# Airborne fungal diversity over home garden in Manipur valley

## \*A. PREMILA AND N. IRABANTA SINGH

\*Department of Botany, Standard College, Imphal 795001, Manipur Department of Life Sciences, Manipur University, Imphal 795003, Manipur

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Monitoring of fungal airspora over a home garden was conducted for two years (January, 2009 to December, 2010) using Tilak rotorod air sampler. Altogether 24,05,395 spores/m<sup>3</sup> of air were trapped and assigned to 29 fungal types. Throughout the investigation period, various allergenic and phytopathogenic fungal spores were present in the air over home garden but in different concentrations. Aspergilli-Penicilli contributed highest with 19.67%. Other dominant fungal types were *Cladosporium, Albugo, Fusarium, Curvularia, Chaetomium, Alternaria,* etc. Different crops growing in the home garden served as the main source of the airspora. Seasonal variations were positively correlated with weather conditions. The average monthly contributions varied quantitatively in both the years.

Key words: Airspora, home garden, meteorological parameters, seasonal variation

## INTRODUCTION

It is a well known fact that many of the fungal spores cause diseases of plants and animals. But their concentration varies with meteorological parameters, source, altitude, etc. (Agarwal and Shivpuri, 1969). Home garden is an inevitable component in the rural areas of Manipur, one of the seven sister states of northeast India. Every household in Manipur valley maintain home gardens for their day to day consumption. Home gardens never remain empty. Instead, they are always covered by seasonal crops, trees, etc. Seasonal crops include vegetables, pulses, spices, oil yielding crops, medicinal plants, etc. In Manipur, a lot of work on aerobiology has been carried out by Singh and his co-workers (Singh and Singh, 1994; Singh, 2006) but no information is available about the aeromycoflora of home gardens. Thus, the present investigation has been undertaken to assess the gualitative and quantitative concentration of airborne fungal spores over the home gardens of Manipur valley and their correlation with meteorological parameters.

## MATERIALS AND METHODS

Monitoring of fungal airspora was done for two years (from January, 2009 to December, 2010). Air sampling was done using Tilak rotorod air sampler over a home garden located in Imphal West District, Manipur. Transparent cellotape was applied to the rods of the sampler, trimmed back to the width of the rods and coated with vaseline. The sampler was operated thrice a month by keeping at a height of 1 metre above ground level. Slides were prepared using glycerine jelly mountant and scanned regularly. Fungal spores were identified with the help of published literatures (Ellis, 1971; Barnett and Hunter, 1972) and by comparing with reference slides. The spore count was multiplied by the conversion factor, 5. During the investigation period, meteorological parameters were obtained from ICAR Research Centre, Imphal.

## **RESULTS AND DISCUSSION**

All the catches were categorized into two groups – fungal spores and other types. Other types con-

Table 1 : Fungal airspora (average of total population) and their contribution (%) to different spore types over home garden in Manipur,

