramural exploration of mycoflora in poultry farm at Nagbhid dist. Chandrapur (MS) India

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ABSTRACT

The study was undertaken to determine microbial loads in indoor environment of poultry farm. Environmental factors influencing to increase airborn mycoflora. These airborne components were trapped by using the 'Volumetric Tilak air sampler'which is an electrically operated device was fixed in middle of the poultry farm at the height of 1 meter from ground level and runs continuously in the month of rainy season 2016. Total 63 types and 679716 Spores/m^3 were revealed from which Aspergilllus sp., Cladosporium sp., Unidentified Ascospores, Basidiospores, Bitrimonospora,Alternaria sp. were dominant. The maximum fungal load was found in the month of July. More number of fungi was found as incline of attraction towards the moisture availability and nutrition (litter) present in the poultry environment. 21 types and 82085spores/m^3 from 63 types of spores including class Ascomycetes were obtained fortunately they was the indicator of rainy season.

Keywords: Aeromycoflora, Allergens, indoor environment, aerosol, poultry.

INTRODUCTION

In the course of evolution, the fungi are adapted to transfer by means of air in greater extents comparatively to any other biological components which are transferred by wind such as pollen, insect, bacteria etc. Intramural environmental aeromycology constitute one of the major aspects mainly because of the dominance of fungal spores in the airspora (Tilak, 1998). The number of fungal spore types and their diversity vary with time of day, weather, seasons, geographical location and the presence of local sources. The highest number of airborne spores was found in temperate and tropical region and the least in desert. (Lacey, 1981). There is impact of aerobiocomponents on plants, animals and human beings.

Hazardous effects of fungi on human, animals and plants health can be minimized by monitoring the quality of air for knowing the diversity, abundance and variation according to seasonal changes. The day by day changing atmosphere affect the quality of air, reasoned due to change of its

Biological and Non-biological components. For understanding of these variant phenomena, the continuous air sampling is needed. For this cause, the present study was carried out. The concentrations of aeromycoflora in indoor air were significantly correlated with the indoor temperature, indoor relative humidity and the outdoor climatic factors mentioned above, except for the average velocity of wind of the day.

METHODOLOGY

The 'Volumetric Tilak air sampler' is an electrically operated device was fixed in middle of the poultry farm at the height of 1 meter from ground level and runs continuously in the month of rainy season for a period of four month from June to September 2016.

The glycerin jelly mounted 14 slides were prepared from Vaseline coated cello tape, removed from rotating drum of the sampler at the end of 7th day. The slides were scanned by Binocular research microscope. Fungal spores, aerospora were observed qualitatively and quantitatively recorded and identified by the standard literature.

The Spores per cubic meter were calculated by the following formula: Spores/m3 = No. of same type of spore X 14 (Where 14 is the conversion factor for Tilak Air Sampler). Permanent slides are prepared from cellotape mounts in melted glycerin jelly. (Glycerin jelly is solid at N.T.P. and melted at about 45^{0}C). Add 3-4 drops of melted glycerin jelly over the tape by a dropper. Put a rectangular cover slip and press it to remove the air bubbles. The jelly solidifies when it attains room temperature and the slide is now ready for microscopic examination.

RESULT AND DISCUSSION

Qualitative analysis of air sampling revealed 63 types of airborne biocomponents. Including 56 fungal spore types and 07 other types. Quantitative analysis revealed 679716/m^3 under to 63 types of airborne biocomponents. The total number of fungal spores encountered was 649885/m^3 under 56 fungal types and 7 other types 29831/m^3.

Out of 56 types of fungal spores, 31 types belonged to Deteromycotina (522284/m^3, 64%), 21 types to Ascomycotina (82085/m^3, 21%), 3 types to Basidiomycotina (42364/m^3, 9%) and 01 type belonged to Phycomycotina (1512/m^3, 6%). Deuteromycota contributed highest count followed by Ascomycota, while minimum fungal count was associated with phycomycotina and other types. The dominant microfungal genera of this group include *Alternaria, Cladosporium, Curvularia, Fusarium, Helminthosporium* and *Trichothecium*. These results are in confirmation with the earlier findings (Kayarkar A. *et al*, 2014, Adams *et al*, 2013; Luka *et al.*, 2014). Seven other types include cellulose fibers (1302/m^3), epidermal hairs (698/m3), fungal hyphae (14490/m), insect wings (4424/m), Mites (784/m3), Pollen grains (1992/m3) and unidentified types (fig 1).

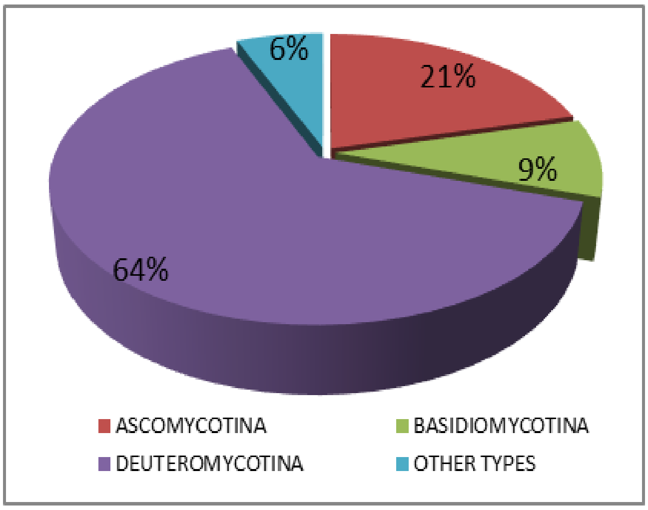

Fig. 1: Classwise pecentage contribution of Aerospora to the total aerospora from friends poultry farm.

