

Helminthosporium Spore concentration over Onion field at Udgir, MS, India

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Manuscript Details

Available online on <https://www.irjse.in>
ISSN: 2322-0015

Editor: Dr. Arvind Chavhan

Cite this article as:

Lohare Sunita Dhundiraj. Helminthosporium Spore concentration over Onion field at Udgir, MS, India, *Int. Res. Journal of Science & Engineering*, 2020, Special Issue A9: 185-188.

Article published in Special issue of International e-Conference on "Emerging trends and Challenges In life sciences" organized by Department of Botany, Indraraj Arts, Commerce & Science College, Sillod-431112, Dist Aurangabad, Maharashtra, India date, June 18-19, 2020.



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Abstract

The present investigation deals with the study of microscopic air spora over the Onion (*Allium cepa* L.) (Vegetable) field at Udgir. This study was conducted for rabbi season from 1st November 2017 to 25th January 2018 using continuous Tilak air sampler. In the air sampling 56 airborne components trapped among these 01 belongs to Phycomycetes, 12 belongs to Ascomycetes, 03 belongs to Basidiomycetes, 34 to Deuteromycetes and 06 to other types. The highest percentage contribution of the spore belongs to Deuteromycetes group was 71.76%, Ascomycetes 16.36%, other types 7.85%, Basidiomycetes 3.32% and Phycomycetes 0.71%. In this study *Cladosporium* was most dominant type among the fungal spores contributed 21.89% to the total air spora and *Helminthosporium* contributed 4.42% to the total airspora and ranked third from Deuteromycetes group. The airspora studies over Onion fields have contributed to understand the general components of airspora in this region. It also revealed that the occurrence of spores in air correlate with weather condition. The present study will be useful in divicing for disease forecasting system of Onion crop which would help for protecting the crops from infection and disease.

Keywords: Rabbi Season, Tilak air sampler, Aerobiology.

Introduction

Air is the natural environment of microorganisms. The airborne organisms come from different sources i.e. soil, organic wastes, dead and decaying substrata and infected hosts.

The present investigation deals with the studies in the airspora over Onion (vegetable-particularly Onion, Tomato and Brinjal) fields at Udgir for rabbi season from 1st November 2017 to 25th January 2020. In India efforts have been made to find out the air spora of many agricultural crop plants but aerobiological investigations on vegetables have not received much attention, though these crops stand next to cereals as human food. Kulkarni [1], Lakhe [2], and Bhasale [3] has carried out some preliminary investigation about the airspora over the vegetable fields in this region. Nagpurne [4] had carried out investigation about the airspora over the vegetable fields at Kandhar.

The vegetables play very important role in the human diet. They are essential for a balanced diet and maintenance of good health. There is greater demand for vegetable from urban population than from rural population hence most of the vegetable required are grown in areas closer to the town and cities. Hence, the vegetables are easily attack by pests and diseases. Therefore, more attention needs to be given by Indian plant pathologist to the diseases of vegetable crops in the field at harvest, in storage and in market place as basis for developing suitable control measures Bagwan [5].

Onion (*Allium cepa* L,) Family-Liliaceae is an important vegetable crop grown in India. Onions have considered to have diuretic properties and beneficial to the digestive tract. It is good for eyes and act as heart stimulant. It has some medicinal properties. India ranks first in the world in area under Onion 3.35 lakh ha and ranks second in Onion production 3.50 million tones ICAR Publication [6]. Total area under Onion cultivation in Maharashtra was in 1990 (90000 ha), 1991 (87000 ha), 1992 (86000 ha) and in 1993 (86000 ha). Fungal pathogens play a significant role in causing the diseases and resulting in the losses in yield. Very few aerobiological investigations over this crop have been intensively studied in the region. It is therefore essential to conduct few more air monitoring experiments over these crops in order to trap the pathogenic fungal spores, their source, dispersion and impact of meteorological parameters in relation to pathogen.

Methodology

The aerobiological investigation over Onion crop fields include qualitative and quantitative analysis of airspora at Udgir. The main aim of this study is to find out airspora components over Onion field in relation to different growth stages and meteorological parameters. Investigation can be carried out throughout day and night or round the clock using continuous Tilak air sampler (plate I) Tilak and Kulkarni [7]. Tilak air sampler is an electrically operated device. The apparatus provides continuous sampling of air for 8 days. The sampler is a tin box with 10.4" x 8' size. It has an elevated round cap on its lid. The cap contrast an exhaust fan inside. The cap is provided with a netted window for expelling out the internal sucked air. At the bottom of box a clockwise mechanism is fitted. A circular drum is attached on the clock box. The drum rotates in anticlockwise manner when electricity on. The circular outer surface of drum has 16-line mark of equal distance. The front side of sampler is fitted with a pilot lamp of socket for electrical connection and a switch for on and off. Backside of tinbox is provided with a small orifice projecting tube through which sucked air enters in the air sampler. As the air rushes in it impinges on transparent cello tape of the rotating drum coated with a thin layer of petroleum jelly or transparent Vaseline and thus entraps the bio particles from the air. It gives continuous 8 days data of various components of air/unit volume/unit time.

The present work of airsampling was carried out for rabbi season by operating air sampler in the centre of the Onion crop fields kept at constant height of 4 feet from ground level with orifice towards west. Permanent slides were prepared by mounting in glycerine jelly. Scanning of slides containing air borne catches was done regularly. The identification of spore types and other biological materials on the exposed tape was done by direct microscopic observation of spore with reference to size, colour, shape and septation. The confirmation of identity was made by referring standard literature and relevant books of the authors Tilak [8], Baret and Hunter [9], Mukadam [10], Alexopolus [11], Dube [12] and Ainsworth [13].

