

Investigation of Aeromycoflora in Soybean field from Latur District, M.S., India

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Abstract

The present investigation deals with the atmospheric concentration of Aeromycoflora over soybean (*Glycine max* (L.) field during 10th July 2021 to 10th October 2021 with the help of continuous Tilak air sampler. The area was selected because soybean crop increasing highest cultivation and production recorded in Latur district. During the period of investigation the aeromycoflora population comprises large number of fungal spore, pollen grains, insect part etc. in this study 52 fungal spore were identified during the period. The fungal spore belongs to five different classes, out of which Deuteromycetes contributed highest percentage 72.01% to the total air spora followed by Ascomycetes 11.12%, Basidiomycetes 10.01%, Oomycetes 5.07% and Zygomycetes 1.16% during the period of investigation. In this season the most dominant spore were *Alternaria* 11.21%, *Aspergillus* 10.2%, *Cladosporium* 7.19%, *Helminthosporium* 6.65%, *Curvularia* 6.51%, *Albugo* 6.01%, *Colletotrichum* 5.9%, *Fusarium* 5.1%, *Smut* spore %, *Spordaria* 4.8%, *Puccinia* 4.2%, *Cercospora* 4.1% and *Plasmopara* 4.1%. These studies in relation to phytopathology will put forth much useful results for implementation of cheaper and better preventive measures.

Keywords: Soybean field, Aeromycoflora, Fungal spore, Tilak air sampler

1. Introduction

Aeromycology is part of plant pathology which deals with study of fungal flora in air. The term aerobiology was coined by American plant pathologist Fred Campbell Meier. The Aeromycology studies include not only fungal spore's liberation from sources, transport and deposition but also their effect on plants, animal, humans and even over food, building, working places etc. [1]. In Maharashtra particularly in Marathwada credit for developing the aerobiological research work goes to Prof. S. T. Tilak.

The aerobiological studies over few crops have been investigated so far. In Marathwada region the climate is relatively moderate, average rainfall is 650 mm in monsoon, temperature ranges from 20^o c to 38^o c and relative humidity varies from 30 to 70 %. Latur is one of the district of Marathwada regions; where it is known for highest trading in oil seed mainly soybean, sunflower and groundnut. The highest increasing soybean production was recorded in Latur district i.e. 2961.19 qtls. Soybean is a high-quality protein eating one or two servings of soy products per day can be beneficial to our health. It is a significant crop in the Latur district of Maharashtra. The study of aerobiology gives information of concentrations of airborne fungal spores is especially important for agricultural and occupational medicine [2].

The aerobiological study helps to effective management of crop diseases. It is desirable to study the prevalence of air spora in this region. Crop diseases caused by airborne mycosporophytes constitute another important aspect of agriculture. The studies on air spora have been described by Sreeramulu [3]. The present investigation was under taken to identification of Aeromycoflora of soybean (*Glycine max* (L.) Merr) crop field from Latur district. The study of aerobiology is important in plant pathology and in disease forecasting of plant diseases. There are several factors which reduce the yield of soybean crop among which fungal diseases are found to be harmful as it reduces quality and quantity of the crop. Leaf spot diseases on soybean crop are caused by pathogenic fungal spores and their seasonal variation and disease forecasting system for privation, avoidance and treatment of soybean crop diseases.

2. Methodology

The air monitoring over soybean field was carried out for kharif season by using continuous Tilak air sampler. Sampler is an electrically operated machine which runs on electric power supply and provides a continuous air sampling data. The air sampler kept at constant height of 1 meter above the ground in soybean field at Handergulli, Tq. Udgir dist. Latur from 10th July 2021 to

10th October 2021. The air was sampled at the rate of 5 liters for minute and transparent cellophane tape was fixed on the drum coated uniformly with white petroleum jelly as adhesive. This cellophane brought to laboratory, slides were made and scanned. Fungal spore's isolation was made from these slides over soybean field.

