

# Aeromycoflora over a sugarcane field at Ahmedpur Dist. Latur (M.S.)

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## SUMMARY

Aeromycological studies were carried out over a sugarcane field at Ahmedpur using volumetric Tilak air sampler, from 1<sup>st</sup> June 04 to 31<sup>st</sup> May 2005. A total 61 fungal spore types were recorded, in which *Ustilago*, *Cercospora*, *Helminthosporium*, *Colletotrichum*, *Fusarium*, *Alternaria* were found pathogenic to the sugarcane crop. '*Ustilago scitaminea*' caused whip smut disease, which affected the sugarcane crop in the whole Marathwada region of Maharashtra. The results indicated that fungal population has wide variation at different stages of crop development.

**Key words :** Aeromycoflora, Sugarcane, *Ustilago*

Sugarcane is traditional crop of India. There were mentions of sugarcane in several of our ancient books such as "Atharva veda", 'Rug Veda' and 'Manu's Law' book dating back to 1000 to 3000 BC. Sugarcane is an important commercial crop of the country. It occupies about 23% of the cultivated land area of cash crop. Fungal spores cause various diseases on cash crops. Stakman and Christensen (1946) made an intensive study and established the relationship between aerobiology and plant diseases and emphasized its role in forecasting the disease. Studies on fungal components of air over crop fields are useful in understanding plant pathogens and in establishing the forecasting system for disease control.

In the present study, the airborne incidence of pathogenic fungal spores was determined with the relationship with meteorological factors and growth stages of the crop.

## MATERIALS AND METHODS

A five hectares of land growing sugarcane crop (*Saccharum officinarum* L.) cv. CO-421 was selected as the air sampling site. The airborne fungal spores were trapped using 'Tilak air sampler' (Tilak and Kulkarni, 1970) from 1<sup>st</sup> June 2004 to 31<sup>st</sup> May 2005. The sampler was installed at a constant height of 5 feet above the ground level at the centre of crop. Slide preparation was done by the method after Tilak and Srinivasulu (1967). Spore count on strip was expressed as number / meter<sup>3</sup>

after multiplying with the conversion factor. Identification of fungal spore was accomplished with the help of visual identification and literature after Burnett and Hunter (1972).

During the investigation period, the data of meteorological parameters were recorded by the data collected from Meteorological Department Government, Agriculture College, Latur.

## RESULTS AND DISCUSSION

The present investigation indicated the presence of fungal spores, pollen grains, trichomes, fungal hyphae, insect scales and protozoan cysts etc. Total of 61 types of fungal spore were recorded. Among these genera, 3 belong to Phycomycetes, 15 to Ascomycetes, 5 to Basidiomycetes and 38 to Deuteromycetes. In all fungal spore types among which *Colletotrichum* sp. and smut spores were found pathogenic to the sugarcane crop (Table 1 and Fig. 1).

Affected plants, at the growing axis, were characterized by the production of a long whip-like, dusty, black shoot, often several feet in length and much curved on itself. This was might be due the floral shoot that gets transformed into a long whip-like structure. A silvery, thin membrane covered the whip.

The disease appeared in the 2nd week of November, when the crop was of 6 Month old. It was probably due to 95% humidity and the temperature 25-28°C. As the scanning record was kept daily and it was observed that, the occurrence of the smut spores was 16.38%. The corresponding mean temperature of the week was 26-28°C and the humidity was recorded 85-90% in month of September. During the severe infection in the last week of the prevalence of the smut spores was up to 26547/m<sup>3</sup> of air to the total pathogenic spore concentration recorded, during which, the relative humidity recorded was 34%

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**Table 1 : Monthly contribution of smut spore/m<sup>3</sup> of air over sugarcane field during 1<sup>st</sup> June 04 to 31<sup>st</sup> May 05**