Results and Discussions

The studies in the airspora over Onion (vegetable) field was carried to find out the airspora and disease incidence during rabbi season at Udgir, Dist. Latur Maharashtra from 1st November 2017 to 25th January 2018 using Tilak air sampler. In the investigation of Onion field in all 56 types of spore were recorded of which 50 were fungal spore types and remaining 06 were other biological forms which includes hyphal fragment, insect parts, pollen grains, protozoan cyst and unclassified group. During present investigation the spore types belongs to Deuteromycetes having their highest mean percentage contribution 71.76% to the total airspora, Ascomycetes 16.36%, other types 7.85%, Basidiomycetes 3.32% and Phycomycetes 0.71% over Onion field (Table I). Out of 56 air borne components 01 belongs to Phycomycetes, 12 to Ascomycetes, 03 to

Basidiomycetes, 34 to Deuteromycetes and 06 to other types. Total number of fungal spore concentration was 35106 spores/m³ of air found during these as on. The class Deuteromycetes contributed 34 spore types and it is dominant to the total airspora. *Cladosporium* was the dominant fungus contributed 21.89% to the total air spora followed by *Alternaria* 14.75%, *Helminthosporium* 4.42%, *Cercospora* 4.26%, *Curvularia* 4.22%, *Nigrospora* 3.46%, *Pithomyces* 1.63%, *Epicoccum* 1.39%, *Memmoniella* 1.19% (Table II). The pathogenic spore types *Alternaria*, *Cercospora*, *Curvularia* and *Helminthosporium* were found dominant throughout the season (Plate I). *Helminthosporium* was found third dominant spore type from Deuteromycetes group. Maximum spore concentration of *Helminthosporium* were recorded 546 spores/m³ of air in the month of January 2018 and minimum 476 spores/m³ of air in the month of December 2017.



Figure 1: Continuous Tilak air sampler in Vegetable (Onion) Field



Curvularia

Helminthosporium

Cercospora

Alternaria

TABLE 1: Concentration and percentage contribution of spore group during 1st November 2017 to 25th January 2018.

Sr. No.	Spore group	Total spore	Percentage %
1	Phycomycetes	140	0.39
2	Ascomycetes	6398	18.93
3	Basidiomycetes	896	2.7
4	Deuteromycetes	25220	70.75
5	Other group	2394	7.23

TABLE 2: Concentration, percentage contribution and monthwise seasonal concentration of some Deuteromycetes spore during 1st November 2017 to 25th January 2018.

Sr. No.	Spore type	Total spore	Perc. %	Monthwise Seasonal Concen		
				November	December	January
1	Cladosporium	7686	21.89	3738	3290	658
2	Alternaria	5180	14.75	3318	1456	406
3	Helminthosporium	1554	4.42	532	476	546
4	Cercospora	1498	4.26	532	644	322
5	Curvularia	1484	4.22	644	532	308
6	Nigrospora	1218	3.46	770	308	140
7	Pithomyces	574	1.63	196	266	112
8	Epicoccum	490	1.39	140	238	112
9	Memnoniella	420	1.19	140	126	154

During the period of investigation total number of *Helminthosporium* spore contributed 1554 spores/m³ of air. Bharat Rai [14] reported *H.anamalum* Gilmon and about from the exposed petriplate with different media round about *Saccharummunja* Roxb plant at Banarus. Bhasale [3] reported *Helminthosporium* spore concentration 1.24% to the total air spora over vegetable field at Aurangabad.

Conflicts of interest: The authors stated that no conflicts of interest.

References

- Kulkarni RL. Studies in airspora over some fields at Aurangabad. Ph. Thesis Marathwadw University, Aurangabad, 1971.
- Lakhe DG. Airspora studies over some fields, Ph. D. Thesis, Marathwada University, Aurangabad, 1980.
- Bhasale SS. Studies in airspora of Aurangabad, Ph.D. Thesis, Marathwada University, Aurangabad, 1983.
- Nagpurne SD. Studies in the airspora at Kandhar. Ph. D. Thesis. Marathwada University, Nanded, 1993.
- Bagwan. Studies in airspora over Vegetable market and post harvest fruit pathology at Udgir. Ph. D. thesis. S.R.T.M.U. Nanded, 2001.
- ICAR Publication. 50 years of Horticultural research, 1998, p. 135-137.
- Tilak ST and Kulkarni RL. A new air sampler experiment, 1970, 26: 443-444.
- Tilak ST. Air borne pollen and fungal spores, Vajjanty Prakashan, Aurangabad, 1989.
- Barnet and Hunter B. Illustrated genera of imperfect fungi. Burgess publishing company, Minnepollis, Minnesota, 1972.
- Mukadam DS. The illustrated kingdom of Fungi. Aksharganga prakashan, Aurangabad, 1997.
- Alexopolous CJ. Introductory Mycology. John Wiley and Sons, NewYork, London. Sydeny and Toronto, 1980.
- Dube HC. Text book of Fungi, Bacteria and Viruses, Vikas publishing House, Pvt. Ltd. New Delhi, Bombay, Benglore, Kolkatta, Kanpur, 1978.
- Ainsworth GC. Fungi. Academic press. London, 1973.
- Bharat Rai. Air fungal flora of Varanasi. Proc. 56th Ind. Sci. Congr. Bot. Sec. Abst., 1969,pp.113.