

OCCURRENCE OF *CURVULARIA* SPORES IN THE ATMOSPHERE OF SEMIURBAN AND URBAN AREA AT NAGPUR (M.S.), INDIA.

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ABSTRACT : The concentration of *Curvularia* spores in air was monitored from semiurban area (Site I-Wanjra) and urban area (Site II-PDKV area) for the period of two years from February 2006 to January 2008. A total of 7540 spores/m³ were captured from Site I while 4660 spores/m³ from Site II. The maximum spore concentration was recorded in the month of October at both the sites. Knowledge of concentration of airborne *Curvularia* is very important as it causes various diseases in plants and allergic disorders in human. The present study revealed the prevalence of *Curvularia* in the atmosphere of Nagpur in relation to meteorological parameters like rainfall, relative humidity and temperature.

Key words: - *Curvularia*/Meteorological parameters/ Allergic disorders.

INTRODUCTION:

Fungi live as a saprophyte on organic material or as parasites (mainly plant pathogens), so the majority of fungal spores in outdoor air come from farms, forest stands and decomposing plants matter (Sabariago *et al.*, 2007). Fungal spores of specific taxa are very often implicated in respiratory allergy symptoms (Mari *et al.*, 2003, Gioulekas *et al.*, 2004). Fungal spores are also responsible for hospital admissions related to asthma attacks or even acute respiratory failure (O' Hollaren *et al.*, 1991, Bush & Prochnau, 2004). *Curvularia* is one of the dominant genera found in air at many places (Kalkar and Patil, 1994, Jothish *et al.*, 2004, Chauhan *et al.*, 2004). *Curvularia* is also reported as an aeroallergen (Shivpuri, 1982, Tilak, 1998). The aim of present study was to find out the atmospheric concentration of *Curvularia* and its correlation with meteorological parameters.

MATERIALS AND METHODS :

Location- Nagpur is situated in the central part of India in Maharashtra State. It is located between 21°45' N to 20°30' N and 78°15' E to 79°45' E, which essentially indicates that Nagpur is located in the Deccan Plateau.

Sampling sites-The present study was carried out at two regions of the Nagpur city viz, semiurban area (site I-Wanjra) and urban area [Site II- Panjabrao Deshmukh Krishi Vidyapeeth (PDKV) area] for the period of two years from February 2006 to January 2008.

Sampling method- Spore sampling was done by Rotorod sampler. Sampler was kept nearly 25 feet above the ground level and daily data was collected. The conversion factor for sampler is 5. Hence, if the total number of spores of one type from the catches is 8, then total number of these spores/ m³ of air will be 8 x 5 = 40. This number is the total number of spores/m³ of air at that particular site and height at that time.

Analysis of data- Daily slides were observed under the microscope and aerospora types were identified with the help of standard literature and reference slides up to genus level.

Meteorological data- It was obtained from Meteorological Department, College of Agriculture, PDKV, Nagpur.

RESULTS AND DISCUSSIONS :

Air monitoring was conducted for two consecutive years, viz. from February 2006 to January 2007 (Ist year) and from February 2007 to January 2008 (IInd year). A total of 7540 spores/m³ of *Curvularia* spores were recorded from site I out of which 3760 spores/m³ were observed during Ist year while 3780 spores/m³ were observed during IInd year of investigation. While from site II total 4660 spore/m³ were recorded among which 1720 spore/m³ were recorded in Ist year while 2940 spores/m³ were recorded during IInd year of study. *Curvularia* spores were recorded throughout the investigation period inspite of variations in its concentration. The highest peak was recorded in October at both the sites (Fig. 1 & 2) and minimum in May (Site I) and March (Site II). Unusual rainfall was recorded in every month except December and January. The percentage of *Curvularia* was found to be more in semiurban area as compared to urban area (Fig. 3). Monthly variation in temperature, humidity and rainfall were noted to correlate the occurrence of *Curvularia* (Fig. 4, 5 & 6).

Concentration of *Curvularia* spores was maximum in winter and minimum during summer season. During the winter maximum temperature was recorded as 33°C in October while minimum 13°C was recorded in January. The maximum relative humidity was recorded as 68% in October while minimum 32% was recorded in January. Winter season also witnessed the unusual rainfall. This is a season for the growing and maturation of most of the kharif crop in semiurban area where few agriculture lands are present. This may be the reason for its peak in this season. Occurrence of *Curvularia* was less during July and August, though the air consists of enough moisture and humidity but heavy rainfall may settled down the spores. Chakraborty *et al.*, (2000) showed that moisture and humidity have a positive effect on sporulation of *Curvularia*.

