

# Aeromycological investigations over Jowar crop field at osmanabad (M.S)

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## ABSTRACT:

Aeromycological investigations was carried out over jowar (*sorghum vulgare L.*) field for two Rabbi Seasons. Air sampling was carried out using volumetric continuous Tilak Air sampler. Altogether 69 fungal spore types were identified. Beside the Haphal fragments, pollen grains, Algal filaments, Insect scales, protozoan cysts and unidentified spores was found during two kharif seasons. The out of 69 fungal spore types. Including 33 forms of Deuteromycotina, 18 forms of Ascomycotina, 07 forms of other types, 05 forms of Basidiomycotina, 04 forms of Zygomycotina and 02 forms of Myxomycotina. Percentage contribution of these fungal spores to total airspora includes, Deuteromycotina (47.70%) as a dominant group, Basidiomycotina (23.83%), Ascomycotina (12.58%), Zygomycotina (4.15%) Myxomycotina (2.53%), and other types (9.19%).

**KEY WORDS:** Jowar crop, Aeromycological, Rabbi Seasons. Metrological parameters.

## INTRODUCTION:

Jowar (*Sorghum Vulgare L.*) is one of the most important cereal crops of the osmanabad district of Maharashtra, India. Jowar is grown in many parts of the world under the tropical climatic conditions either for food or feed. It is an important food and fodder crop of India. Jowar is also used for starch, alcohol and ethanol production. The fungal spores present in the atmosphere have been found to be responsible for the causation of various diseases over many important crop plants. Severe diseases result in to maximum losses of these crops in terms of quality as well as quantity to the crop yield affecting economic of the farmers.

In India sorghum occupies an area over 17-18 million hectares. The annual production of grain is over 8 million tons, in the state of Maharashtra. The crop is subjected to variety of diseases, important disease of sorghum are leaf spot caused by *Alternaria*, *Cladosporium*, *Helminthosporium* etc. Rust diseases caused by *Puccinia*, Smut caused by *Sphacelotheca*, Seed mold Caused by *Curvularia* and *fusarium*. These diseases severely affects the crop and subsequent yield. pande (1976) carried out aerobiological work over orange, mung and sorghum at Nanded. Bhalke (1980) studied the airspora over sorghum field in detail.

## MATERIALS AND METHODS:

In the present study volumetric continuous Tilak air sampler (plate A), (Tilak and Kulkarni, 1970) was installed in the field to trap the spores for two jowar crop seasons. I, e First season from 01 Nov 2015 to 28 Feb 2016 and second season from 01 Nov 2016 to 28 Feb 2017. over jowar crop fields. Air sampler was placed in the middle of the jowar fields at a height of 1.5meter above the ground level on the field. The slides were prepared and scanned according to the methods suggested by Tilak (1987). 'Air monitoring 'identification was done with the help of authentic literature, photographs, reference slides etc., daily metrological data has been recorded time to time. Osmanabad district is located in Maharashtra state in India. It is situated between the Latitude 18<sup>0</sup>.11 North and 76<sup>0</sup>.02 East Longitude

