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RESEARCH ARTICLE

ATMOSPHERIC FUNGAL ASSORTMENT OVER *Cajanus cajan* L. FIELD AT MALIWADA VILLAGE DIST. AURANGABAD (M.S.)

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ABSTRACT

The present investigation deals with the Atmospheric Fungal Assortment over *Cajanus cajan* Field at Maliwada village Dist. Aurangabad (M.S.). The aerobiological investigation was carried out by using volumetric Tilak air sampler from 1 July 2016 to 31 December 2016. Total number of fungal spores found during the month of July to December 2016 were (62289 spores/m³) belonging to 44 genera. Dominant spore group accounted were Deuteromycotina about (70.09%). Throughout the season *Cladosporium* were most dominant spore (29.51%). Variations were seen among the fungal spores with respect to seasonal changes.

INTRODUCTION

The atmosphere is the combination of different types of living as well as non-living organisms in the form of microscopic to huge organisms. The amount of fungal airspora and their diversity altered with meteorological factors such as Temperature, Humidity, Rainfall and also with time of day, geographical distribution. The aerobiological studies are essentially related with interrelationship among the biological component present in the atmosphere. It is also focused on their source, release, deposition and influence on health of plants and animals plus human beings. Airborne pollutions and the subsequent diseases threaten the lives and productivity of plants. Airborne diseases still have a challenge to mankind. Aerobiological survey conducted in various part of India to discover the abundance of air spora. Pigeon pea (*Cajanus cajan* L.) is one of the most important pulse crop in Marathwada region. From the ancient time Pulses are being grown India. It is the chief source of protein. As considering survey of this crop that since last few years pigeon pea is suffering with various types of pathogenic diseases like fungi, bacteria and viruses etc. Therefore preliminary study on air borne fungi has been conducted at Maliwada village of Aurangabad district of Maharashtra State.

MATERIALS AND METHODS

Aerobiological survey was undertaken in the field of *Cajanus cajan* L., present in the Maliwada village of Aurangabad district. Volumetric Tilak Air Sampler (Tilak and Kulkarni, 1970) was

installed at a constant height of 1.5m above the ground level in the field. The experimental work was carried out continuously from 1st July 2016 to 31st December 2016. After sampling, aerobiological slides were prepared. Identification of trapped fungal spore types was done by direct microscopic observation and through scanning. Size, colour, shape and septation of fungal spores and other morphological features aided by published literature (Barnett, 1970.). The daily record of Temperature, Relative Humidity, Rainfall, wind velocity was obtained from Bajara research center, Aurangabad (M.S.).

RESULTS AND DISCUSSION

The aerobiological survey over *Cajanus cajan* L. field revealed rich airspora including fungal spore types and other types throughout the period of investigation. During this analysis 44 fungal spore types were recorded. These spores are grouped according to classes- Deuteromycotina includes (21), Ascomycotina (19), Basidiomycotina (03), and only single spore of group Myxomycotina were noticed. Besides this fungal fragment, pollen grain, mycelium, insect part also recorded and categorised under other types. Monthly concentration of each spore group from 1st July to 31st December 2016 is shown in (Figure I.) However the trapped fungal spore types exhibited variation in their concentration. Deuteromycotina group is the prevailing group among all fungal groups. It represented by (70.09%) of total aerospora (Figure II). Similar observation were recorded by Ahire P.P. (2013). The next dominant fungal group is Basidiomycotina which represented by (26.11%) of aerospora.

