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INVESTIGATION OF FUNGAL SPORE OVER SUNFLOWER (HELIANTHUS ANNUSL.) FIELD AT RAJURI (N), DIST. BEED

J. J. Kshirsagar
Department of Botany, VasantdadaPatil College, Patoda, Dist.Beed. (M.S)
Corresponding Author: jyotikshirsagar1974@gmail.com

ASTRACT:
Air spora survey was carried out in the Sunflower field (Helianthus annus L.) for a period of winter Seasons from20th October 2003 to 20th January 2004 and 1st October 2004 To 11th January 2005.For trapping the fungal spores. Tilak air sampler was used. During the investigation the aero microflora population includes large number of fungal spores, pollen grains, inscect parts etc. The result showed incidence of varieties of fungal spores in the environment. In this investigation 70 spores were identified during the period of survey. In this season the most dominant spores were *Cladosporiun*, ***Al****ternaria*, *Cercospora*, *Curvularia*, *Helminthosporium*, *Periconia*, *Rust* spores, *Nigrospora*.

Key word: - *Sunflower (Helianthus annus L.) field, Tilak air sampler, fungal spores.*

INTRODUCTION:

Aerobiology is branch of science which draws information from various disciplines like ecology, mycology and plant pathology, palynology, bio-chemistry, immunology and Clinical medicine.

Each and every living organism, whether it is a human being, plant, animal or a microbe, always struggles to exist on the earth in water or in air and tries to keep pace with its neighbour and accumulate the strength required for its existence, sometimes in harmony, but at times causing loss or damage.

Environment is a mixture of all kinds of living beings varying from the minute micro–organisms to the large macro-organisms. Air is one of the most important ingredients like soil and water of the environment.

The aerobiological studies are 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. In Marathwada region, the climate is relatively moderate, average rainfall is 650mm in monsoon. Temperature ranges from 20^0c to 38^0c, relative humidity varies from 30 to 70 %. For effective management of crop diseases, it is desirable to study the prevalence of air spore in this region. This is achieved by aerobiological study. Hence this observation could be helpful for the treatment of diseases (allergicas well as agriculture).

Crop diseases caused by airborne mycosporophytes constitute another important aspect of agriculture. Our agriculture crops, however continuously influence from various diseases, out of which fungal diseases are dominant in this region. In a study of airspora of Sunflower fields, observed different types. Among them the *Alternaria, Cladosporium, Cercospora, Curvularia, Rust* spores, *Helminthosporium*, *Periconia*, *Nigrospora*, hyphal fragments, Pollen grains and insect parts were dominant ones. In view of the above facts qualitative and quantitative airborne spores was worked out.

In Maharshtra and Marathwada many workers have made attention towards the relationship between liberation of airborne fungi with the meteorological i.e. temperature, relative

humidity and rain. In India and Marathwada several workers like Cunningham (1873),Wilcoxson et.al., (1967), Ingold (1965), Durham (1943, 1946), Baruah and Chettia (1966), Brown and Jackson (1978), Rees (1964), Gregory (1961), Calvo et.al., (1979), Kramer (1959), Pady and Kramer (1960), Tilak and Banu (1982), Jayswal (1993), Shukla (1971), Shinde (1996), Pawar (1998), Ramkrishna Reddy (1987), Malabade (1990), Patil (1983),Patil (1985),Agarwal and Shivpuri (1974), Shukla (1971) at various centers and over the various crop.

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 Sunflower field of 7 acres of land area. Tilak air sampler is an electrically operated machine which runs on electric power supply of (AC 230 V) & 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 Sunflower field. The air was sampled at the rate of 5 liters for minute & the transparent cellophane tape was fixed on the drum, coated uniformly with white petroleum jelly as adhesive. These cellophanes brought to the laboratory, slides were made and scanned. Fungal spores' isolation was made from these slides over Sunflower Field.

Scanning:

Loaded tape on each slide was divided into six equal divisions by marking it over cover slip with a pointed ball pen. Each division representing two hours air sampling. Scanning of slides was carried out under the binocular research microscope using 10X X 45 x magnification, as per the procedure mentioned by (Tilak and Kulkarni, 1970). The identification of fungal spore type was made on the basis of size, shape septation of spores using standard keys and available authentic literature.