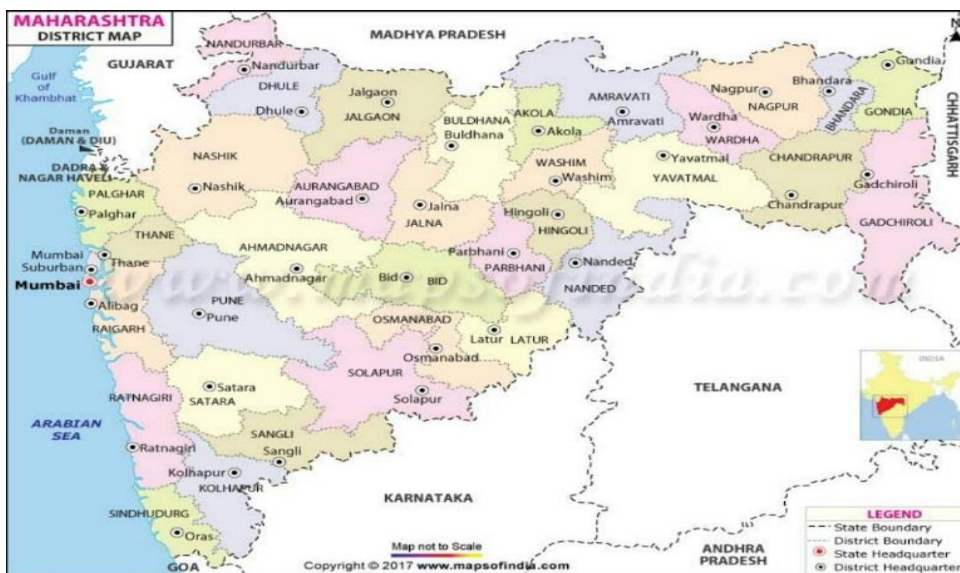


Figure 1-Maharashtra District Map

**RESULT AND DISCUSSION:**

During the investigation in the first Rabbi seasons 6, 49782 spores and in the Second Rabbi Season 7, 20216 spores are counted, the spores belonging to Deutromycotina of both the seasons contributed highest percentage (47.70%) followed by Basidiomycotina (23.83%), Ascomycotina (12.58 %), other types (9.19%), Zygomycotina (4.15%) and Myxomycotina (2.53%) the dominant spore types are Cladosporium (15.48%) as a dominant type followed by Curvalaria(5.76%),Nigrospora(5.69%),Alternaria (4.94%),Smuts pores(9.82%), Rust spores (10.13%), Heliminthosporium (1.62%) etc. pathogenic spore types likeAlternaria, Curvularia, Heliminthosporium, Rust spores and Smut spores have been observed in sufficient higher concentration. This study is very important in disease forecasting system of jowar crop.

**Plate A- Tilak Air Sampler**

**Plate- B Fungal spores**

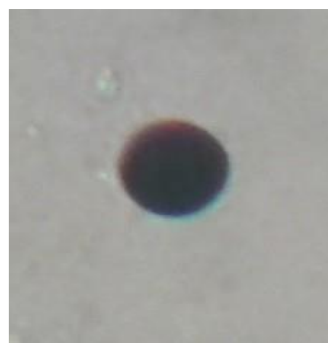
**Jowar crop Field**



**1) Cladosporium**



**2) Nigrospora**



**3) Alternaria**



**4) Helimintosporium**



**4) Smut spores**



**Table No.1**

**Two year Rabbi Season mean concentration and percentage Contribution of each spore types to the total airspora over jowar crop field.**

**From (Season I: 1 Nov 2015 to 28 Feb 2016)**

**(Season II: 1 Nov 2016 to 28 Feb 2017)**

Sr. no.	Spore Types	Total Spore Conc.	Total % Conc. to the total airspora
<b>A)</b>	<b>MYXOMYCOTINA</b>		
1.	Physarum	23212	1.69
2.	Stemonities	11466	0.83
Total		34678	2.53
<b>B)</b>	<b>ZYGOMYCOTINA</b>		
1.	Cunnighamella	40082	2.92
2.	Mucor	644	0.05
3.	Rhizopus	2674	0.19
4.	Sclerospora	13468	0.98
Total		56868	4.15
<b>C)</b>	<b>ASCOMYCOTINA</b>		
1.	Ascospores	630	0.04
2.	Bitrimonospora	9058	0.66
3.	Chaetomium	18298	1.33
4.	Claviceps	7756	0.56
5.	Cucurbitaria	9352	0.68
6.	Didymosphaeria	26908	1.96
7.	Hypoxyton	1918	0.14
8.	Leptosphaeria	18480	1.35
9.	Lophiostoma	45864	3.35
10.	Massaria	154	0.01
11.	Melanospora	560	0.04
12.	Metasphaeria	3668	0.27
13.	Otthia	2016	0.15
14.	Parodiella	266	0.02
15.	Pleospora	7756	0.56

