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Research Article

Occurrence of *Alternaria* spores at Barshi area of Solapur district of Maharashtra

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Abstract

Effect of environmental factors on *Alternaria* fungi were studied from Barshi area of Solapur district of Maharashtra, India. The period of study was two years from June, 2015 to February 2017. In whole working period 1353spore/m^3 were captured from first year while 1758spore/m^3 from second year. The maximum spore concentration was recorded in month of July and August at both year.

INTRODUCTION

Fungal spores are universal atmospheric components in both indoor and outdoor environments. Fungal spore constitutes the greatest and most important portion in air (Salvaggio and Lars, 1981). Fungi have both beneficial and nuisance effects on our lives. Fungal bioaerosol responsible to cause severe plant diseases to crop plants and respiratory allergy in animal (Shivpuri, 1982). The fungal genus *Alternaria* is common especially in outdoor environments worldwide. The *Alternaria* genus contains 44 species of which most of parasitic and few are soilborne (Ianovici, 2003; Janovici, 2008a and Ianovici, 2007).

Alternaria is one of the dominant genus associated with *Sorghum* fields at many places (Leukel and Martin, 1943; Navi *et al*., 1999; Chavan and Mukadam, 2001). *Alternaria* is most common pathogen of cereals, vegetables and weeds and it may contaminate a wide variety of crop in the field and causepost harvest decay of various fruits, grains and vegetable (Guo *et al*.,2004). Currently the study of *Alternaria* is very interesting both from an aerobiological and from clinical point of view. The aim of present study was to find out the concentration of *Alternaria* in atmosphere and its correlation with meterological parameter.

MATERIALS AND METHODS

Location- Barshi is situated in 18º13 north latitude and 75º41 east longitude north west of Solapur district of Maharashtra, India. Barshi is a dry place.

Sampling method- The present study was carried out at Barshi region for the period of two years from June 2015 to February 2017. Aeromycological investigations were carried out by operating continuous volumetric Tilak air sampler (Tilak and Kulkarni, 1970) located in 3 feet above the ground level. The air was sampled at the rate of 5 liters per minute and the transparent cellotape fixed on the drum coated uniformly with petroleum jelly. The drum was changed after every eight days. The complete tape was cut into eight equal segments, again each segment into two equal parts, each representing 12 hours trace area of day and night. The cellotape segments were mounted on glass slide by using glycerine jelly as mounting.

Analysis of data and scanning- Daily slides were observed under the microscopic and identified with the help of standard literature up to genus level. Slides have been scanned under 45X x 10X combination of binocular microscope.

Meterological data- It was obtained from Indian Meterological Department, Pune.

RESULTS AND DISCUSSION

The survey was conducted for two consecutive years *viz*. from June 2015 to February 2016 (first year) and June 2016 to February 2017 (second year). A total of 3111 spore/m^3 of *Alternaria* spores were recorded from Barshi area out of which 1353 spore/m^3 were observed during first year while 1758 spore/m^3 were observed during second year of investigation (Figure-1). *Alternaria* spores were recorded throughout the year. The highest spore concentration was recorded in July and August and lowest in January and February. Monthly variation in temperature, humidity, rainfall was noted and correlate with the presence of *Alternaria* (Figure 2 and Figure 3). The monthly concentration and yearly contribution of *Alternaria* spores count were recorded throughout the investigation (Table 1 and 2).

During rainfall most of the crop growing and maturation hence maximum number of *Alternaria*spore was found in July and August. Hasnian (1993) reported that *Alternaria* spores found in higher concentration in August similar results obtained to our findings.

Concentration of *Alternaria* spores was maximum in rainy and minimum during winter season. During rainy season maximum temperature was recorded as 34.8ºC in June while minimum 16ºC was recorded in December. The maximum relative humidity was recorded as in 81% in July and August while minimum 30% was recorded in January. Calvo *et al* (1981) reported that occurrence of *Alternaria* in atmosphere greatly affected by climatic conditions. Several workers like Infante and Dominquez (1988), Gonzales and Minero *et al*. (1994), Ricci *et al*. (1995), Mendez *et al.*, (1997), Giner and Garcia (1995) stated that the temperature and humidity have a positive significant correlation and played major role in dispersion of *Alternaria* population.

