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### AEROMYCOLOGICAL STUDIES OF GROUNDNUT FIELD AT NASHIK, (M.S.)

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**Abstract:** Groundnut is an important oil seed crop in many tropical and subtropical regions of the world. Present investigations deals with aeromycological studies over groundnut (*Arachis hypogae* L.) field at Nashik. The period of investigation was from August 2004 to November 2004, the studies were carried out by using Tilak Air Sampler. The incidence and percentage contribution of individual spores was recorded separately. During investigations total 48 fungal spore types and 4 other types were recorded. Maximum percentage contribution of following spores were observed. *Cladosporium* contributed in highest number 9.23 % to the total airspora. It was followed by *Alternaria* 7.45 %, *Uredospores* 5.79% , *Cercospora* 5.27% , *Leptosphaeria* 4.54 % , *Curvularia* 3.34 % , *Helminthosporium* 2.86 % and *Pithomyces* 3.71%. Rust disease of groundnut caused by (*Uredospores*) *Puccinia arachidis* and Tikka disease caused by *Cercospora arachidicola*. These diseases are responsible for considerable losses in yield of groundnut crop. These studies are helpful to provide information towards disease forecasting system.

**Keywords:** Aeromycology, *Cladosporium* , *Cercospora* , Rust and Tikka disease.



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## INTRODUCTION

Air is one of the most important components of the environment as soil and water. Today plants, animals and human beings are continuously facing attacks of microorganisms on food, water and environment. Air borne microorganisms especially bacteria and fungi attack the biotic flora, deteriorate food and damage crops. The fungal spores are disseminated by fruiting bodies of fungi and blown by air facilitating attack on plants.

The present investigation deals with the airspora over Groundnut field. Groundnut (*Arachis hypogea* L.) is an important oil seed crop in many tropical and subtropical regions of the world. Oil seeds account for one ninth of the total agricultural production in India. The average area under groundnut cultivation is 72.57 lakh hectares. Andhra Pradesh, Maharashtra, Gujrat, Madhya Pradesh, Karnataka & Tamil Nadu account for 78% of the area under groundnut cultivation in India. Groundnut is subjected to various fungal, viral and pest diseases. The diseases are airborne and soil borne. Major airborne diseases are Tikka disease caused by *Cercospora arachidicola* Hori., and *Cercospora personatum* (Berk and Curt.) Deighton. Rust disease caused by *Puccinia arachidis* Speg. Other airborne minor diseases like leaf spots caused by *Leptosphaerulina crassica* (Sechet) Jackson and Bell, *Alternaria alternata* (Fr.) Keissler and *Myrothecium roridum* Rode ex Fr. etc.

Tikka disease is a common foliar disease of Groundnut and occurs in every Groundnut growing country in the world. The rust disease was first reported in 1971 from Punjab (Chahal and Chohan, 1971) and now it has spread throughout the country. However aerobiological work has not been carried out over Groundnut crop at Nashik. Much of the land is under cultivation of this crop and hence it was intended to find out the general composition of airspora over Groundnut crop (*Arachis hypogea* L.). During present investigations, more stress has been given on fungal components of airspora.



Map of Maharashtra showing geographical location of Nashik District

### Map of Nashik District showing geographical location of Nashik

#### MATERIAL AND METHODS :

Nashik (20° 02' N, 73° 50' E) lies on banks of Godawari river. The main sea level of Nashik is 612 Meters. The site for this study was a Groundnut field, situated at a distance of 4 kms towards west from Central bus stand, Nashik, on Gangapur road. The present study was carried out during the period August 2004 to November 2004, by using Tilak Air Sampler (Tilak and Kulkarni 1970).

The apparatus was operated continuously for 24 hours every week for the entire study period. After air sampling, the cellotape was removed and equally divided into 16 equal segments, each measuring 4.2 cm. Each piece of the tape thus obtained represents air sampling for twelve hours, day and night respectively. Each segment was mounted on clean glass slide with glycerin jelly and covered with 22 X 40 mm cover glass. Scanning was done regularly after slide preparation, under 10x45-eyepiece objective combination of binocular research microscope.

#### RESULTS AND DISCUSSION

During the period of air sampling over the Groundnut field for one kharif season, in all total 48 fungal spore types and 4 other types were recorded. (Other types include fungal fragments, pollen grains, insect scales and unidentified spores). Table I shows the recorded spores; classified under their respective groups, arranged in alphabetical order under each respective group along with their percentage contribution over the groundnut field.

Table No-I

Total Contribution and percentage contribution of each airborne component over the Groundnut field

No.	Spore Type	Concntration / m3	% Contribution
<b>I</b>	<b>MYXOMYCOTINA</b>		
1	<i>Physarum</i>	1078	0.35
2	<i>Stemonitis</i>	1092	0.35
<b>II</b>	<b>ZYGOMYCOTINA.</b>		
1.	<i>Albugo</i>	5950	1.92
2.	<i>Circinella</i>	3976	1.28
3.	<i>Cunninghamella</i>	3738	1.21
4.	<i>Mucor</i>	13818	4.46
5.	<i>Rhizopus</i>	7042	2.27
<b>III</b>	<b>ASCOMYCOTINA</b>		
1.	<i>Bitrimonospora</i>	1232	0.40
2.	<i>Chaetomium</i>	4060	1.31
3.	<i>Didymosphaeria</i>	7770	2.51
4.	<i>Hysterium</i>	5488	1.77
5.	<i>Leptosphaeria</i>	14098	4.55
6.	<i>Lophiostoma</i>	4032	1.30
7.	<i>Massarina</i>	644	0.21
8.	<i>Melanospora</i>	980	0.32

