

PREVALANCE OF AIRBORNE FUNGAL SPORES IN THE ONION FIELD AT NASHIK

S.V.GOSAVI AND S.I.PATEL*

Arts, Science and Commerce College, Saikheda, Tal.-Niphad, Dist.-Nashik
*Arts, Science and Commerce College, Ozar(Mig.), Tal.-Niphad, Dist.-Nashik

Email-svgosavi09@gmail.com

Received on : 13.01.2016 and Accepted Revised on : 22.06.2016

ABSTRACT : Aeromycological survey was carried out over Onion field at Saikheda, Tal-Niphad, Dist. - Nashik (M.S.) for two consecutive seasons i.e. Kharip and Rabbi seasons (from June 2012 to November 2012 and December 2012 to April 2013) by using continuous Tilak's air Sampler. Altogether 59 fungal spores and other types were identified. Deuteromycotina contributed the highest percentage followed by Ascomycotina, Basidiomycotina and Phycomycotina. In the aeromycoflora *Aspergillus*, *Cladosporium*, *Fusarium*, was found to be dominant type. It was followed by *Alternaria*, *Curvularia*, *Didymosphaeria*, *Cercospora*, *Helminthosporium*, *Chaetomium*, *Sordaria*, *Nigrospora* and etc.

Key word:-Aeromycology, fungal spore, Tilak Air Sampler.

INTRODUCTION:

Aerobiology is an important and applied biological branch which is usually understood to be the passively airborne microorganism of their identity, behavior, movement and survival. One of the special area of research in Aerobiology is the Aeromycology. Aeromycology constitutes one of the major aspects mainly because of the dominance of fungal spores in the ambient air. Keeping this in mind the fungal air spora of onion field in Nashik was decided to investigate.

Onion (*Allium cepa* L.) is one of the important commercial vegetable crops grown in India. It is widely grown in different parts of the country mainly by small and marginal farmers. It has very good medicinal value. Nutritive value of onion varies from variety to variety. Its major value is in its flavour. The demand of onions within the country and for the export has made it essential to supply onions round the year either from fresh harvest or from stocks. Annual production of onion is estimated to be about 74.50 Lakh tonnes. This quantity is enough to meet the present domestic requirement as well as export of onions. A global review of area and production of major vegetable crops shows that onion ranks second in area under vegetables and third in production in the world.

The present study gives information on the aeromycoflora and their diversity in the onion field. Aeromycological studies over onion field were carried out to understand the incidence of various air borne fungal spores and its seasonal concentration. A.H. Rajasab and H.T. Chawada (1994), N.V.Hoa, Y.S. Ahlawat and R.P. Pant (2003), K.Raju and M.K.Naik (2006), M.K. Naik et.al (2008), N.Laxsgmi (2008), Jury Devi et al.(2010), Pande B.N., Derle P.K. and Arsule C.S. (2012), Patel S.I (2013), A.H. Rajasab and H.T. Chawada(1994) are the workers who have worked on onion crop.

MATERIAL AND METHOD :

Aeromycological studies were decided to carry out in the onion field at saikheda Niphad, Dist. Nashik(M.S.) for two consecutive seasons i.e. Kharip and Rabbi seasons (from 15th June 2012 to 3rd November 2012 and 4th December 2012 to 14th April 2013) by using continuous Tilak's air Sampler,

which provides the data of components of airspora. Tilak air sampler was installed at a constant height of 3-4 feet from ground level in the Onion field. After sampling slides were prepared and scanning of prepared slides was regularly done. The identification and description of spore types is essentially based on visual identifications by spore morphology, comparisons with reference slides. The slides were scanned under Binocular research microscope. The fungal spores and other components were identified by referring published literature (Tilak, 1989) and reference slide prepared. The counting of spores was done by using 'short transverse' method of Hirst (1959). The total exposed area was scanned under the microscope with 10X-45 X eyepiece objective combinations.

RESULTS AND DISCUSSION :

In the present Aeromycological investigation the air samples were collected in the Onion field with the help of Tilak's Air Sampler for the said period. During the period of investigation 59 and 53 types of fungal spore were encountered in the first and second season respectively, out of which 33 and 29 belonging to Deuteromycotina, 14 and 12 belonging to Ascomycotina, 3 belonging to Phycomycotina, 4 belonging to Basidiomycotina along with 5 other types were identified for the first and second season respectively. Deuteromycotina dominated the air spora and exhibited the highest percentage concentration 81.13% and 80.47% followed by, Ascomycotina 6.31% and 6.44%, Basidiomycotina 4.80% and 3.65%, Phycomycotina 1.09% and 2.63% and other types 6.66% and 5.66% for the first and second season respectively.

Phycomycotina group contributed 1.09% and 2.63% to the total air spora for the first and second season respectively. Phycomycotina group was presented by 3-spore type viz. *Albugo*, *Cunninghamella* and *Rhizopus*. Out of these spore types, *Cunninghamella* occurred as dominant. *Cunninghamella* contributed 0.67% and 1.29% to the total airspora for first and second season respectively. *Rhizopus* was also frequent and was recorded throughout the period of investigation. *Rhizopus* contributed 0.27% and 0.45% to the total airspora for first and second season respectively. *Rhizopus* causes Mucormycosis infection that usually occurs

in the presence of low host resistance or under metabolic conditions.