Statistical Analysis

The total spores counted per day. The counted spores were multiplied by conversion factor 14 of Tilak Air Sampler.

RESULT AND DISCUSSION:

Analysis of spore encountered form the investigation presented in Table 1. The present investigation in relation to general airspora studies over the sunflower fields (*Helianthus annus L*) was carried out for two winter seasons using continuous volumetric Tilak Air Sample. All the trapped airborne fungi have been included under "Spore types". in addition, filaments, epidermal hairs, hyphal fragments pollen grains, insect scales, protozoan cysts etc. are included under the "Other types" group.

In all, on an average during the period of the present investigation, 70 types of airborne components were reported, of which 38 types belonged to Deuteromycotina, 21 to Ascomycotina,5 to Other types, 4 to Basidiomycotina and 2 to Zygomycotina shown in Table 1.

During two winter seasons Deuteromycotina contributed with highest percentage of 67.11 % and 71.28 % to the toalairspora followed by Basidiomycotina 24.76 % and 14.28 %, Other types 5.46 % and 4.79 %, Ascomycotina 2.58 % and 6.88 %, and Zyogomycotina 0.09 % and 2.17 % respectively. So in all the two seasons, it was evident that the group Deuteromycotina dominated the total airspora.

The airborne components like *Alternaria, Curvularia, Nigrospora,* Smut spores, Uredospores, *Cladosporium,* Hyphal fragments, *Helminthosporium, Periconia, Fusierella* and *Bispora* contributed significantly to the total airspora in all the two seasons.

REFERENCES:

Arsule, C.S. and Pande, B.N. (2012)." Aeromycology of *Cercospora* on Groundnut at Newasa (MS)." Int. Nal. Jr of Pl. Protection 5 (1): 8-11.

Agarwal, M.K. and D.N. Shivpuri, 1974. Fungal spores, their role in respiratory allergy. Adv. Pollen Res.**1**: 78-128.

Baruah, H.K. and M. Chetia, 1966.Airspora and allergic human diseases. A study of fungal spores and pollen grains of Gauhati. Ind. J. Exp. Bot., **4**: 236 – 238.

Brown, H.M. and F.A. Jackson, 1978. Spore and pollen survey across Britain. he first International conference on Aerobiology, Munich.1978, pp. 23.

Calvo, M.A., T.J. Guarro, G.S. Fernandez and C. Ramirez, 1979. Airborne fungi in the air of Barcelona (Spain) - II. The genus *Alternaria.*Mycopathologia**69 (3)**: 137 - 142.

Durham, O. G., 1943. The volumetric incidence of atmospheric allergens. Spectific gravity of pollen grains. J. Allergy. **14**:455 - 461.

Durham, O. G., 1946. The volumetric incidence of atmospheric allergens - 3. Rate of fall of pollen grains in still air. J. Allergy. **17**: 70 - 78.

Gregory, P.H., 1961. The microbiology of the atmosphere. Leonard Hill (Books) Ltd.Interscience PublishersInc, New York, pp. 233.

Ingold, C.T., 1965. Spore liberation. Clarenden Press, Oxford, 1 :210 - 220.

Jayswal, B.O., 1993. Atmospheric incidence of microbial population at Dhuleand its relevance to environmental parameters. Ph.D. Thesis, Marathwada University, Aurangabad.

Kramer, C.L., S.M. Pady and C.T. Rogerson, 1959. Kansas Aeromycology - IV. *Alternaria*. Trans. Kansas Acad. Sci. **62**: 252 - 256.

Malabade, H. S., 1990. Aeromycological studies at Chalisgaon. Ph. D. Thesis, Marathwada University, Aurangabad.

Pady, S. M. and C. L. Kramer. 1960. Kansas aeromycology - VII. Smuts, Phytopath **50**: 332 - 334.

Patil, C. R., 1983. Aerobiological studies at Aurangabad. Ph. D. Thesis, Marathwada University, Aurangabad.

