Original Research Article

Studies on composition and components of airspora belonging to phycomycetes over the field of sugarcane

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Abstract

During the present studies composition and components of the airspora belonging to the Phycomycetes over the field of sugarcane, slides of spore catches were prepared, mounted and spore scanning was carried out regularly. Four types of fungal spores belonging to the Phycomycetes were trapped on the cellophane tape fixed on the drum of the sampler. Apart from these various dust particles were also seen in abundance.

Key Words: Airspora, phycomycetes, sugar cane, fungal spores, and cellophane.

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INTRODUCTION

Aerobiology is an interdisciplinary science which deals with the study of biological components like pollen grains, fragments of fungal spores, hyphal fragments bacteria, viruses, algae, lichens, plant seeds and other propagules, protozoa, minute insects and insect parts etc. in the atmosphere. Abiotic particulates and gases affecting living organisms have been recently included in the concept of aerobiology. The aerobiological studies are mainly concerned with the interrelationships between the biological components in the atmosphere, sources of biological components, their release in the atmosphere, their deposition and impact on health of plants and animals including human beings. Airborne infections and the resulting diseases threaten the lives and productivity of plants. Airborne diseases still pose a challenge to mankind. It is evident from the literature that investigations on outdoor (extramural) atmosphere for the detection of microorganisms have got manifold significance and utility. The aero allergenic pollen grains, fungal spores and other biologically significant particles detected from the atmosphere have their impact on human health. The detection and trapping of the significant plant pathogenic airborne fungi over crop fields are ultimately helpful in formulating a better and efficient forecasting system. It is also clear from the literature that many workers have focused attention towards the relationship between airborne fungi and Phytopathological problems. In India several workers like Cunningham (1873), Mehta (1952), Padmanabhan (1953), Ramlingam (1966), Sreeramalu (1970), and Tilak (1970) carried out the systematic and classic aerobiological work on rust spores with reference to wheat, Jowar, bajra, rice, sugarcane, cotton, banana, citrus and vegetables at various research centers. In Maharashtra particularly in the Marathwada region aerobiological work with reference to many crop plants was extensively carried out by various workers like Tilak (1970), Nagpurne (1973), Bhalke (1979), Chakre (1979), Balkhanale (1980), Babu (1983) Meshram (1990), Naik (1995), Pawar (1997), Kadam (2002), Bembrekar (2005), Dhaware (2007) and Patil (2008) at various centres. However detail studies on air spora over Botanical gardens in respect seasonal conditions are meager. Considering these facts studies on air spora belonging to the Phycomycetes over the field of sugarcane is carried out.

MATERIALS AND METHODS

Composition of airspora belonging to Phycomycetes over the field of sugarcane during two consecutive kharif seasons (Table-1, Plate-2): In order to study composition and components of the airspora belonging to the Phycomycetes over the botanical garden, slides of spore catches were prepared, mounted and spore scanning was carried out regularly. Before the scanning, the slides were marked with a ball-point pen in to six equal parts, each part indicating the spore catch of two hours of sampling period. Area of 9600sq. micron of the total area of the trace obtained was scanned under 10X x 45X eye piece objective combination of binocular research microscope. The identification of fungal spore types was made on the basis of morphological characters, visual identification by comparison with reference slides.

RESULTS AND DISCUSSION

Analysis of spore catches from the results presented in table-1 revealed that four types of fungal spores belonging to the phycomycetes were trapped on the cellophane tape fixed on the drum of the sampler. Apart from these various dust particles were also seen in abundance. Enumeration of the identified spores of fungi belonging to Phycomycetes over the Sugarcane field during the two consecutive kharif seasons:

Acaulopage Drechs: Mycelium slender, aseptate, sparsely branched, Conidia aerial, hyaline, borne singly on prostrate hyphae. During the present studies the spore concentration in the first test kharif season from 21-06-2009 to 30-09-2009 and second test kharif season from 21-06-2010 to 30-09-2010 was recorded 1498/m³ and 1190/ m³ of air respectively. They contributed 0.91% and 0.74% to the total airspora in the first and second kharif seasons respectively. The average percentage contribution for both the test seasons was recorded 0.82% to the total airspora over the botanical garden

Albugo Pers: The spore one celled, nearly globose, thick walled, smooth, hyaline to yellow coloured, 14-16µm, borne in chain on aseptate club shaped conidiophores. During the present studies the spore concentration in the first test kharif season from 21-06-2009 to 30-09-2009 and second test kharif season from 21-06-2010 to 30-09-2010 was recorded 4830 /m³ and 5334 / m³ of air respectively. They contributed 2.95% and 3.32% to the total airspora in the first and second kharif seasons respectively. The average percentage contribution for both the test seasons was recorded 4.61% to the total airspora over the Sugarcane field.

Mucor Micheli ex Fr: Spores one celled globose to oval, thin walled, smooth dark in mass 3-5 µm diameter, common during wet months of rainy seasons, saprophytic on a variety of substrates. During the present studies the spore concentration in the first test kharif season from 21-06-2009 to 30-09-2009 and second test kharif season from 21-06-2010 to 30-09-2010 was recorded 2408/m³ and 238/ m³ of air respectively. They contributed 1.47% and 0.14% to the total airspora in the first and second kharif seasons respectively. The average percentage contribution for both the test seasons was recorded 0.80% to the total airspora over the Sugarcane field.

Rhizopus Ehren: The spores of *Rhizopus* are unequal, irregular, round, oval, angular, striate, 9-11 x 7.5 µm in size. It is common saprophyte and facultative parasite on mature fruits, vegetables and on many other substrates. During the present studies the spore concentration in the first test kharif season from 21-06-2009 to 30-09-2009 and second test kharif season from 21-06-2010 to 30-09-2010 was recorded 462/m³ and 2772/m³ of air respectively. They contributed 0.28% and 1.72% to the total airspora in the first and second kharif seasons respectively. The average percentage contribution for both the test seasons was recorded 1% to the total airspora over the Sugarcane field.

Table 1: Composition of airspora belonging to Phycomycetes over the Sugarcane field during two consecutive kharif seasons

Sr. No.	Spore type
1	*Acaulopage* Drechs
2	*Albugo* Pers.
3	*Mucor* Micheli ex Fr.
4	*Rhizopus* Ehren.

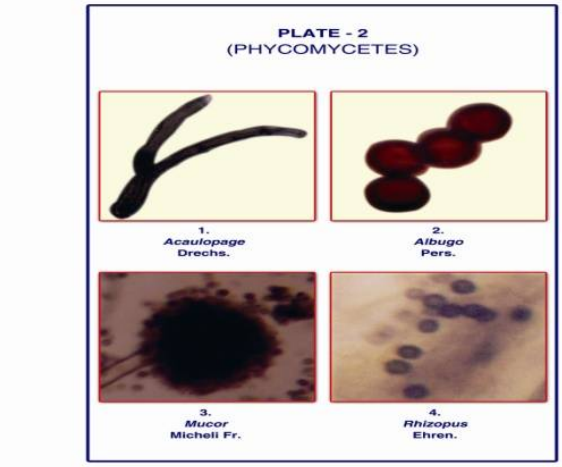

Figure 1:

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