Other types of aerospora also observed in special findings in indoor environment causing health hazards to workers and cellulosic materials. (Pawar SG and Ingole 2013) In total aerospora, in the month of July contributed highest concentration of aerospora i.e. 188974 spores/m3 with 21-27 0c Average temperature, 85% RH and 166mm rainfall followed by September i.e. 166726 Spores/m3 with 23.5-26.1 average temp., 84% RH and 8.02 mm rainfall followed by August i.e. 161672 Spore /m 3 with 20.1-28.1 moderate temp., 75% RH and 35 mm rainfall and least concentration of aerospora in June i.e. 134932 spores / m3 with 26.2-30oc average temp., 68% RH and 123.8mm rainfall. Due to the heavy rainfall in the last days of June month is responsible for the increasing aerospora and highest contribution of aeromycoflora in the July month, this result is confirmed with findings (Jogdand and Ingole 2014) 19 types of dominant aerospora and their percentage contributions to the total aerospora have been recorded in the Table 1.

Table 1: Monthly Percentage contribution of Some Dominant Aerospora in the Intremural Environment of Poultry for June to September 2016

Sr. No.	Types of Spores\months	June	%	July	%	Aug	%	Sept	%
1	*Apiorhyncostoma* (Petrak)	826	0.61	1470	0.78	1316	0.81	1246	0.75
2	*Bitrimonospora* and Tilak	3108	2.3	28840	15.3	1848	1.14	1540	0.92
3	*Chaetomiu* Kunz ex. Fr.	1960	1.45	2562	1.36	630	0.39	1512	0.91
4	*Didymoshaeria* Fuck.	2328	0.54	2240	1.19	1008	0.62	658	0.39
5	*Hysterium* Tode. Ex Fr	728	0.54	2240	1.19	1008	0.62	658	0.39
6	*Parodiella* Theiss and Syd	546	0.4	952	0.5	308	0.19	994	0.6
7	*Pleospora* Rabh	756	0.56	728	0.39	924	0.57	588	0.35
8	*Unidentified ascopores*	4774	3.54	4466	2.36	4018	2.49	3388	2.03
9	*Basidiospore*	6720	4.98	8050	4.26	8204	5.07	3360	2.02
10	*Ganoderma* Kartz.	3836	2.84	4774	2.53	3682	2.28	3388	2.03
11	*Alternaria Nees*	3654	2.71	6356	3.36	5166	3.2	2604	1.56
12	*Aspergillus* Michel	51842	38.4	83622	44.3	55510	34.3	72044	43.2
13	*Cercospora* Fr.	1512	1.12	1148	0.61	2030	1.26	630	0.38
14	*Clasosporium* Link	33180	24.6	34454	18.2	41958	26	35322	21.2
15	*Curvularia* Boed	3094	2.29	4102	2.17	140	0.09	2884	1.13
16	*Epicoccu* link	140	0.1	140	0.07	140	0.09	602	0.36
17	*Monotospora* Sacc	2898	2.15	2030	1.07	1344	0.83	1554	0.93
18	*Nigrospora* Zimm	5180	3.84	5894	3.12	6314	3.91	5614	3.37
19	*Torula* [Pers.] Link	1372	1.02	2310	1.22	3122	1.93	2450	1.47
	Total	134932		188974		161672		166726	

The viable microfungal propagules in atmosphere carried to a long distance far away from existing condition by wind current, may get deposited on healthy flora, can cause many plant diseases as well as deposited on indoor environment cause diseases to animals and human beings. Hence the knowledge of their periodicity is of great concern in terms of predicting the plant epidemics (Chelak and Sharma, 2012).

Among these most prevalent fungi, *Aspergilli* and *Penicilli* were the most abundant and widely distributed microfungal organisms on the globe (Verma *et al*., 2013). This statement is exactly match with our findings ie. Most dominant fungal spores are *Aspergilli, Penicillin* and *Cladosporium, Nigrospora* and *Ascospores* etc. The air borne fungi from indoor environment include a very large and heterogeneous group of organisms having an enormous diversity.

Accordind to (Kayarkar and Bhajbhuje., 2014) major components and most frequently encountered *Aspergilli* and *Penicilli* spp. while minor components included less frequent and sporadic types. Other stable components recorded were *Botryodiplodia, Chaetomium*, and Sterile mycelia and in our observation major or dominant components are *Aspergilli Penicilli, Cladosporium, Ascospores and Diplodia, Hysterium, Beltraniella* etc.are less or recessive types of aerospora.

CONCLUSION

Indoor aeromycoflora from poultry farm is known to be significant in respect of allergic as well as air borne diseases to poultry birds as well as workers. Present investigation revealed that the month of July contributed highest concentration of aerospora in favorable condition which is available in the July month i.e. Moderate temperature and high humidity is expected ideal for rapid proliferation and 166mm rainfall is responsible for releasing the aerospora. Impact of airborne fungal spores including their release, dissemination, deposition and effect of great significant to identify the health hazards to poultry birds and physiological disorders in poultry workers.

Thus clean indoor environment is prime importance for the maintenance of healthy health in rainy season. According to findings is clear that Ascomycetes were obtained fortunately they was the indicator of rainy season.

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