Curvularia made significant contribution in the total catch at other places in India (Agrawal *et al.*, 1969; Subba Reddi, 1970; Janaki Bai and Subba Reddy, 1981) and abroad (Levetin & Horowitz, 1978, Al-Doory *et al.*, 1980, Lacey, 1981, Herrero *et al.*, 1996, Dixit *et al.*, 2000). Mali and Ambhore (2008), Chate (2010), Mali and Sayyed (2011). Dere *et al* (2012), Mali and Pande (2012), Pathare and Mali (2012).

The monthly concentration and yearly contributions of *Curvularia* spore count was noted throughout the investigation period (Table 1 & 2).

Curvularia occurred predominantly in the environment. The percent occurrence of *Curvularia* spore was more in semiurban area (61.80%) than urban area (38.20%). *Curvularia* species are commonly found as a parasites or saprobes (saprophytes) on graminaceous hosts (grasses and cereals) present in this area. *Curvularia* is a dematiaceous filamentous fungus. Most species of *Curvularia* are facultative pathogens of soil, plants. *Curvularia* is mostly parasitic and saprophytic forms, being liberated from infected wood stored in forests, lumber yards and sawmill compounds (Jothish and Nayar, 2004). Leaf blight in Bajra due to *Curvularia* was observed by Patil *et al.* (1966). Khasanov *et al.* (1990), observed the plant diseases range from seedling failure to leaf blight including grass “fade out” during hot, humid weather due to *Curvularia*. As well as being a contaminant, *Curvularia* may cause infections in both humans and animals. *Curvularia* is responsible for allergic cases in Nagpur (Kalkar *et al.* 1998). *Curvularia* infections are invasive and cause allergic sinusitis and bronchopulmonary disease. Infection of the cornea was the first human disease proved to be caused by *Curvularia* (Anderson *et al.*, 1959).

Thus the study of *Curvularia* spores in Nagpur atmosphere may prove useful for the farmers about incidence of disease and also in protecting the crops from infection and diseases. Such study may also help the allergologist, physician and allergy patients in the management of allergic ailments in this area.