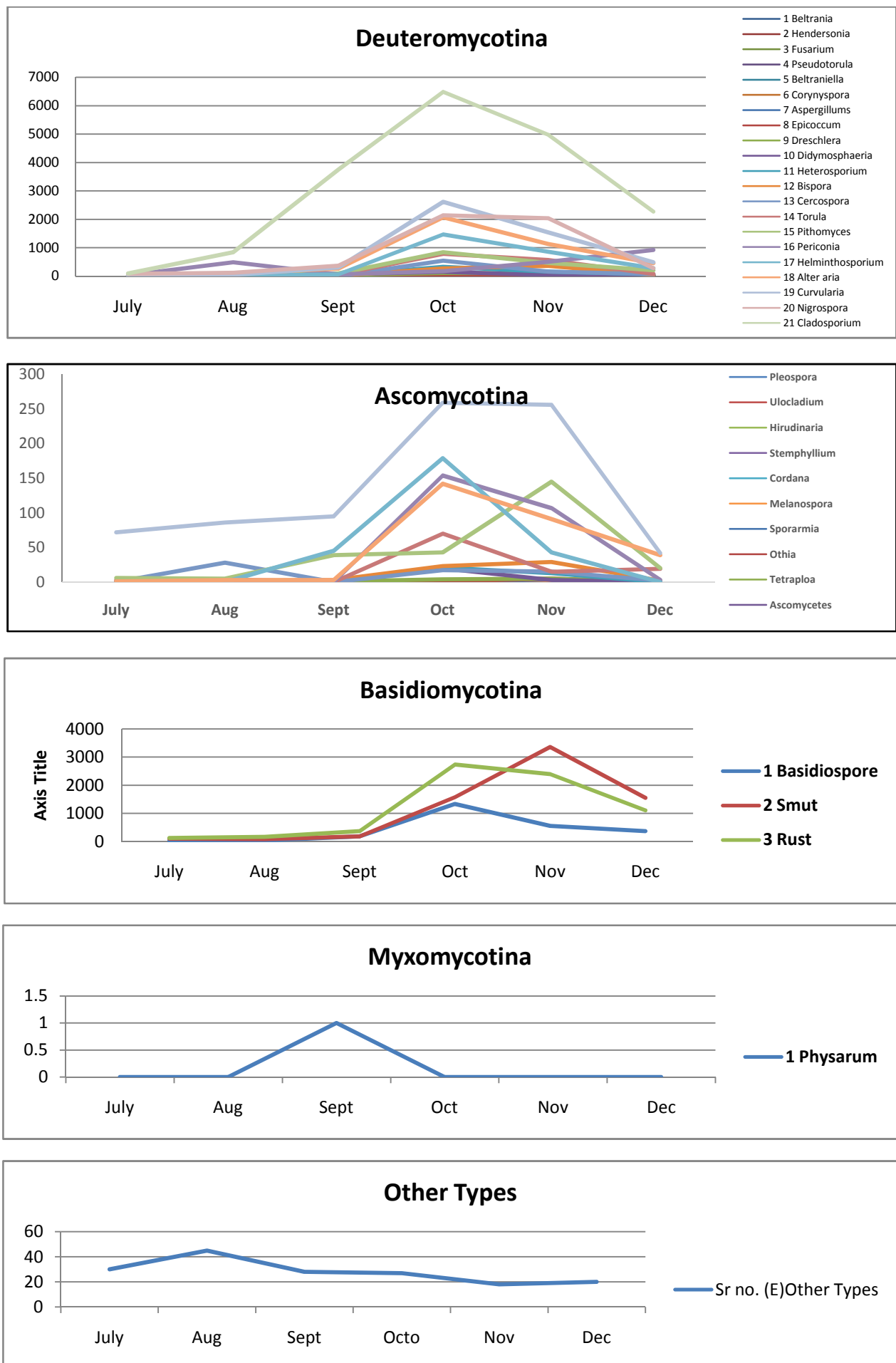
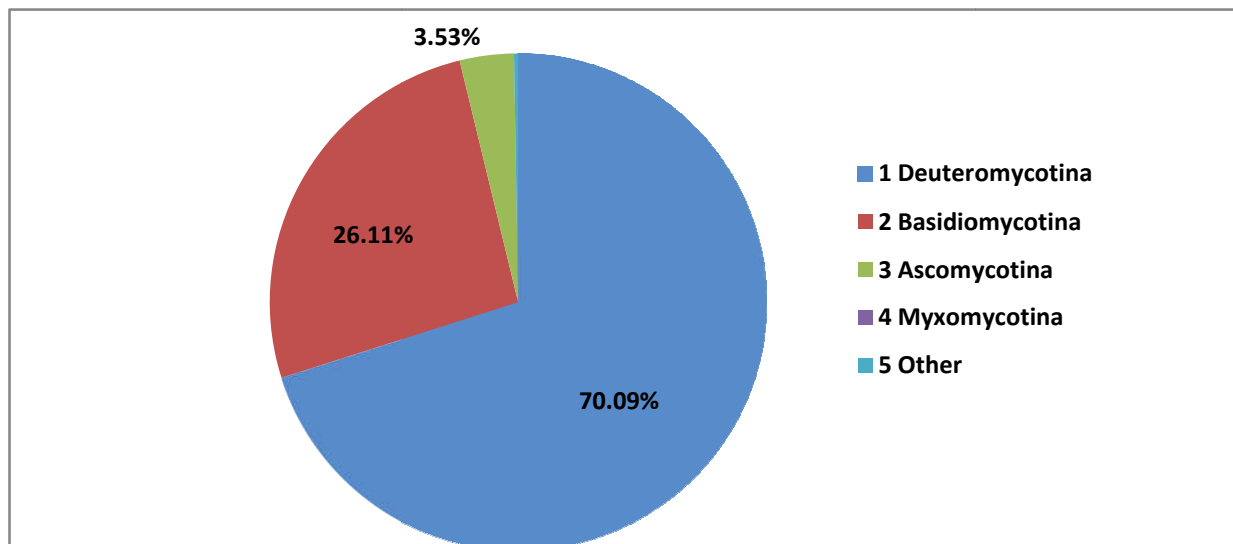