9.	<i>Pleospora</i>	1050	0.34
10	<i>Sordaria</i>	1554	0.50
11.	<i>Trematosphaeria</i>	798	0.26
12.	<i>Xylaria</i>	1806	0.58
<b>IV BASIDIOMYCOTINA</b>			
1	<i>Ganoderma</i>	8414	2.71
2	Smut	24276	7.83
3	Uredospores	17962	5.79
<b>V DEUTEROMYCOTINA</b>			
1	<i>Alternaria</i>	23100	7.45
2	<i>Aspergillus</i>	5908	1.91
3	<i>Beltrania</i>	2310	0.75
4	<i>Beltraniella</i>	1022	0.33
5	<i>Bispora</i>	9996	3.22
6	<i>Botryodiplodia</i>	588	0.19
7	<i>Cercospora</i>	16338	5.27
8	<i>Chaetomella</i>	3164	1.02
9	<i>Caldosporium</i>	28602	9.23
10	<i>Cordana</i>	462	0.15
11	<i>Curvularia</i>	10346	3.34
12	<i>Dictyoarthinium</i>	392	0.13
13	<i>Dictyosporium</i>	770	0.25

14	<i>Epicoccum</i>	1218	0.39
15	<i>Exosporium</i>	1400	0.45
16	<i>Fusarium</i>	2156	0.70
17	<i>Helminthosporium</i>	8862	2.86
18	<i>Heterosporium</i>	5180	1.67
19	<i>Nigrospora</i>	6972	2.25
20	<i>Periconia</i>	4466	1.44
21	<i>Pestalotia</i>	672	0.22
22	<i>Phaoetrichoconis</i>	966	0.31
23.	<i>Pithomyces</i>	11508	3.71
24	<i>Sirodesmium</i>	1162	0.37
25.	<i>Torula</i>	9506	3.07
26.	<i>Trichoconis</i>	1484	0.48
VI	OTHERS		
1	.llllp Hyphal Fragment	4732	1.53
2	Insect parts	6090	1.96
3	Plant part	5614	1.81
4	Pollen grains	4130	1.33
	<b>Total</b>	<b>309974.00</b>	<b>100.00</b>

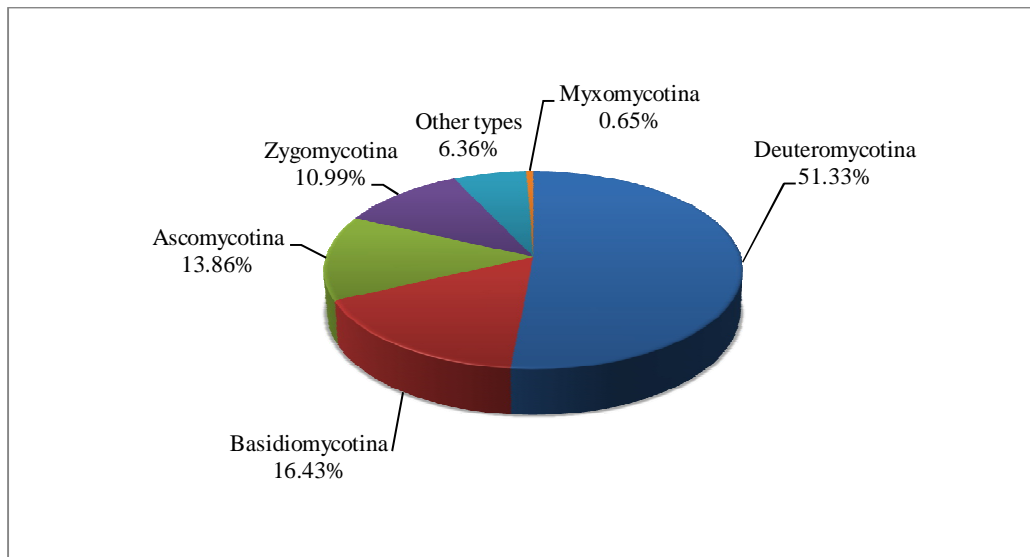
In present study 48 fungal spore types and 4 other types were recorded , out of which 2 belong to Myxomycotina, 5 to Zygomycotina, 12 to Ascomycotina, 3 to Basidiomycotina and 26 to Deuteromycotina. The average percentage contribution of each spore group over the groundnut field was as follows :- Deuteromycotina (51.33 %), followed by Basidiomycotina(16.43%), Ascomycotina (13.86%), Zygomycotina (10.99%), other types (6.36%), and Myxomycotina (0.65%). Among the spores *Cladosporium* had maximum concentration i.e.,

9.23 % of the total airspora, followed by *Alternaria* 7.45 %, *Uredospores* 5.79% , *Cercospora* 5.27% , *Leptosphaeria* 4.54 % , *Curvularia* 3.34 % , *Helminthosporium* 2.86 % , *Pithomyces* 3.71 % , etc.

It was observed that occurrence of spores in air was in correlation with unpredictable changes in weather parameters, field operations and crop growth stages. Spores pathogenic to Groundnut contributed 26.92% to the total airspora. Spores like *Alternaria*, *Cercospora*, *Helminthosporium* , *Leptosphaeria* which are responsible for initiating leaf spot diseases of groundnut were noted. *Uredospores* responsible for Rust disease of groundnut were also recorded. Similar observations were recorded by earlier workers like Rees (1964), Srinivasulu (1967), Sreeramulu (1995), Aher and Pande (2004), Kadam *et al* (2008). Such a long term air monitoring exploration will be of great help in devising a system for forecasting diseases for groundnut crop in this region and consequently at the state and national level too.

FIG-i

**PERCENTAGE Contribution OF EACH SPORE GROUP TO THE TOTAL airSPORA over the Groundnut field**



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