In rural environment there are more organic material from agricultural fields where fungi can grow as parasite or saprophyte. This is the main reason the airborne*Alternaria*species are more common in rural area than city (Kasprzyk, 2006). *Alternaria* is most common saprophyte, leaf surface organism and plant pathogen founds of variety of crop plant. According to Ramchander (1993) *Alternaria alternate* causes leaf and stem spot disease in sunflower and conidia were trapped from air when crop was flowering stage. Chawda and Rajasaab (1994) reported day to day variations in the concentration of *Alternariaporri* conidia over onion crop infected with purple blotch. There is very little information available on the head blight due to *Alternariasp*. to grow and produce mycotoxins on ripening *Sorghum* (Jewers and John, 1990). Blight disease in cotton due to *Alternaria* was observed by Hadas and Jakoby (1981).

Alternaria was known as aeroallergen. A correlation was observed between the concentration of *Alternaria* spore in the atmosphere and symptoms of diseases. Higher concentration of *Alternariasp*. causes most severe formof asthma (Down *et al.*, 2001, Mitakakis*et al.*, 2000, Delfino *et al.*, 1997, Fung *et al.*, 2000 and Perzanowski*et al.*, 1998) as well as lower concentration play important role in aeroallergens (Beaumont *et al.*, 1984). Allergy appears to be one of the commonest major health problems. More than 25% people suffer from allergic problem due to bioaerosol. *Alternaria* spores may be an important cause of allergic rhinoconjuctivitis reported by Anderson *et al.*, (2003). *Alternaria* also responsible for respiratory allergy (Caretta, 1992). In the present attempt, diversity of *Alternaria* was studied during rainy and winter seasonin Barshi region. *Alternaria* spores most common and more or less concentration appear throughout the year. Thus, the study of *Alternariasp*. may provide useful information about the incidence of diseases and impact on allergy on human health.

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Table- 1: Monthly concentration of *Alternaria* spore/m^3 during June 2015 to February 2017 2017.

Site	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb
Rural area (2015-2016)	108	124	719	77	64	86	112	63	-
Rural area (2016-2017)	120	230	810	125	72	110	156	80	55

Table- 2: Total spore count of *Alternaria* during 2015-2017

Site	Spore count from June 2015 to February 2016	Spore count from June 2016 to February 2017	Total spore count From June 2015-February 2017
Rural area (Barshi)	1353	1758	3111

Figure1: Percentage occurrence of *Alternaria* spore in the atmosphere of Barshi.

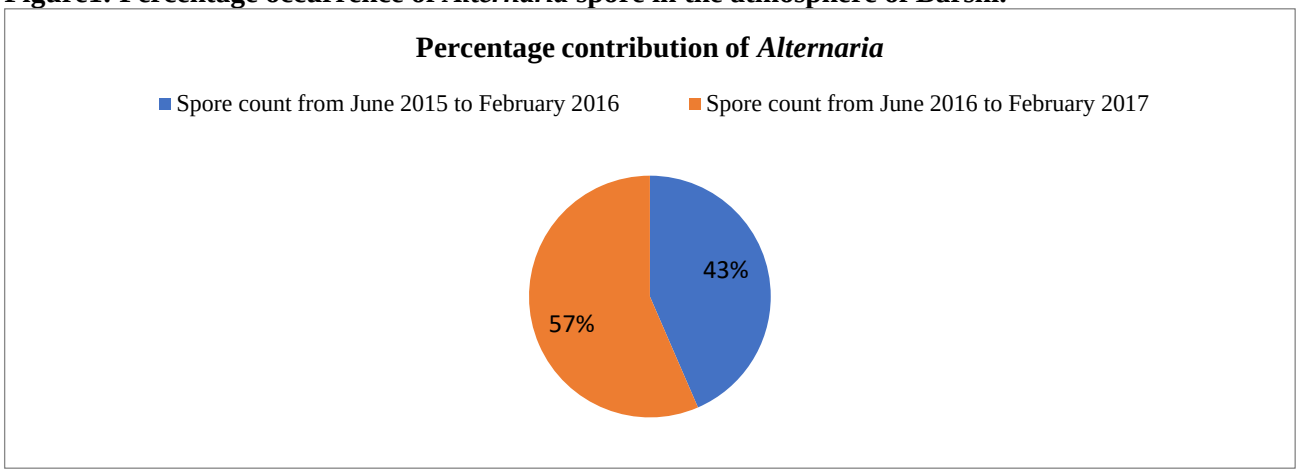


Figure 2: Monthly variation in temperature, humidity and rainfall during June 2015- February 2016