Figure 1. Monthly concentration of each spore group * & spore type (spore /m³ of air) during the period of July to December 2016

Table 1. Variation in the Total Concentration and Percentage Contribution of different spore types During July to December 2016

Sr No	Spore group & spore type (A) Ascomycotina	Total Conc. Of spore/m3 of air	% Contribution to the Total airspora
1	Pleospora	1	0.001
2	Ulocladium	1	0.001
3	Hirudinaria	1	0.001
4	Stemphyllium	2	0.003
5	Cordana	2	0.003
6	Melanospora	4	0.006
7	Sporarmia	4	0.006
8	Othia	6	0.009
9	Tetraploa	10	0.01
10	Ascomycetes	23	0.03
11	Bertia	36	0.05
12	Teichospora	60	0.09
13	Tetracoccusporium paxianum	62	0.09
14	Xyleria	111	0.17
15	Diplodia	258	0.41
16	Hysterium	264	0.42
17	Leptosphaeria	267	0.42
18	Spegazzinia	279	0.44
19	Hypoxyton	810	1.3
Sr No	Spore group & spore type(B)Basidiomycotina	Total Conc. Of spore/m3 of air	% Contribution to the Total airspora
1	Basidiospore	2499	4.01
2	Smut	2500	4.01
3	Rust	2501	4.01
Sr No	Spore group & spore type(C) Deuteromycotina	Total Conc. Of spore/m3 of Air	% Contribution to the Total Airspora
1	Beltrania	6	0.0096
2	Hendersonia	10	0.016
3	Fusarium	11	0.017
4	Pseudotorula	12	0.019
5	Beltraniella	44	0.7
6	Corynyspora	84	0.13
7	Aspergillum	104	0.16
8	Epicoccum	137	0.21
9	Dreschlera	307	0.49
10	Didymosphaeria	324	0.52
11	Heterosporium	566	0.9
12	Bispora	725	1.16
13	Cercospora	782	1.25
14	Torula	1530	2.45
15	Pithomyces	1671	2.68
16	Periconia	2183	3.5
17	Helminthosporium	2674	4.09
18	Alternaria	4052	6.5
19	Curvularia	5012	8.04
20	Nigrospora	5018	8.05
21	Cladosporium	18400	29.53
Sr no.	Spore group & spore type(D)Myxomycotina	Total Conc. Of spore/m3 of air	% Contribution to the total airspora
1	Physarum	1	0.001
Sr no.	Spore group & spore type	Total Conc. Of spore/m3 of air	% Contribution to the total airspora
	(E)Other Types	168	0.26