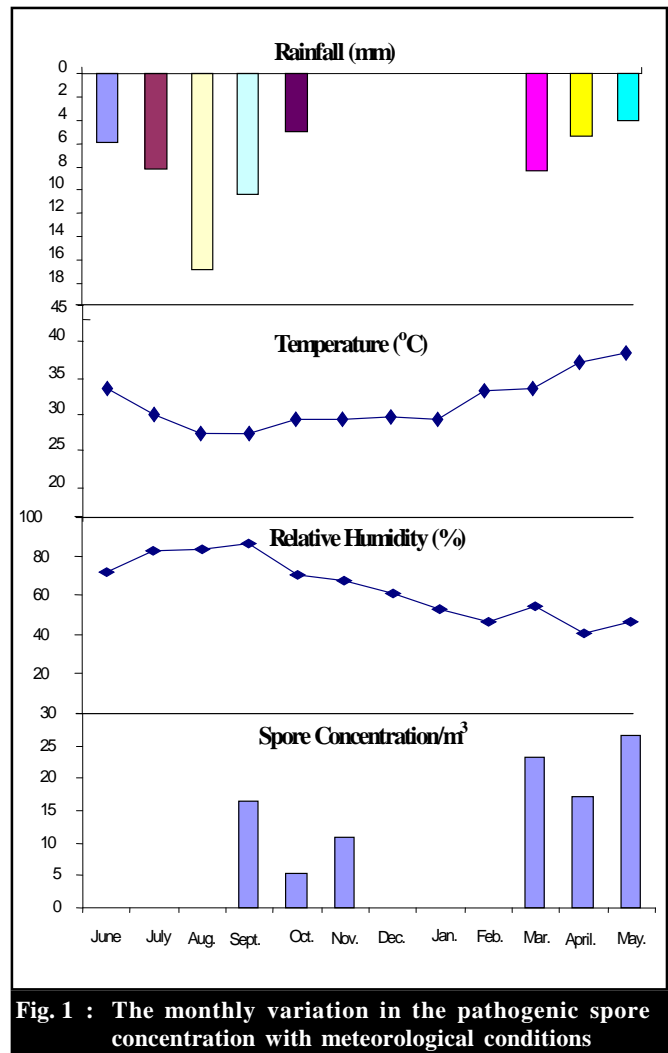
Month	Average meteorological factors			
	Spore concentration /m <sup>3</sup> of air	Relative humidity (%)	Rainfall (mm)	Temperature (°C)
June	1.00	71.70	5.87	33.44
July	1.23	82.34	8.2	29.96
Aug.	4.32	83.58	16.8	27.32
Sept.	16.38	86.43	10.40	27.23
Oct.	9.39	70.00	4.95	29.43
Nov.	13.94	95.46	--	29.35
Dec.	6.03	61.10	--	29.52
Jan.	3.21	52.83	--	29.37
Feb.	2.22	46.36	--	33.20
March	3.26	54.02	--	35.56
April	7.17	40.40	--	38.33
May	2.54	46.65	4.00	39.36

along with the 43.5°C as mean temperature of the week. Singh *et al.* (1992) reported the similar results while studying the fungal air spora over a sugarcane field in Imphal.

During the present investigation it was inferred that the spores of '*Ustilago scitaminea*' caused, whip smut disease of sugarcane crop as reported by the workers.

The present investigation indicates that the net crop loss due to disease was near about 40-50% (on the local survey basis) of the sugarcane field per acre in terms of quality and quantity. The disease was more destructive because of its period of incidence, severity and also the important plant parts *i.e.* stem affected during the infection. It was also noticed that the disease was not only observed in the experimental plots but found in every sugarcane growing fields of this variety (CO-421) in the surroundings of Ahmedpur. It was due to the liberation of smut spores through air. Gregory (1945) and Gregory *et al.* (1954) concluded that, spore liberation as measures by spore trapping in air, is independent of wind speed. It is therefore, from the present investigations, concluded that the 'whip smut' disease is a major disease of sugarcane crop with tremendous damage.

The probable reason for the severity and spread of the disease was because of continuous rainfall, alternate cloudy weather, morning dew, humidity and slow wind these set of meteorological conditions favors the pathogen,

**Fig. 1 : The monthly variation in the pathogenic spore concentration with meteorological conditions**

however observations in and around the diseased fields revealed that the genus "*Ustilago scitaminea*" served as collateral hosts. Boughey (1947) attributed that, the spore load and infection have inverse correlation of their distribution with the mean annual rainfall.

These studies also helped in providing data of atmospheric micro biota, particularly pathogenic and non-pathogenic spore types, with the meteorological parameters and their role in inciting the disease incidence.

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