2009         2010         Total of 2009 & 2010           MASTIGOMYCOTINA Albigo         No.         %         No.         %         No.         %           Albigo         150385         6.25         178340         7.41         328725         13.66           CYGOMYCOTINA Round spores (Rhizopus- Mucor type)         16245         0.68         16680         0.69         32925         1.37           ASCOMYCOTINA Chaetomium         34530         1.44         38720         1.61         73250         3.05           Fusiform ascospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA Basidospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA Basidospores         65480         2.72         66575         2.77         132055         5.49           Alternaria         65480         0.002         65         0.002         130         0.004           Carcospora         2870         0.12         1970         0.08         4840         0.20           Caldesporium         2505         2.88         88660         3.69         15710         6.57           Diptodia		Spore types	Total number of spores / m <sup>3</sup> of air and percentage contribution							
MASTIGOMYCOTINA Albugo         No.         %         No.         %         No.         %           Albugo         150385         6.25         178340         7.41         328725         13.66           ZYGOMYCOTINA Round spores (Rhizopus- Mucor type)         16245         0.68         16680         0.69         32925         1.37           Mucor type)         ASCOMYCOTINA Chaetomium         34530         1.44         38720         1.61         73250         3.05           BASIDIOMYCOTINA Basidospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA Basidospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA Alternaria         66480         2.72         66575         2.77         132055         5.49           Aspergili – Penicilli         199685         8.30         273455         11.37         473140         19.67           Bilspora         65         0.002         65         0.002         130         0.0046           Calcosporium         261805         10.88         207150         8.61         468955         19.49           Collectrichum         1050         0.041			2009		2010	2010		9 & 2010		
Albugo         150385         6.25         178340         7.41         328725         13.66           ZYGOMYCOTINA         16245         0.68         16680         0.69         32925         1.37           Mucor type)         ASCOMYCOTINA         0.69         32925         1.37           ASCOMYCOTINA         0.05         2305         0.10         3425         0.15           ASCOMYCOTINA         35650         1.44         38720         1.61         73250         3.05           BASIDIOMYCOTINA         35650         1.49         41025         1.71         76675         3.20           BASIDIOMYCOTINA         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA         199685         8.30         273455         11.37         473140         19.67           Alternaria         6540         0.02         65         0.002         130         0.004           Bispora         657         0.12         1970         0.08         4840         0.20           Cladosporium         261805         10.88         279150         8.61         48895         19.49           Colidebrichum         1050         0.04			No.	%	No.	%	No.	%		
Abburgo         130383         5.25         178340         7.41         322725         13.66           Round spores (Rhizopus- Mucor type)         16245         0.58         16680         0.69         32925         1.37           ASCOMYCOTINA Chaetomium         34530         1.44         38720         1.61         73250         3.05           ASCOMYCOTINA Fusiform ascospores         1120         0.05         2305         0.10         3425         0.15           ASIDIOMYCOTINA Basidiospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA Aspectilii         19965         8.30         273455         11.37         473140         19.67           Baltrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Collectrichum         1650         0.04         1330         0.06         2380         0.10           Corprespora         180         0.007         160         0.006         340         0.013           Collectrichum         1050         0.04         1330         0.06         2380 </td <td></td> <td>Alburgo</td> <td>150005</td> <td>0.05</td> <td>1700.40</td> <td><b>-</b> 44</td> <td></td> <td></td>		Alburgo	150005	0.05	1700.40	<b>-</b> 44				
Round spores         (Round sp	1.1.1		150365	6.25	178340	7.41	328725	13.66		
Noticity Spins         Instance         16243         0.68         1680         0.69         32925         1.37           ASCOMYCOTINA         Chaetomium         34530         1.44         38720         1.61         73250         3.05           BASIDIOMYCOTINA         35650         1.49         41025         1.71         76675         3.20           BASIDIOMYCOTINA         35650         1.49         41025         1.71         76675         3.20           Basidiospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA         Basidiospores         905         0.04         1310         0.055         2.49           Aspergilli - Penicilli         199685         8.30         2.72         66575         2.77         132055         5.49           Basidiospores         2870         0.12         1970         0.08         4840         0.20           Caladosporium         221805         10.88         207150         8.61         468955         19.49           Colladosporium         125         0.04         1330         0.006         2380         0.10           Carvataria         69250         2.88         88660<		21 GOM FCOTINA	10045	0.00	40000					
Mobul (pg) ASCOMYCOTINA Chaetomium         34530         1.44         38720         1.61         73250         3.05           Fusiform ascospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA Basidiospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA Beltrania         65480         2.72         66575         2.77         132055         5.49           Aspergili – Penicilli         199685         8.30         273455         11.37         473140         19.67           Beltrania         40         0.0016         90         0.003         130         0.004           Circospora         2870         0.12         1970         0.08         4840         0.20           Cilatotrichum         1050         0.04         1330         0.06         2380         0.10           Curvularia         69250         2.88         8660         3.69         157910         6.57           Dipicotia         110         0.004         1325         0.004         0.005         2.20         0.012           Direchslera         885         0.04         1025         0.03         <		Muserture)	16245	0.68	16680	0.69	32925	1.37		
ASCOUNCE INVA         34530         1.44         38720         1.61         73250         3.05           Fusiform ascospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA         65480         2.72         66575         2.77         132055         5.49           Alternaria         65480         2.72         66575         2.77         132055         5.49           Beltrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Caladosporium         261805         10.88         207150         8.61         468955         19.49           Calidotrichum         1050         0.04         1330         0.006         340         0.010           Carrospora         180         0.007         160         0.006         340         0.010           Carrospora         180         0.007         160         0.006         340         0.010           Curvularia <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>										