**Figure 2. Total Number of Spores & Percentage Contribution of each spore group from July to Dec 2016**

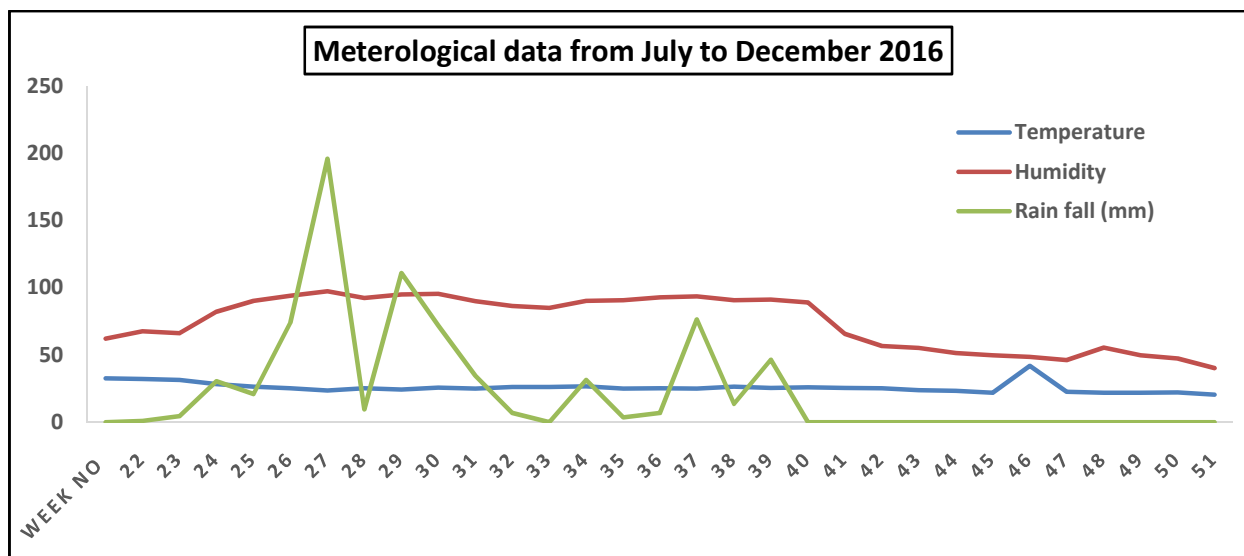


Figure 3.

It is followed by Ascomycotina (3.53 %), Other Types (0.26%), and Myxomycotina by (0.0016 %) of total aerospora. Maximum aerospora have been recorded in the month of October 2016 i.e. (24823 / m³) (Figure I). Occurrence of some of the dominant spores types of Deuteromycotina in decreasing order are *Cladosporium* (29.53%), *Nigrospora* (8.05%), *Curvularia* (8.04%), *Alternaria* (6.5%), *Helminthosporium* (4.09%). Whereas spores such as *Beltrania*, *Hendersonia*, *Fusarium*, *Pseudotorula* recorded in very less amount (Figure I). *Cladosporium* spore requires cool, humid weather conditions for intense growth. Percentage of spores increase during the month of September i.e. (60.28%). In the month of September the Average Temperature was (25.44° C). *Cladosporium* are active at low Temperatures and High Humidity (Rafał Ogórek *et al.*, 2012). Surrounding area of the crops is also covered by dead material (debris), so that percentage of *Cladosporium* increases in the field. Basidiomycotina was the second most dominant group during the study as said earlier. It includes three types of the fungal spores such as *Basidiospore*, *Rust* and *Smut* 4.01% respectively (Figure I). The maximum dispersal of spores takes place at 24^o to 27^oC and 50 to 60% relative humidity. (Prateeksha Mehra) (2015). Ascomycotina spores such as *Hypoxyylon*, *Spegazzinia*, *Leptosphaeria*, *Hysterium*, *Diplodia*, *Xylaria*, *Tetracoccosporium paxianum*, *Teichospora*, *Bertia*, *Ascomycota*, *Tetraploa*, *Othia*, *Sporarmia*, *Melanospora*, *Cordana*, *Stemphyllium*, *Hirudinaria*, *Ulocladium*, *Pleospora* were recorded as shown in (Figure No.I) This group contributed about (3.53%) of the total airspora (Figure II) out of which the highest count of *Hypoxyylon* spore is observed during the investigation (810 /m³ of air) (Figure I.) *Pleospora*, *Ulocladium* and *Hirudinaria* spores found rarely and only in the month of November 2016 (Figure I).

Conclusion

It was observed that Occurrence of spores in air was in relationship with impulsive changes in weather parameters, field operations and growth stages of crop. The Average Temperature during July to December was (25.83^oC), Average

Humidity (74.46 %) and Rainfall was (23.85 mm) (Figure No.III). Increased Humidity, adequate Temperature and dense Rainfall has been found to increase spore load in the atmosphere. Decreased spore load in the atmosphere is the cause of Continuous heavy rainfall as a result of rainfall it wash out the aerospora. This is mostly wet aerospora. Aerobiological studies must be carried out continuously year around in order to study transport of plant pathogenic spore type from place to place and their ultimate role in provoking plant diseases.

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