16.	Sordaria	10696	0.78
17.	Sporormia	8932	0.65
18.	Teichospora	126	0.01
Total		172438	12.58
<b>D)</b>	<b>BASIDIOMYCOTINA</b>		
1.	Basidiospores	24990	1.82
2	Ganoderma	224	0.01
3.	Rust Spores	138796	10.13
4.	Smut Spores	134484	9.82
5.	Urediniospores	27986	2.04
Total		326480	23.83
<b>E)</b>	<b>DEUTEROMYCOTINA</b>		
1.	Alternaria	67634	4.93
2.	Aspergillus	11508	0.84
3.	Beltraniella	6342	0.46
4.	Beltrania	6356	0.46
5.	Bispora	5306	0.39
6.	Botryodiplodia	182	0.01
7.	Cercospora	3066	0.22
8.	Cladosporium	212072	15.48
9.	Cordana	294	0.02
10.	Corynespora	1302	0.09
11.	Curvularia	78932	5.76
12.	Dictyoarthrinium	1876	0.13
13.	Diplodia	1190	0.08
14.	Drechslera	518	0.04
15.	Epicoccum	9520	0.69
16.	Fusariella	4088	0.29
17.	Haplosporella	11172	0.81
18.	Harknessia	378	0.03
19.	Helminthosporium	22050	1.61
20.	Heterosporium	19600	1.43
21.	Lacellina	26040	1.90

22.	Lacelinopsis	7490	0.54
23.	Memnoniella	2828	0.20
24.	Nigrospora	77994	5.69
25.	Papularia	42	0.01
26.	Penicilium	3864	0.28
27.	Periconia	47334	3.45
28.	Pestalotia	1778	0.13
29.	Pithomyces	12726	0.93
30.	Pseudotorula	392	0.03
31.	Tetraploa	8288	0.60
32.	Torula	826	0.06
33.	Trichoconis	546	0.04
Total		653534	47.70
<b>F)</b>	<b>OTHER TYPES</b>		
1.	Algal Filaments	8960	0.65
2.	Epidermal hairs	4900	0.36
3.	Hyphal Fragments	37660	2.75
4.	Insect Scales	28420	2.07
5.	Pollen grains	25900	1.89
6.	Protozoan cysts	3654	0.26
7.	Unidentified Spores	16506	1.20
	Total	126000	9.19
	<b>Grand Total</b>	1369998	100

Table No.2

Seasonwise comparative total airspora and its percentage contribution for two Rabbi Seasons over jowar crop field.

From (Season First: 1 Nov 2015 to 28 Feb 2016)

(Season Second - 1 Nov. 2016 to 28 Feb. 2017)

Sr. No	Spore Types	First, Rabbi Season		Second Rabbi Season		Total Spore Conc.	Total % Conc. to the total airspora
		Spores Conc.	% Conc.	Spores Conc.	% Conc.		
<b>A)</b>	<b>MYXOMYCOTINA</b>						
1.	Physarum	11774	1.81	11438	1.59	23212	1.69
2.	Stemonities	5740	0.88	5726	0.79	11466	0.83
<b>B)</b>	<b>ZYGOMYCOTINA</b>						
1.	Cunnighamella	20216	3.12	19866	2.76	40082	2.92
2.	Mucor	476	0.07	168	0.02	644	0.05
3.	Rhizopus	1400	0.21	1274	0.17	2674	0.19
4.	Sclerospora	6818	1.06	6650	0.92	13468	0.98
<b>C)</b>	<b>ASCOMYCOTINA</b>						
1.	Ascospores	364	0.05	266	0.04	630	0.04
2.	Bitrimonospora	4592	0.70	4466	0.62	9058	0.66
3.	Chaetomium	8988	1.39	9310	1.29	18298	1.33
4.	Claviceps	3934	0.61	3822	0.53	7756	0.57
5.	Cucurbitaria	4732	0.74	4620	0.64	9352	0.68
6.	Didymosphaeria	13930	2.15	12978	1.80	26908	1.96
7.	Hypoxyton	1022	0.16	896	0.12	1918	0.14
8.	Leptosphaeria	8960	1.39	9520	1.32	18480	1.35
9.	Lophiostoma	23030	3.55	22834	3.17	45864	3.35
10.	Massaria	98	0.01	56	0.01	154	0.01
11.	Melanosporea	350	0.05	210	0.03	560	0.04
12.	Metasphaeria	2058	0.31	1610	0.22	3668	0.27
13.	Otthia	1106	0.17	910	0.13	2016	0.15
14.	Parodiella	154	0.02	112	0.01	266	0.02