Charlonium         34330         1.44         38720         1.61         73250         3.05           Fusiform accospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA         35650         1.49         41025         1.71         76675         3.20           DEUTEROMYCOTINA         905         0.04         1310         0.05         2215         0.09           Alternaria         65480         2.72         66575         2.77         132055         5.49           Aspergilli - Penicilli         199685         8.30         273455         11.37         473140         19.67           Beltrania         65         0.002         65         0.002         130         0.004           Carospora         2870         0.12         1970         0.08         4840         0.20           Caldosporium         261805         10.88         207150         8.61         468955         19.49           Callostorichum         1050         0.04         1330         0.06         2386         0.10           Carospora         180         0.007         160         0.006         340         0.013           <		Chaotomium	04500				_			
Pusitorin ascospores         1120         0.05         2305         0.10         3425         0.15           BASIDIOMYCOTINA Basidiospores         905         0.04         1310         0.05         2215         0.09           DEUTEROMYCOTINA Alternaria         65480         2.72         66575         2.77         132055         5.49           Aspergilli - Penicilli         199685         8.30         273455         11.37         473140         19.67           Beltrania         40         0.0016         90         0.002         130         0.0046           Bispora         65         0.002         65         0.002         130         0.0046           Calidotsporium         261805         10.88         207150         8.61         468955         19.49           Calidottrichum         1050         0.04         1330         0.066         2380         0.10           Carvaspora         180         0.007         160         0.006         245         0.0101           Diploida         110         0.0045         135         0.004         1910         0.08           Epicoacum         125         0.005         75         0.003         200         0.012 <td></td> <td></td> <td>34530</td> <td>1.44</td> <td>38720</td> <td>1.61</td> <td>73250</td> <td>3.05</td>			34530	1.44	38720	1.61	73250	3.05		
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Alternaria         65480         2.72         66575         2.77         132055         5.49           Aspergilli – Penicilli         199685         8.30         273455         11.37         473140         19.57           Beltrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Cercospora         2870         0.12         1970         0.08         4840         0.20           Colletotrichum         1050         0.04         1330         0.066         2380         0.10           Convespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88603         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         1235         4.74         108070         4.49         222025         9.23           Memoniella		Basidiospores	905	0.04	1310	0.05	2215	0.09		
Alternaria         65480         2.72         66575         2.77         132055         5.49           Aspergilli         Penicilli         199685         8.30         273455         11.37         473140         19.67           Belltrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Carcospora         2870         0.12         1970         0.08         4840         0.20           Caladosporium         261805         10.88         207150         8.61         468955         19.49           Collectorichum         1050         0.04         1330         0.066         340         0.013           Curvularia         69250         2.88         8860         3.69         157910         6.57           Diplodia         110         0.0045         135         0.004         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.001           Mermioniella         160         0.006         160         0.006         320         0.012           Ni		DEUTEROMYCOTINA								
Aspergill - Penicilii         199685         8.30         273455         11.37         473140         19,67           Beltrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Cladosporium         261805         10.88         207150         8.61         468955         19.49           Colletotrichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.011           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Mermoniiella		Alternaria	65480	2.72	66575	2.77	132055	5.49		
Beitrania         40         0.0016         90         0.003         130         0.0046           Bispora         65         0.002         65         0.002         130         0.004           Cercospora         2870         0.12         1970         0.08         4840         0.20           Calaosporium         261805         10.88         207150         8.61         488955         19.49           Colletotrichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.002         245         0.011           Drechslera         885         0.04         1902         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.0012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300		Aspergilli – Penicilli	199685	8.30	273455	11.37	473140	19.67		
Bispora         65         0.002         65         0.002         130         0.004           Carcospora         2870         0.12         1970         0.08         4840         0.20           Cladosporium         261805         10.88         207150         8.61         468955         19.49           Collatotichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Kusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         320         0.012         150         0.066         450         0.018		Beltrania	40	0.0016	90	0.003	130	0.0046		
Cercospora         2870         0.12         1970         0.08         4840         0.20           Cladosporium         261805         10.88         207150         8.61         468955         19.49           Colletotrichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Eusarium         113955         4.74         108070         4.49         22025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis <td< td=""><td></td><td>Bispora</td><td>65</td><td>0.002</td><td>65</td><td>0.002</td><td>130</td><td>0.004</td></td<>		Bispora	65	0.002	65	0.002	130	0.004		
Cladosporium         261805         10.88         207150         8.61         468955         19.49           Colletotrichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis		Cercospora	2870	0.12	1970	0.08	4840	0.20		
Collectorichum         1050         0.04         1330         0.06         2380         0.10           Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Memoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40		Cladosporium	261805	10.88	207150	8.61	468955	19.49		
Corynespora         180         0.007         160         0.006         340         0.013           Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Memoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52855         2.20         108565         4.51           Prithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60		Colletotrichum	1050	0.04	1330	0.06	2380	0.10		
Curvularia         69250         2.88         88660         3.69         157910         6.57           Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         22025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         670 <td></td> <td>Corynespora</td> <td>180</td> <td>0.007</td> <td>160</td> <td>0.006</td> <td>340</td> <td>0.013</td>		Corynespora	180	0.007	160	0.006	340	0.013		