Scanning: the air sampler loaded cellophane tape was removed without touching and it was cut in to six equal divisions. The slide was mounted in glycerin jelly and each divisions representing two hours air sampling. The scanning of slides was carried out under the binocular research microscope using 10 x × 45 x magnifications as per the producer mentioned by Tilak and Kulkarni [4]. The fungal spores were identified up to generic level. The identification of fungal spore's type was done with the help of literature [5].

3. Results and Discussion

The investigation of Aeromycoflora over soybean field has been reported 52 fungal spores. In this investigation the fungal spore belonging to Deuteromycetes contributed highest percentage 72.01% to the total air spora followed by Ascomycetes 11.12%, Basidiomycetes 10.01%, Oomycetes 5.07% and Zygomycetes 1.16% during the month of 10th July 2021 to 10th October 2021.

In the above listed members majority are plant pathogens which causes various diseases in plant. The abundant spore observed in the month of August and September 2021 *Alternaria* 11.21%, *Aspergillus* 10.2%, *Cladosporium* 7.19%, *Helminthosporium* 6.65%, *Curvularia* 6.51%, *Albugo* 6.01%, *Colletotrichum* 5.9%, *Fusarium* 5.1%, Smut spore %, *Spordaria* 4.8%, *Puccinia* 4.2%, *Cercospora* 4.1%, *Plasmopara* 4.1% *Nigrospora* 3.6%, *Penicillin* 3.01%, *Rhizopus* 2.27%, *Phytophthora* 2.04%, *Pithomyces* 2.03%, *Periconia* 1.21%, *Trichoderma* 1.13%, *Ramularia* 1.1%, *Pithomyces* 1.1%, *Mucor* 1.02% and *Memmoniella* 0.52% were found dominant type to the total air spora. The percentage contribution of pathogenic spore type *Alternaria*, *Aspergillus*, *Cladosporium*, *Curvularia*, *Albugo*, *Colletotrichum*, *Fusarium*, *Smut spore*, *Puccinia*, *Cercospora*

Table No. 1. The percentage contribution of pathogenic spore type over soybean field

Sr. no.	Fungal Class	Percentage of contribution
1.	Deuteromycetes	72.01%
2.	Ascomycetes	11.12%
3.	Basidiomycetes	10.01%
4.	Oomycetes	5.07%
5.	Zygomycetes	1.16%

Yearly total Cow and buffalo doses are 629

and *Plasmopara* were found maximum in the month of August and September and minimum in month of July and October.

The concentration of pathogenic fungal spore over different crop is also reported by Dhaware [7] Muley [8]. The spores of *Alternaria*, *Aspergillus*, *Cladosporium*, *Curvularia*, *Helminthosporium*, *Cladosporium*, *Curvularia*, *Mucor*, *Penicillium* and *Rhizopus* were the major component in the air of Gorakhpur, UP [9]. The similar finding also reported that *Alternaria*, *Puccinia*, *Cercospora*, *Helminthosporium*, *Colletotrichum* and *Fusarium* are plant pathogenic fungi and found throughout the year over agricultural field and infect the healthy crops [10]. *Alternaria* spore contaminate variety of crops in the field and causes variety of post harvested decays in fruits and grains and also it is the most common pathogen on the cereals [11]. The fungal spore *Cercospora*, *Helminthosporium* sp. *Ramuluriareloia* and *Alternaria* sp. were reported pathogenic to the cotton crop by Ahmedapur, Maharashtra [8].

The class Deuteromycetes contributed highest percentage of contribution and various leaf spot diseases causing *Alternaria* and *Cercospora* were responsible for initiating the diseases of soybean. Aerobiological studies are very important in relation to disease forecasting, so it must be carried out throughout the season in order to study transport of plant pathogenic spores type from place to place and their ultimate role in inciting plant diseases. The fungal spores like *Alternaria*, *Cladosporium*, *Helminthosporium*, *Curvularia* and *Cercospora* were observed in sufficiently

high concentration which was responsible for deterioration in soybean field. It indicates that wet weather, low temperature and high concentration of air borne fungal pathogen were most favorable conditions for diseases incidence.

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

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