



FUNGAL AIRSPORA OVER THE SUGAR CANE FIELDS AT NASHIK USING TILAK AIR SAMPLER



IJPRBS-QR CODE

AHIRE P. P.¹, SHINDE H. P.², GOSWAMI D. B.³,
KADAM V. B.¹



PAPER-QR CODE

1. P. G. Department of Botany & Research Centre, K.T.H.M. College, Nashik.
2. Department of Zoology, K.V.N. Naik College, Nashik.
3. Department of Botany, K.V.N. Naik College, Nashik.

Abstract

Accepted Date:

20/02/2013

Publish Date:

27/04/2013

Keywords

Fungal airspora,
Atmospheric parameters

Sugarcane is one of the most important cash crops of the Nashik district. The district is also known for cultivating other important crops like onions, grapes, pomegranates, and different vegetables. This region includes Western Ghats of Sahyadris and other hill areas including Saptashrungi hills. The district of Nashik is situated in North Maharashtra nearly 200 km. of Mumbai on National Highway Number 3.

Corresponding Author

Dr. Ahire P. P

INTRODUCTION

Aeromycological investigations were carried out for the first time at Nashik. The sugarcane field along the bank of Godavari River was selected to know the incidence of various fungal spores during the period of investigation.

Since the Sugarcane (*Saccharum officinarum* Linn.) is one of the important Cash crop of Nahik district. The sugarcane is mainly used for manufacturing of sugar and ethanol. The annual rainfall (175+20 cms) and temperature (27+03⁰C) of the district are favorable for the growth of sugarcane crop. The sugarcane crop is mainly affected by more than twenty fungal diseases. Hence attempt has been made to study this in detail to understand aerial microbial population and incidence of the disease. Airborne fungal spores show host-parasitic relationship with specific atmospheric conditions like rainfall, relative humidity and temperature.

Airspora studies in the field with sugarcane and other plantation have been made by Sreeramulu and Ramkrishna (1971) in certain areas of Andhra Pradesh and their

findings helped in evaluating disease epidemics in certain cases.

Sreeramulu and Vitthal (1972) measured the incidence of chlamydo spores of *Ustilago scitaminea* Syd. in the air within and above sugarcane fields. Studies on these issues have been carried out in different countries. In India, such work has been carried out by workers like Tilak S.T. and Kulkarni R.L. (1970). Result obtained during studies over sugarcane fields are similar to results reported by earlier workers, hence compilation of data will be very useful for devising disease forecasting system for the sugarcane crop.

MATERIALS AND METHODS

The air sampling was carried out over the sugarcane fields at Nasik for the first time. Tilak air sampler (Tilak and Kulkarni, 1970) was placed at the centre of sugarcane fields at the height of four feet's. Tilak air sampler is electrically operated device, sampling continuously for twenty four hours. The rotating drum of the sampler is synchronized with inbuilt clock. Where one complete rotation of drum requires eight days. After weekly sampling the rotary drum was taken out and the pre-coated

cellophane tape was divided into sixteen pieces, where each piece of cellophane tape represents the air sampling for twelve hours. Each piece was then mounted on a clean glass slide using glycerine jelly and covered with 22x40 mm cover glass. The permanent slides consisted of fungal spores, hyphal fragments, insect scales, epidermal hairs, and miscellaneous particles. The fungal spores so trapped were identified based on morphological characters, visual identification by comparison with reference slides and also from the published available literature.

RESULTS AND DISCUSSIONS

This paper deals with airspora over sugarcane fields at Nashik.

Fifteen types of ascospores were collected from the class Ascomycetes. Their average percentage of occurrence ranged between (0.004-0.93 percent). Their contribution to total airspora was 04.50%. The presence of many ascospore types in the airspora reveals the abundance of Ascomycetes in and around the sugarcane fields. Most of the ascospores showed their seasonal maxima in the rainy season. The relationship between the occurrence of

ascospores in the airspora and the presence of rainfall was found in the fungi like *Didymoshaeria*, *Leptoshaeria* and *Pringsheimia*. Spores occurred normally during night hours and their presence was mainly confined to the wet period. Similar observations were recorded by Rees (1964), Tilak and Kulkarni (1971).

The class Deuteromycetes contributed maximum during the period of investigation than any other fungal group. Deuteromycetes alone contributed fifty types of spores to the total airspora. Their contribution to total airspora was 69.39%. The highest contribution was made by *Cladosporium*, which has been always a dominant fungus everywhere in the world.

From the class Basidiomycetes five spore types were trapped, the smut spores showed highest contribution. The smut spores got second position, among the total airspora. Paddy (1957) observed smut spores through the year. In the present investigation smut spores were too recorded in both years of investigation. Attempts were also made to study diurnal periodicity patterns.

Gregory (1967) has clearly stated that interpretation of diurnal periodicity studies are not always clear, some reflects a diurnal rhythm in liberation mechanism and meteorological factors. The spores release and their incidence in the air is also controlled by meteorological conditions so that the diurnal periodicity patterns may differ from place to place. The smut spores were discharged mainly during the day time. These spores showed their daily maxima between 10.00 hrs. To 16.00 hrs. And reaching peak at about 14.00 hrs. This indicates that, the temperature has an enhanced effect on the release and dispersal of smut spores. The occurrence and abundance of smut spores in the air appears to be correlated not only with the rains but also with age of sugarcane crop (Ahire and Kadam, 2008). During rains the concentration of smut spores decreased while a marked increase in concentration appeared after the rains. Lower Basidiomycetes are more likely to discharge spores when the substratum is wet. Spore shedding in Higher Basidiomycetes is less affected by air, humidity and wind. Besides meteorological parameters the age and

maturity of sugarcane crop also played a significant role in the disease incidence.

Many of the spores recorded during present studies are found to be responsible for different sugarcane diseases. These observations will help not only to understand various components of the air and their occurrence over sugarcane fields, but also be useful in devising disease forecasting system for the sugarcane crop. During entire period of investigation daily record of meteorological data like temperature, rainfall and humidity was recorded.

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