Diplodia         110         0.0045         135         0.0056         245         0.0101           Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.0047           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         100         0.005           Torula         670		Curvularia	69250	2.88	88660	3.69	157910	6.57		
Drechslera         885         0.04         1025         0.04         1910         0.08           Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Torula         670         0.03         410         0.02         1080         0.005           Trichoconis         130		Diplodia	110	0.0045	135	0.0056	245	0.0101		
Epicoccum         125         0.005         75         0.003         200         0.008           Fusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45		Drechslera	885	0.04	1025	0.04	1910	0.08		
Fusarium         113955         4.74         108070         4.49         222025         9.23           Memnoniella         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         7		Epicoccum	125	0.005	75	0.003	200	0.008		
Memnoniella Nigrospora         160         0.006         160         0.006         320         0.012           Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         1080         0.05           Tetraploa         215         0.008         110         0.0047         325         0.0112           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           Pof625         32.857		Fusarium	113955	4.74	108070	4,49	222025	9.23		
Nigrospora         5190         0.22         6015         0.25         11205         0.47           Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           By165         3.71		Memnoniella	160	0.006	160	0.006	320	0.012		
Periconia         300         0.012         150         0.006         450         0.018           Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         73950         3.71         116705         4.85         205870         8.56           163115         6.78<		Nigrospora	5190	0.22	6015	0.25	11205	0.47		
Pestalotiopsis         55730         2.31         52835         2.20         108565         4.51           Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         100         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         73950         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925		Periconia	300	0.012	150	0.006	450	0.018		
Pithomyces         40         0.0016         75         0.0031         115         0.0047           Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         73950         3.07         72100         3.00         146050         6.07           0thers*         163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100 <td></td> <td>Pestalotiopsis</td> <td>55730</td> <td>2.31</td> <td>52835</td> <td>2.20</td> <td>108565</td> <td>4.51</td>		Pestalotiopsis	55730	2.31	52835	2.20	108565	4.51		
Sclerotium         12585         0.52         13565         0.56         26150         1.08           Spegazzinia         60         0.0025         60         0.0025         120         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         73950         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Pithomyces	40	0.0016	75	0.0031	115	0.0047		
Spegazzinia         60         0.0025         60         0.0025         120         0.005           Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Hyphal fragments         73950         3.07         72100         3.00         146050         6.07           0thers*         163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Sclerotium	12585	0.52	13565	0.56	26150	1.08		
Tetraploa         215         0.008         110         0.004         325         0.012           Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         790625         32.8571         822310         34.1887         1612935         67.0458           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           By165         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Spegazzinia	60	0.0025	60	0.0025	120	0.005		
Torula         670         0.03         410         0.02         1080         0.05           Trichoconis         130         0.005         135         0.006         265         0.011           Trichothecium         45         0.0019         35         0.0015         80         0.0034           OTHER TYPES         790625         32.8571         822310         34.1887         1612935         67.0458           OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           B9165         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Tetraploa	215	0.008	110	0.004	325	0.012		
Trichoconis Trichothecium         130 45         0.005 0.0019         135 35         0.006 0.0015         265 80         0.011 0.0034           OTHER TYPES Hyphal fragments Others*         790625         32.8571         822310         34.1887         1612935         67.0458           OTHER TYPES Hyphal fragments Others*         73950         3.07         72100         3.00         146050         6.07           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Torula	670	0.03	410	0.02	1080	0.05		
Trichothecium         45         0.0019         35         0.0015         80         0.0034           790625         32.8571         822310         34.1887         1612935         67.0458           OTHER TYPES Hyphal fragments Others*         73950         3.07         72100         3.00         146050         6.07           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Trichoconis	130	0.005	135	0.006	265	0.011		
790625       32.8571       822310       34.1887       1612935       67.0458         OTHER TYPES       73950       3.07       72100       3.00       146050       6.07         Others*       73950       3.71       116705       4.85       205870       8.56         163115       6.78       188805       7.85       351920       14.63         GRAND TOTAL       1156925       48.0971       1248470       51.8987       2405395       100		Trichothecium	45	0.0019	35	0.0015	80	0.0034		
790625         32.8571         822310         34.1887         1612935         67.0458           OTHER TYPES Hyphal fragments Others*         73950 89165         3.07 3.71         72100 116705         3.00 4.85         146050 205870         6.07 8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100						0.0010	00	0.0004		
OTHER TYPES         73950         3.07         72100         3.00         146050         6.07           Others*         89165         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100			790625	32.8571	822310	34,1887	1612935	67 0458		
Hyphal fragments Others*73950 891653.07 3.7172100 1167053.00 4.85146050 2058706.07 8.561631156.781888057.8535192014.63GRAND TOTAL115692548.0971124847051.89872405395100		OTHER TYPES		5						
Others*         89165         3.71         116705         4.85         205870         8.56           163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Hyphal fragments	73950	3.07	72100	3.00	146050	6.07		
163115         6.78         188805         7.85         351920         14.63           GRAND TOTAL         1156925         48.0971         1248470         51.8987         2405395         100		Others*	89165	3.71	116705	4 85	205870	8.56		
163115 6.78 188805 7.85 351920 14.63 GRAND TOTAL 1156925 48.0971 1248470 51.8987 2405395 100							200010	0.00		
GRAND TOTAL 1156925 48.0971 1248470 51.8987 2405395 100			163115	6.78	188805	7.85	351920	14.63		
GHAND I OTAL 1156925 48.0971 1248470 51.8987 2405395 100					Ū.					
		GHAND TOTAL	1156925	48.0971	1248470	51.8987	2405395	100		

