



## FUNGAL SPORE OF GROUNDNUT FIELDS IN BEED DISTRICT

**J. J. Kshirsagar, A. N. Dharasurkar, G. L. Pachkore**

Department of Botany, P.V.P. College, Patoda, District Beed,

jyotikshirsagar1974@gmail.com

**Abstract:**

In this investigation 58 spores were trapped to air over groundnut field through out the season. Deuteromycotina was dominated the air spora. The total airspora was peak in February. The spores *Alternaria*, *Cladosporium*, *Helminthosporium* Smuts, *Nigrospora*, Hyphal fragments and Pollan grains were trapped and their concentration increased in February and decreases later. Day on which highest counts of individual spores types were obtained.

**Keyword:** Airspora, Tilak air sampler, groundnut field.

**Introduction:**

The aerobiological studies are of recent origin in India. In Maharashtra and Marathwada credit for developing the aerobiological research work goes to Prof. Tilak S.T. Very few crops have been investigated so far. ( Sreeramulu and Seshavataram 1962; Sreeramulu and Ramalingam, 1963, 1966; Sreeramulu and Vittal 1966, 1971 ), Tilak et al. ( 1967 and onwards ) actively engaged in the field of aerobiology and studied the airspora over the different crop, vegetable and cotton field. They had obtained the higher catches in June to October and these coincided with monsoon. In a study of airspora of groundnut fields, Deshpande et al. (1967) have observed different spore types , *Cladosporium*, *Alternaria* and *Helminthosporium* were the dominant only. In a study of airspora of groundnut fields, observed different spores types. Amongst them the *Alternaria*, *Cladosporium*, Smuts and *Nigrospora* was dominant ones. In Beed district, the groundnut field is a cash crop. Before this Deshpande et al. (1967) and Gopan (2002 – 2003) study the airspora of groundfield field.

**Material and Method :**

In the present study, Tilak Air sampler was implemented to find out the availability of casual microbes of blight and leaf spot diseases in the groundnut field of 10 acres of land area. Tilak air sampler is an electrically operated machine which runs on electric power supply of (AC 230 V) and provides a continuous air sampling data for eight days. Sampler was kept with its orifice at constant height of 1 meter above the ground in the groundnut field. The air was sampled at the rate of 5 liters for minute and the transparent cellophane tape was fixed on the drum, coated uniformly with white petroleum jelly as adhesive. These cellophane brought to the laboratory, slides were made and

scanned. Fungal spores isolation was made from these slides over groundnut fields.

**Results and discussion :**

Percentage contribution of different spore types to the total airspora was calculated and is given in Table 1. *Alternaria* , *Cladosporium* and smut spore made a major components of airspora contributing 11.69 % , 30.38% and 9.31% spores respectively. The spores Smuts, *Curvularia*, *Nigrospora*, *Periconia*, *Helminthosporium*, Hyphal fragments, contributed 3 to 9 % to the total airspora. *Cunninghamella*, *Rust spore*, *Drechslera*, *Heterosporium*, *Pseudotorula*, and Pollan grains obtained 1 to 3% of the total airspora.

Deuteromycotina recorded maximum percentage contribution to the total airspora (66.59%) and were followed by the group Basidiomycotina (14.10%), Ascomycotina ( 8.14% ) , other types (7.41) and Zygomycotina (3.76 %).

The percentage contribution of different groups in relation to the season was also calculated. Total airspora was found to increase in gradually and reached maximum concentration in February, while in the month of January and March, the concentration was moderate. The percentage of ascomycotina increases abruptly in February and decreases later. The group ascomycotina were recorded throughout the season. Basidiomycotina were also found throughout the season and reached maximum concentration in February. While in March, there is a slight decrease in concentration and abruptly decreased in April. The percentage of concentration of deuteromycotina was throughout the season and there was slight changes in the concentration of spores. The group Zygomycotina did not show any definite pattern of distribution, although the distribution was not uniform throughout the season.

The concentration of spore types in relation to the season noticed that the *Alternaria* spore were present in the air throughout the season. This appears from the early stage of the crop. A high concentration *Cladosporium*, Smuts, *Curvularia*, *Nigrospora* and *Helminthosporium* in the month of February. The total spore concentration revealed peak in February. While minimum peak were noticed at the end of April. *Curvularia* obtained differences in their counts were maximum in January and minor peak were observed later in the season.

Member of the deuteromycotina appeared to dominant air over groundnut field contributing about 66.59% to the total air spora. Amongst the dominant types *Cladosporium* contributed a maximum share to the total airspora (20.38%), *Alternaria* also formed a major component of the airspora ( 11.69% ). Dominance member of deuteromycetes in airspora appears to be an universal features. ( Gregory and Hirst 1957; Adams 1964; Sreeramulu and Ramalingam 1966; Dransfield 1966 and Turner 1966 ) Irrespective of the crop or the site selected, groundnut doesn't appear to be an exception. *Alternaria* has been reported to be contribute a major share. Yousef-Al-Doory (1967) reported their highest concentration in August. Scheneck (1968) in Florida, reported *Alternaria* with high concentration in the month of June. The concentration suddenly increased after rains, however prolonged dry periods reduced the concentration. Mishra and Kamal (1971) reported *A Humicola*, Chen et al. (1978) reported spores from Taipei airspora.