Patil, B. Y., 1985. Aerobiological studies at Aurangabad. Ph. D. Thesis, Marathwada University, Aurangabad.

Pawar, K.D., 1998. Aeromycological studies at Nanded. Ph. D. Thesis, Dr. B.A. Marathwada University, Aurangabad.

Ramakrishna Reddy, N. 1987. Airspora at Aurangabad - I. Ph. D. Thesis, Marathwada University, Aurangabad.

Rees, R.G., 1964. The airspora of Brisbane.Aust.J. Bot. **12**: 185 - 204.

Shinde, R.S., 1996. Airspora overjowar and sunflower fields at Nanded. Ph.D.Thesis, Marathwada University, Aurangabad.

Shukla, D.S., 1971. Fungal airspora of "Sal" (Shorearobusta). Proc. 58th Ind.Sci. Congr. Bot. Sec. Abstr. 53.

Tilak, S.T., and M. Babu, 1982. Aerobiological approach to leaf spot disease of bajra. Ind. J. Bot. **4**: 87 - 90.

Wilcoxon, R. D. and M.C. Pandey., 1967. Effect of temperature on ejection of ascospores of *Leptoshaerulina briosiana* Indian Phytopath., **20** :199 – 20

TABLE- 1

SEASONWISE COMPARATIVE TOTAL AIRSPORA AND IT'S PERCENTAGE CONTRIBUTION TO THE TOTAL AIRSPORA OF TWO WINTER SEASONS OVER SUNFLOWER CROP FIELD FROM OCTOBER 2003 TO JANUARY 2004 AND FROM OCTOBER 2004 TO JANUARY 2005

Sr. No.	Spore type	I st Winter Season		II nd Winter Season		Total spore conc/m ^{3} of air	% Contribution to the total airspora
		Spore conc/ m^3 of air	%Contri-bution	Spore conc/m^3 of air	%Contri-bution		
1	2	3	4	5	6	7	8
(A)	ZYGOMYCOTINA						
1	Cunninghamella	224	0.06	7546	2.16	7770	1.07
2	Sclerospora	126	0.03	42	0.01	168	0.02
	Total	350	0.09	7588	2.17	7938	1.09
(B)	ASCOMYCOTINA						
1	Amphisphaeria	322	0.09	0	0.00	322	0.04
2	Bombardia	238	0.06	14	0.00	252	0.03
3	Chaetomium	1148	0.30	9660	2.76	10808	1.49
4	Claviceps	42	0.01	0	0.00	42	0.01
5	Cucurbitaria	140	0.04	532	0.15	672	0.09
6	Didymosphaeria	2856	0.76	10010	2.86	12866	1.77
7	Hypoxylon	42	0.01	0	0.00	42	0.01
8	Hysterium	476	0.13	280	0.08	756	0.10
9	Lacanidion	84	0.02	42	0.01	126	0.02
10	Leptosphaeria	70	0.02	70	0.02	140	0.02
11	Lophiostoma	532	0.14	840	0.24	1372	0.19
12	Massarina	224	0.06	56	0.02	280	0.04
13	Melanospora	728	0.19	0	0.00	728	0.10
14	Parodiella	322	0.09	378	0.11	700	0.10
15	Pleomassaria	98	0.03	280	0.08	378	0.05
16	Pleospora	602	0.16	630	0.18	1232	0.17
17	Rosellinia	280	0.07	14	0.00	294	0.04