The spores of Ascomycotina occurred in the environment when then conditions are favorable for their formation and release. During the present investigation the group Ascomycotina contributed 6.31% and 6.44%, to the total air spora for first and second season respectively. Ascomycotina was represented 14 spore types. Viz. *Chaetomium*, *Didymosphaeria*, *Hypoxylon*, *Melanospora*, *Pleospora*, *Sordaria*, etc. were the dominant spore type recorded. During the present investigation the occurrence of ascospore was high when the relative humidity was high and the temperature was optimum. Dewfall affects the occurrence and release of ascospore (Ingold 1965). *Sordaria* a potential allergent was recorded throughout the period of investigation. Its total contribution to the total airspora was 1.34% and 0.90% for first and second season respectively.

The present studies showed the occurrence of spores belonging to Basidiomycotina were common in the air. Basidiomycotina as a whole group contributed 4.80% and 3.65% to the total air spora for first and second season respectively. The Basidiospores were recorded almost throughout the period of investigation. The Smut spores contributed 1.42% and 1.57% to the total airspora for first and second season respectively. In general the concentration of Basidiomycotina in air was directly correlated with occurrence of favorable condition and a source.

During the period of investigation maximum spore load and spore types was represented by the class Deuteromycotina. Deuteromycotina was represented by of 26 spore types. This group contributed 81.13% and 80.47% to the total airspora for first and second season respectively and thus forms the largest contributor. Deuteromycotina was represented by *Alternaria*, *Aspergillus*, *Cladosporium*, *Curvularia*, *Dictyosporium*, *Diplodia*, *Helminthosporium*, *Nigrospora*, *Papularia* etc. These spores occurred throughout the period of investigation. These spores have been referred to "airspora dominant". Among the Deuteromycotina spore types *Aspergillus* contributed the maximum i.e. 19.00% and 20.13% to the total airspora airspora for first and second season respectively. *Aspergillus* is important from the pathogenic point of view.

Beside *Aspergillus* other fungal spore type viz. *Alternaria*, *Cladosporium*, *Cercospora*, *Curvularia*, *Fusarium*, *Helminthosporium*, *Periconia* etc. reported considerable dominant as compared to other.

The heterogenous group comprises of hyphal fragments, insect scales, pollen grains, protozoan cyst and unidentified spores was contributed 6.66% and 5.66% to the total airspora for first and second season respectively. The hyphal fragments constitute a significant population of airspora. The hyphal fragment has been recorded throughout the period of investigation, which may be due to the presence of the substrate and favorable conditions. Their contribution to the total airspora was 1.73% and 1.06% to the total airspora for first and second season respectively. The Pollen grains concentration had great relevance with flowering period of trees, shrub and seasonal respectively located in close vicinity. The importance of pollen grains as allergens has been emphasized and the pollen calendar of various regions has

been prepared. During the present investigation it was observed that high humidity and moderate range of temperature helped to deploy the concentration of insect scales and protozoan cyst.

It is conclusive that the extramural airspora in the Onion field at Niphad, dist- Nashik is rich in fungal spore types besides the organic and inorganic components. These fungal spores and bioparticles have been recorded throughout the period of investigation.

Thus the present investigation has highlighted the biodiversity of the airborne bioparticles present in the air of the Onion field. It also shows that the fungal spores are the major component. The Onion field environment had higher population of *Aspergillus*, *Cladosporium*, *Cercospora*, *Fusarium*, *Alternaria*, *Curvularia*, *Helminthosporium*, *Chaetomium*, *Nigrospora* etc. are some aeroallergic fungal spores recorded in significant concentration in present study. This fungal spore indicates possible source of contamination and possible role in the damage of Onion crop. This fungal spores have also been recorded by earlier worker as pathogenic and aeroallergic.

TABLES

Table I-Percentage contribution of different spore types to the total airspora at onion field
First season-15th June 2012 to 03rd November 2012
Second season-4th December 2012 to 14th April 2013

SR.NO	SPORE TYPE	Percentage Contribution per M ³ of air	
		Season I	Season II
PHYCOMYCOTINA			
1	<i>Albugo Pers.Ex.SF.Gray</i>	0.16	0.92
2	<i>Cunninghamella Matr.</i>	0.67	1.29
3	<i>Rhizopus Enrenberg.</i>	0.27	0.45
ASCOMYCOTINA			
4	<i>Bombardia Fr.</i>	0.28	0.33
5	<i>Chaetomium Kunz. Ex. Fr.</i>	1.12	-
6	<i>Cucurbitaria Gray.ex Grev.</i>	0.48	0.38
7	<i>Didymosphaeria Fuck.</i>	0.70	0.41
8	<i>Hypoxylon Bull.Ex.Fr.</i>	0.27	0.52
9	<i>Hysterium.Tode.Ex.Fr.</i>	0.27	0.29
10	<i>Lepidosphaeria ces&de</i>	0.19	-
11	<i>Lophiostoma Ces de Not.</i>	0.41	0.52
12	<i>Melanospora Corda.</i>	0.09	0.86
13	<i>Parodiella.(Speg) Theiss & syd.</i>	0.22	0.47
14	<i>Pleospora. Rabh.</i>	0.32	1.21
15	<i>Sordaria.Ces & de. Not</i>	1.34	0.90
16	<i>Sporormia Ces & de. Not</i>	0.43	0.21
17	<i>Tiechospora. Fuck.</i>	0.19	0.42
BASIDIOMYCOTINA			
18	Basidiospores	1.38	0.76
19	<i>GanodermaKaitz.</i>	0.21	0.20
20	Smut Spores.	1.42	1.57
21	Uredospores.	1.79	1.16