In maharashtra, the reports of these conidia have been made by Kulkarni ( 1971), Gaikwad (1974), Tilak and Vishwe ( 1975), Pande (1976),

Mane (1978) from the air of Aurangabad, Ahmednagar, Nanded and Vijapur respectively. *Cladosporium* has been reported to contribute a major share in air over paddy fields ( Sreeramulu and Seshavataram 1962; Sreeramulu and Ramalingam 1963, 1966). In London ( Ainsworth, 1952) at Rothansted ( Gregory and Hirst 1957), at Kansas ( Kramer et al. 1959), in banana plantations, Jamaica ( Meredith, 1962), at Brisbane ( Rees 1964). In a study of airspora at Cardiff, Harvey (1967) recorded maximum number of spores of *Cladosporium* in July-August., however, Rajan et al. 1952 reported a few and sporadic ones from Kanpur. Sreeramulu and Ramalingam (1963) reported *Cladosporium* as an important element of air spora, Ramalingam (1971) also recorded highest catches of *Cladosporium*, the most common element of air spora at Mysore.

Most of the fungi ( *Alternaria*, *helminthosporium* and *Curvularia* ) thus recorded their seasonal peak in rainy season. Sreeramulu and Seshavataram (1962) observed higher numbers of *Curvularia* in September-October over paddy fields Dransfield (1966) at Samaru recorded spores of this fungus more frequently during rainy season. Sreeramulu and Ramalingam (1963) reported maximum numbers in December.

Seasonal peak for total air spora was evident in rainy season. When the crop was passing through the growing stage. A slight increase in the total airspora was also evident at the close of the season. This can be attributed to the harvesting operations in the field. This is in agreement with the earlier studies by Sreeramulu and Ramalingam (1963); Sreeramulu and Vittal (1966); and Dransfield (1966).

PERCENTAGE CONTRIBUTION OF EACH AIRBORNE COMPONENT TYPE TO THE TOTAL AIRSPORA OVER GROUNDNUT FIELD DURING SEASON (i.e FROM 1/1/2014 TO 30/4/2014)

Sr. No.	Spore type	Total spore conc/m3 of air	%Contribution to the total airspora
( A )	ZYGOMYCOTINA		
1	Albugo	2324	1.22
2	Cunninghamella	4828	2.54
	Total	7152	3.76
( B )	ASCOMYCOTINA		0.00
1	Amphisphaerella	336	0.18
2	Chaetomium	2226	1.17
3	Claviceps	476	0.25
4	Cucurbitaria	504	0.27
5	Didymosphaeria	4494	2.36
6	Hypoxyton	2744	1.44
7	Hysterium	1162	0.61
8	Massaria	168	0.09
9	Massarina	252	0.13

10	Melanospora	1610	0.85
11	Pleomassaria	392	0.21
12	Pringsheimia	308	0.16
13	Teichospora	322	0.17
14	Xylaria	476	0.25
	Total	15470	8.14
( C )	BASIDIOMYCOTINA		
1	Basidiospores	5838	3.07
2	Rust spores	3250	1.71
3	Smut spores	17696	9.31
	Total	26784	14.10
( D )	DEUTEROMYCOTINA		
1	Alternaria	22218	11.69
2	Bactridium	546	0.29
3	Beltrania	1092	0.57
4	Beltraniella	588	0.31
5	Bispora	1512	0.80
6	Botrydiplodia	658	0.35
7	Ceratophorum	224	0.12
8	Cercospora	2268	1.19
9	Chaetome lla	1526	0.80
10	Cladosporium	38724	20.38
11	Cordana	896	0.47
12	Corynespora	630	0.33
13	Curvularia	5908	3.11
14	Dictyoarthrinium	840	0.44
15	Diplodia	966	0.51
16	Drechslera	5474	2.88
17	Epicoccum	1652	0.87
18	Haplosporella	602	0.32
19	Harknessia	924	0.49
20	Helminthosporium	6006	3.16
21	He te rosporium	3248	1.71
22	Hirudinaria	196	0.10
23	Lacellina	462	0.24
24	Lacellinopsis	420	0.22
25	Me mnonie lla	812	0.43
26	Nigrospora	9268	4.88
27	Periconia	6762	3.56
28	Pestalotia	644	0.34
29	Pithomyces	1260	0.66
30	Pseudotorula	4172	2.20
31	Sirodesmium	308	0.16
32	Stigmina	630	0.33
33	Tetraploa	168	0.09
34	Torula	4928	2.59
	Total	126532	66.59
( E )	OTHER TYPES		
1	Hyphal fragments	7280	3.83
2	Insect parts	1274	0.67
3	Plant parts	1596	0.84
4	Polle n grains	3080	1.62
5	Protozoan cysts	854	0.45
	Total	14084	7.41
	Grand Total	190022	100.00