Sr. No.	Spore type	I st Winter Season		II nd Winter Season		Total spore conc/m³ of air	% Contribution to the total airspora
		Spore conc/ m³ of air	%Contri-bution	Spore conc/m³ of air	%Contri-bution		
1	2	3	4	5	6	7	8
18	Sordaria	84	0.02	28	0.01	112	0.02
19	Sporormia	686	0.18	322	0.09	1008	0.14
20	Teichospora	742	0.20	910	0.26	1652	0.23
21	Tramatosphaeria	14	0.00	0	0.00	14	0.00
	Total	9730	2.58	24066	6.88	33796	4.65
(C)	**BASIDIOMYCOTINA**						
1	Basidiospores	392	0.10	0	0.00	392	0.05
2	Ganoderma	14	0.00	140	0.04	154	0.02
3	Smuts	41062	10.90	15316	4.38	56378	7.76
4	Uredospores	51842	13.76	36568	10.46	88410	12.17
	Total	93310	24.76	52024	14.88	145334	20.01
(D)	**DEUTEROMYCOTINA**						
1	Alternaria	63798	16.93	85876	24.57	149674	20.61
2	Beltrania	56	0.01	196	0.06	252	0.03
3	Beltraniella	392	0.10	196	0.06	588	0.08
4	Bispora	4116	1.09	2744	0.79	6860	0.94
5	Botryodiplodia	154	0.04	42	0.01	196	0.03
6	Cercospora	476	0.13	448	0.13	924	0.13
7	Chaetomella	28	0.01	0	0.00	28	0.00
8	Cladosporium	19656	5.22	11284	3.23	30940	4.26
9	Cordana	28	0.01	0	0.00	28	0.00
10	Corynespora	126	0.03	294	0.08	420	0.06
11	Curvularia	41552	11.03	12642	3.62	54194	7.46
12	Dendryphiopsis	14	0.00	224	0.06	238	0.03
13	Dictyoarthrinium	2520	0.67	1400	0.40	3920	0.54
14	Diplodia	1288	0.34	0	0.00	1288	0.18
15	Drechslera	868	0.23	924	0.26	1792	0.25
16	Epicoccum	882	0.23	0	0.00	882	0.12

Sr. No.	Spore type	I st Winter Season		II nd Winter Season		Total spore conc/m³ of air	% Contribution to the total airspora
		Spore conc/ m³ of air	%Contri-bution	Spore conc/m³ of air	%Contri-bution		
1	2	3	4	5	6	7	8
17	Exosporium	462	0.12	42	0.01	504	0.07
18	Fusariella	6062	1.61	1540	0.44	7602	1.05
19	Fusarium	476	0.13	0	0.00	476	0.07
20	Haplosporella	154	0.04	14	0.00	168	0.02
21	Helminthosporium	7574	2.01	9870	2.82	17444	2.40
22	Heterosporium	6566	1.74	5712	1.63	12278	1.69
23	Hirudinaria	126	0.03	98	0.03	224	0.03
24	Lacellina	14	0.00	0	0.00	14	0.00
25	Memnoniella	2926	0.78	756	0.22	3682	0.51
26	Nigrospora	62342	16.54	90874	26.00	153216	21.09
27	Periconia	12082	3.21	4732	1.35	16814	2.31
28	Pestalotia	1498	0.40	686	0.20	2184	0.30
29	Phaeotrichoconis	1708	0.45	1078	0.31	2786	0.38
30	Pithomyces	5936	1.58	5810	1.66	11746	1.62
31	Pseudotorula	4620	1.23	8694	2.49	13314	1.83
32	Pyricularia	42	0.01	0	0.00	42	0.01
33	Sirodesmium	826	0.22	672	0.19	1498	0.21
34	Spegazzinia	1624	0.43	602	0.17	2226	0.31
35	Tetracoccosporium	42	0.01	84	0.02	126	0.02
36	Tetraploa	182	0.05	84	0.02	266	0.04
37	Trichoconis	154	0.04	238	0.07	392	0.05
38	Torula	1498	0.40	1288	0.37	2786	0.38
	Total	252868	67.11	249144	71.28	502012	69.11
(E)	**OTHER TYPES**						
1	Hyphal fragments	7266	1.93	5474	1.57	12740	1.75
2	Insect parts	70	0.02	70	0.02	140	0.02
3	Plant parts	448	0.12	994	0.28	1442	0.20
4	Pollen grains	280	0.07	630	0.18	910	0.13
5	Protozoan cysts	12502	3.32	9562	2.74	22064	3.04
	Total	20566	5.46	16730	4.79	37296	5.13
	Grand Total	376824	100.00	349552	100.00	726376	100.00