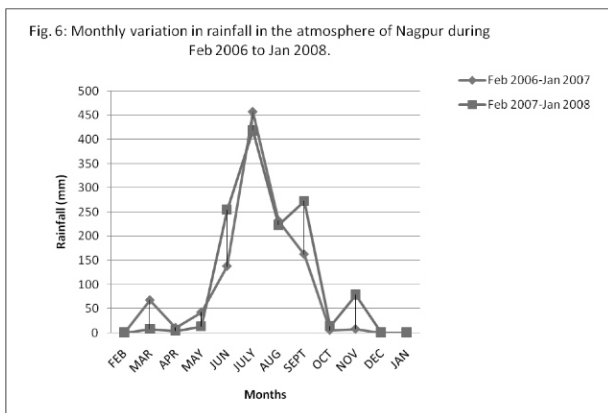
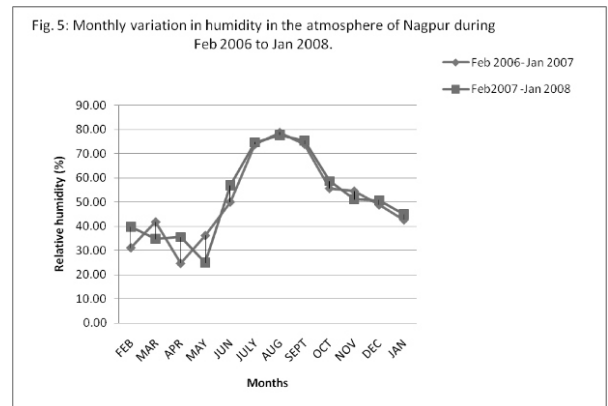
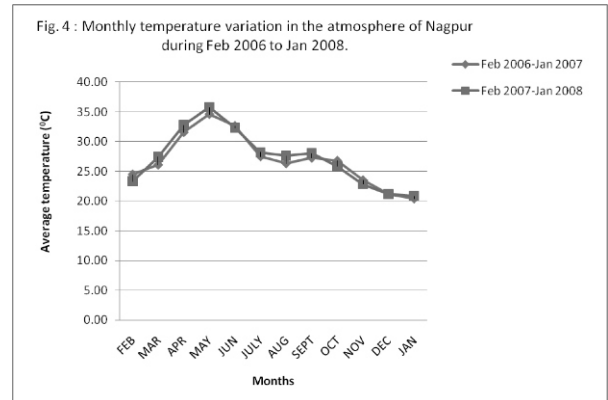
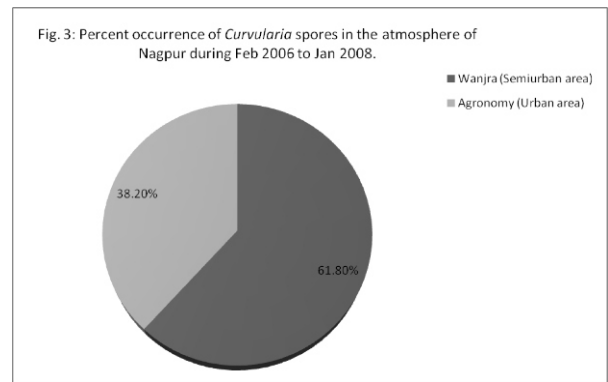
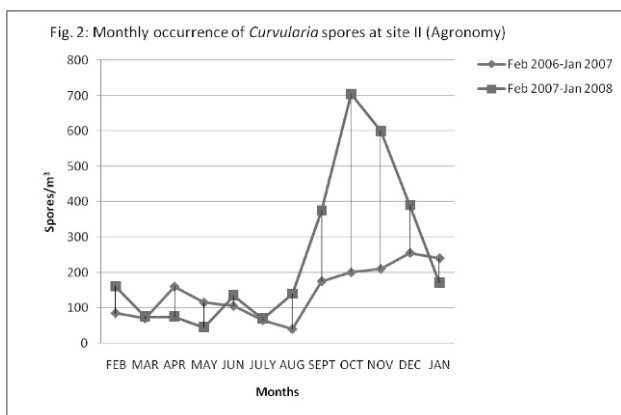
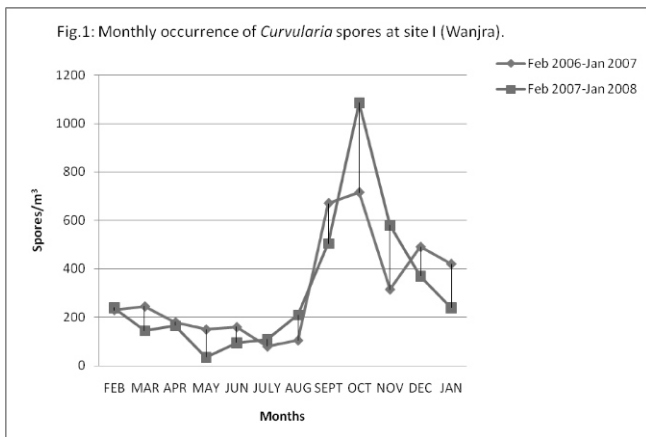


Table 1. Monthly concentration of *Curvularia* spore/m³ during February 2006 to January 2008.

Sites		FEB	MAR	APR	MAY	JUN	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	TOTAL
Wanjra (Semiurban area)	2006-2007	230	245	180	150	160	80	105	670	715	315	490	420	3760
	2007-2008	240	145	165	35	95	110	210	505	1085	580	370	240	3780
Agronomy (Urban area)	2006-2007	85	70	160	115	105	65	40	175	200	210	255	240	1720
	2007-2008	160	75	75	45	135	70	140	375	705	600	390	170	2940

Table 2. Annual totals of *Curvularia* spore/m³ during February 2006 to January 2008.

Sites	<i>Curvularia</i>			
	Spore count from Feb.2006- Jan.2007	Spore count from Feb. 2007- Jan. 2008	Total Spore count from Feb. 2006- Jan.2008	%
Wanjra (Semiurban area)	3760	3780	7540	61.80
Agronomy (Urban area)	1720	2940	4660	38.20
Total spore count	5480	6720	12200	100.00

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