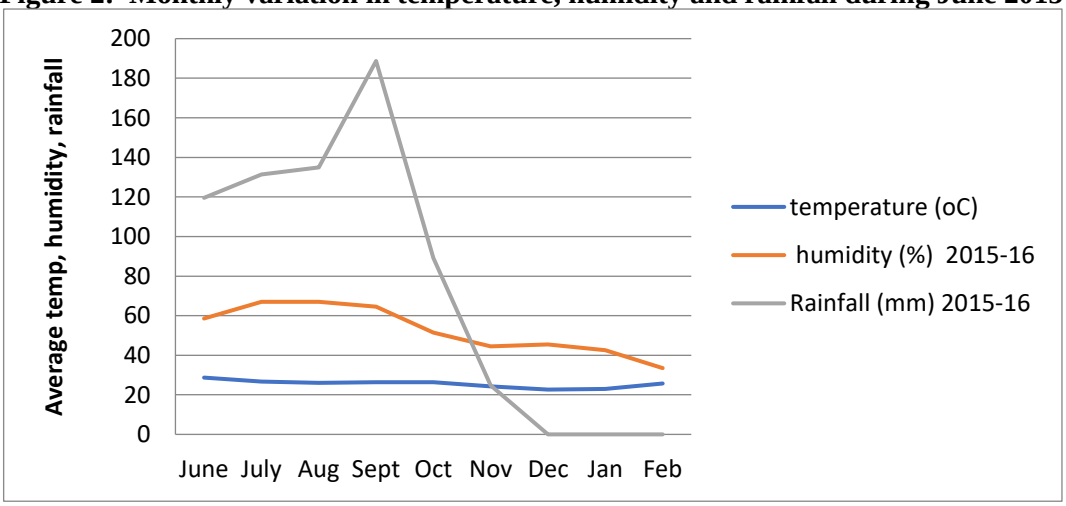
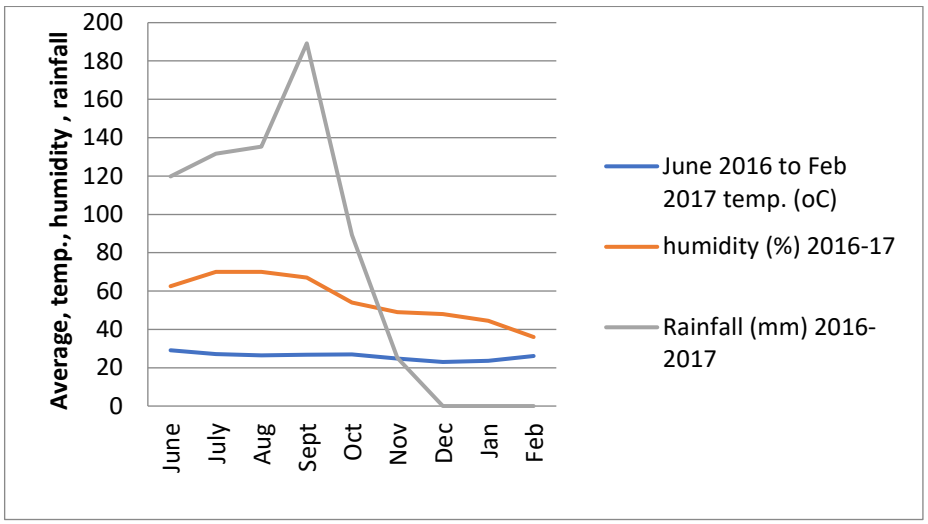


Figure 3: Monthly variation in temperature, humidity and rainfall during June 2016- February 2017



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