\* excluding hyphal fragments

sist of pollen grains, insect scales, mycelial fragments, unidentified types etc. The fungal spores were assigned to 29 fungal types. Fungal spores contributed 85.37% and other types contributed 14.63% of the total airspora. The fungal types detected from the present investigation were classified into five sub-divisions as per Ainsworth's (1966) classification (Table 1). Out of the 29 fungal types identified, 24 fungal types belonged to Deuteromycotina, 2 to Ascomycotina and 1 each to Mastigomycotina, Zygomycotina and

Basidiomycotina. The percentage contribution of individual spores to the total number of spores for two years in desceriding order were Aspergilli – Penicilli (19.67%), *Cladosporium* (19.49%), *Albugo* (13.66%), *Fusarium* (9.23%), *Curvularia* (6.57%), hyphal fragments (6.07%), *Alternaria* (5.49%), *Pestalotiopsis* (4.51%), *Chaetomium* (3.05%), round spores (Rhizopus-Mucor type) (4.37%) etc. The present finding was in agreement with previous reports (Sen and Asan, 2001; Stepalska and Wolek, 2005).

The concentration of spores in different months was shown in fig. 1. The highest concentration of spores was recorded in August contributing 8.9%



Fig. 1 : Monthly variations of total fungal airspora over home garden for 2009, 2010 and sum of 2009 and 2010

in 2009 and 9.03% in 2010. The coincidence of highest concentration of spores in August in both the years might be due to the presence of favourable weather conditions of high relative humidity (>85%), moderate temperature ( $29^{\circ}$ C) and average rainfall of about 6 – 7 mm with intermittent distribution of rain in the month. Similar view was opined by other workers (Lacey, 1981; Reddy, 1979; Mitakakis *et al.* 2001; Stepalska and Wolek, 2005 etc.)

Yearly analysis of data revealed more number of fungal spores during 2010 (12,48,470 spores/m<sup>3</sup> of air) than during 2009 (11,56,925 spores/m<sup>3</sup> of air). Even though there was a little higher in relative humidity (4.7%) and a slight difference in rainfall (1.5 mm), nearly 9.1 x 10<sup>5</sup> spores/m<sup>3</sup> of air was observed higher in 2010 than 2009. This might be due to the availability of substrates in addition to meteorological factors. Various workers reported similar results (Sen and Asan, 2001; Hameed, 2005). Lacey (1981) reported that grasslands and agricultural crops are the major sources of fungal spores which are liberated in the air by human activity specially during harvesting. The existence of airborne fungal biopollutants qualitatively and quantitatively as well as fluctuations in their occurrence are influenced by substrates specially different crops and weeds growing in the home garden, uprooted piled up unwanted weeds etc. in addition to the meteorological factors and disturbance of the substrates by the home gardeners.

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