15.	Pleospora	3906	0.60	3850	0.53	7756	0.57
16.	Sordaria	5110	0.78	5586	0.77	10696	0.78
17.	Sporormia	5012	0.77	3920	0.54	8932	0.65
18.	Teichospora	84	0.01	42	0.01	126	0.01
<b>D)</b>	<b>BASIDIOMYCOTINA</b>						
1.	Basidiospores	9590	1.47	15400	2.14	24990	1.82
2	Ganoderma	126	0.02	98	0.01	224	0.02
3.	Rust Spores	70532	10.85	68264	9.48	138796	10.13
4.	Smut Spores	70056	10.78	64428	8.94	134484	9.82
5.	Urediniospores	14084	2.17	13902	1.93	27986	2.04
<b>E)</b>	<b>DEUTEROMYCOTIN A</b>						
1.	Alternaria	31164	4.79	36470	5.06	67634	4.94
2.	Aspergillus	5278	0.81	6230	0.87	11508	0.85
3.	Beltraniella	3682	0.56	2660	0.37	6342	0.46
4.	Beltrania	2716	0.42	3640	0.50	6356	0.47
5.	Bispora	2702	0.41	2604	0.36	5306	0.39
6.	Botryodiplodia	112	0.02	70	0.01	182	0.01
7.	Cercospora	1680	0.26	1386	0.19	3066	0.23
8.	Cladosporium	82390	12.68	12968 2	18.01	212072	15.48
9.	Cordana	168	0.02	126	0.02	294	0.02
10.	Corynespora	672	0.10	630	0.09	1302	0.09
11.	Curvularia	39732	6.12	39200	5.44	78932	5.76
12.	Dictyoarthrinium	966	0.15	910	0.13	1876	0.15
13.	Diplodia	910	0.14	280	0.04	1190	0.08
14.	Drechslera	266	0.04	252	0.03	518	0.04
15.	Epicoccum	4788	0.73	4732	0.66	9520	0.69
16.	Fusariella	2072	0.32	2016	0.28	4088	0.29
17.	Haplosporella	6258	0.96	4914	0.68	11172	0.81
18.	Harknessia	210	0.03	168	0.02	378	0.03
19.	Heliminthosporium	10500	1.62	11550	1.61	22050	1.62
20.	Heterosporium	9828	1.52	9772	1.36	19600	1.44
21.	Lacellina	11620	1.79	14420	2.02	26040	1.91

22.	Lacelinopsis	3766	0.58	3724	0.53	7490	0.54
23.	Memnoniella	1890	0.29	938	0.14	2828	0.20
24.	Nigrospora	39494	6.08	38500	5.34	77994	5.69
25.	Papularia	42	0.01	-	-	42	0.01
26.	Penicilium	644	0.09	3220	0.45	3864	0.28
27.	Periconia	20314	3.13	27020	3.75	47334	3.45
28.	Pestalotia	910	0.14	868	0.13	1778	0.13
29.	Pithomyces	5866	0.90	6860	0.95	12726	0.93
30.	Pseudotorula	-	-	392	0.05	392	0.03
31.	Tetraploa	4172	0.64	4116	0.57	8288	0.60
32.	Torula	434	0.06	392	0.05	826	0.06
33.	Trichoconis	294	0.04	252	0.03	546	0.04
<b>F)</b>	<b>OTHER TYPES</b>						
1.	Algal Filaments	4130	0.63	4830	0.68	8960	0.65
2.	Epidermal hairs	2100	0.32	2800	0.39	4900	0.36
3.	Hyphal Fragments	17640	2.72	20020	2.78	37660	2.76
4.	Insect Scales	16100	2.49	12320	1.72	28420	2.08
5.	Pollen grains	7840	1.22	18060	2.51	25900	1.89
6.	Protozoan cysts	1470	0.23	2184	0.30	3654	0.27
7.	Unidentified Spores	6720	1.04	9786	1.36	16506	1.20
<b>Grand Total</b>		64978 2	100	72021 6	100	136999 8	100

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