**Reference:-**

- Adams K.F. 1964. Year to year variation in fungus spore content of the atmosphere; *Acta Allergol.* **19** 11-50.
- Ainsworth G.C. 1952. The Incidence of air-borne Cladosporium spore in the London region; *J.Gen. Microbiol.* **7** 358-71.
- Chen et.al 1978. Chen, Z. C., Y.M. Hsiung and H. Y. Tseng 1978. Seasonal variation of fungal airspora in Taipei. *Proc. 1st International Aerobiol. Conf.* Munich, pp.23.
- Deshpane K.B., Deshpande K.S. and Manti J.M. 1967. Studies on the spore content of air over groundnut field I. Changes from 20<sup>th</sup> July to 20<sup>th</sup> August 1967; *Marathwada University. J. Sci.* **B10** 77-80.
- Dransfield J. 1966. The fungal air-spores at Samaru, Northern Nigeria; *Trans. Br. Mycol. Soc.* **49** 121-32.
- Gaikwad Y.B. 1974. Studies in airspora and taxonomy of Pyrenomycetes. Ph.D. Thesis, Marathwada University, Aurangabad.
- Gregory P.H. and Hirst J.M. 1957. The summer air-spores at Rothamsted in 1952; *J.Gen. Microbiol.* **17** 135-52.
- Harvey R.1967. Air spora studies at Cardiff I. *Cladosporium*, *Trans. Br. Mycol. Soc.* **50** 479-495.
- Kulkarni R.L., 1971. Studies in airspora over some fields at Aurangabad. Ph.D. Thesis, Marathwada University, Aurangabad.
- Mane D.A., 1978. Studies on airspora over some fields. Ph. D. Thesis, Marathwada University, Aurangabad.
- Meredith D.S. 1962. Some components of air-spores in Jamaica banana plantations; *Ann. Appl. Biol.* **50** 577-94.
- Mishra B. R. and Kamal. 1971. Aeromycology of Gorakhpur - III. Seasonal variation in air fungal spora. *Mycopath. Mycol.* **45** : 301 - 310.
- Pande B.N. 1976. Studies in airspora over some fields at Nanded. Ph.D. Thesis, Marathwada University, Aurangabad.
- Rajan B.S.V., Nigam S.A. and Shukla R.K. 1952. A study of the atmospheric fungal flora at Kanpur; *Proc. Indian Acad. Sci.* **B35** 33-37.
- Ramalingam A.1971. Air-spores of Mysore; *Proc. Indian Acad. Sci.* **B54** 227-40. Rees R.G., 1964. The airspora of Brisbane. *Aust.J. Bot.* **12** 185 - 204.
- Scheneck, N. C. 1968. Incidence of airborne fungal spores over Watermelon fields in Florida. *Phytopathology.* **58** 97.
- Sreeramulu T. and Seshavatharam V. 1962. Spores content of air over paddy fields I. Changes in a field near Pentapadu from 21<sup>st</sup> September to 31<sup>st</sup> December 1957; *Indian Phytopathol.* **15** 61-74.
- Sreeramulu T. and Ramalingam A. 1963. Spore content of air over paddy fields II. Changes in a field near Visakha patnam for November 3, 1959 to January 9, 1960; *Proc. Natl. Acad. Sci. India.* **B33** 423-28.
- Sreeramulu T. and Ramalingam A.1966. A two year study of the air-spores of a paddy field near Visakhapatnam. *Indian J. Agric. Res.* **36** 111-132.
- Sreeramulu T and Vittal B.P.R. 1966. Some aerobiological observations on the rice stackburn fungus, *Trichoconis Padwickii*; *Indian Phytopathol.* **19** 215-221.
- Sreeramulu T. and Vittal B.P.R. 1971. Periodicity in the Uredospore content of air within and above the sugarcane field; *J. Indian Bot. Soc.* **50** 39-44.
- Tilak S. T. and Srinivasulu B.V. 1967. Airspora of Aurangabad. *Indian J. Microbiol.* **7** 167 - 170.
- Tilak S. T. and Vishwe D. B. 1975. Microbial content of air inside library. *Biovigyanam* **1** 91 - 94.
- Turner P.D. 1966. The fungal air-spores of Hongkong as determined by Agar plate method; *Trans. Br. Mycol. Soc.* **49** 225-27.
- Wadje S.S. and Deshpande K.S.1979. Aeromycology of cotton fields. Sampling through cylinder spore trap. *Proc. Indian Acad. Sci. Vol.* **89**, Number 1, January 1980 pp 15-22.
- Yousef-Al-Doorv. 1967. The fungal flora of the air near the ground in San Antonio, Texas. *Mycopath. Mycol. Appl.* **32** 313 - 318.