

A Census of Air Borne Pathogens over Cotton (*Gossypium Sp.*) Crop

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Abstract: Aerobiological investigations were carried out over cotton field at Kandhar for two seasons from 7th July to 23rd Dec. 2009 and 10th July to 27th Dec. 2010. A total of 49 and 46 fungal spores were recorded in respected year, out of which *Ramularia areola* G. F. Atk., (6.82% & 9.29%), *Cercospora sp.* (1.01% & 1.70%), *Helminthosporium sp.* (5.29% & 2.45%), *Alternaria sp.* (15.19% & 16.26%) were found to be pathogenic to the cotton crop. These pathogenic fungi were taken in to a separate count to study correlation of fungal concentration with meteorological parameters and disease incidence. Incidence of pathogenic fungi recorded maximum in the month of August and September in both crop seasons. The percentage contribution of pathogenic fungi was 28.31% & 29.70% to the total airspora during Ist and IInd crop seasons respectively. Meteorological parameter was maintained throughout the period of investigation.

Key words: *Gossypium sp.*, Pathogenic fungi, weather parameters.

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I. Introduction

Cotton is one of the important cash and commercial yielding crops playing a key role in economic political and social affairs of the world. Near about 20 diseases of microbial nature have been reported on cotton in India. In the present investigation *Ramularia Sp.*, *Cercospora gossypiana*, *Alternaria Sp.*, and *Helminthosporium sp.*, are fungal airborne pathogens were found predominant over the cotton field during the period of Survey and caused leafspot diseases to cotton plants.

It has been found that there is a significant correlation between leaf disease of cotton caused by *Cercospora*, *Alternaria* and *Ramularia areola* G. F. Atk., etc. there is a close relationship among the quantitative assessment of pathogens in the airspora, their monthly variation and prevailing meteorological conditions for disease development and growth stages of the crop field.

II. Materials And Methods

On 7th July 2009, and 10th July 2010, Cotton crop was sown and cultivated in the area of 2 acre land during Ist crop season and IInd crop season respectively. The field located 3 km away from the village. Airspora over cotton crop is obtained operating volumetric Tilak air sampler with its orifice. Air sampler installed in the center of the field at a height of 1.5 mts above the ground level and operated continuously till the harvesting 23rd Dec. 2009 and 27th Dec. 2010 in the Ist and IInd crop seasons respectively. The cellophane tape which is affixed over the rotating drum inside the air sampler, after operating for every 8 days was cut into 16 divisions of equal sizes. Each division provides the data of day/night spore composition.

Mounting of the cellophane tape on the slide was done with the help of Glycerin Jelly, because of its optical properties for the visual examination. An area of (9600 sq. microns) of the trace obtained was scanned under microscope, the slide preparation and scanning was done as per described by earlier workers. (Tilak and Srinivasulu 1967)

The quantitative qualitative analysis of the airspora composition was carried out the identification of the fungal spore made on the basis of morphological characters and visual identification by comparing with the reference slides prepared from field materials. Culture plate were exposed periodically for the study.

Meteorological parameters and incidence of the fungal spores in relation with growth stages of crop have been studied.

III. Results and Discussion

The scanning of the slides indicate composition and various components of air spora includes fungal spores, pollengrain and other group. In all 49 and 46 fungal spore types and four other group were recorded, among which *Alternaria sp.* (15.19% & 16.26%), *Cercospora sp.* (1.01% & 1.70%), And *Ramularia areola* G. F. Atk. (6.82% & 9.29%) *Helminthosporium* (5.29% & 2.45%) were found pathogenic over cotton and produced disease incidence. (Table 1.) Uppal (1948) reported Areolate mildew is of minor importance. Jon-Enrilich and

Frederick (1932), Butler (1918), Dutta and Jha (1979), and Tilak (1988) from Aurangabad reported the disease maximum in month of August and September.

Alternaria leafspot disease was maximum in 3rd week of September in both seasons. When the crop was in bull formation stage. *Cercospora* leaf spot also observed and severe in between flowering and bull formation stage in sporadic condition.

Helminthosporium leaf spot caused by *Helminthosporium gossypii*, *Alternaria* leaf spot caused by *Alternaria macrospora*, *Cercospora* leaf caused by *Cercospora gossypina*, wilt, stem rot, damping off, blight and several other fungal disease have been reported from various regions. The finding agreed with earlier reports.

Gray or Areolate mildew caused by *Ramularia areola* G. F. Atk. shown clear symptom over cotton. It is septate mycelium with short conidiophore. Conidia are born singly or in short chain, colorless, oblong, with pointed flattened end. They are unicellular 1-3 septate. Govindrao and Subbaiah (1954) reported this disease sporadic in some places of A. P. and Mysore.

Spore catches were recorded throughout the period of sampling with more or less in their incidence. In the beginning there is low percentage of spores but gradually increased in spore number is noticed it might be secondary infection which repeated many times leads to maximum spore count and severe disease incidence. The maximum spore concentration was observed in between August-September months in both years may be because of favourable rainfall. It was recorded when prevailing favourable climatic conditions such as high humidity (76-94%) and moderate temperature (23^o-30^oc) followed rainfall were existed.

In the present two years survey it was clearly revealed that the spore concentration was correlated with favourable weather conditions and disease incidence. In both season weather conditions with a little variation and also found variation in spore quantity.

Such Aerobiological experiment would be conducted continuously to formulate a better and efficient disease forecasting system over cotton crop in order to save the crop from fungal diseases and economy of farmer

Table-I

Percentage Contribution of pathogenic fungi to the total air spora during Ist and IInd crop seasons.

(I- 7/7/2009 to 23/12/2009)

(II- 10/7/2010 to 27/12/2010)

Name of the pathogen	Concentration no. /m3 of air		Percentage contribution to the total air spore		Mean percentage
	I crop season	II crop season	I crop season	II crop season	
<i>Alternaria macrospora</i>	9442	10388	15.19%	16.26%	15.72%
<i>Cercospora gossypiana</i>	630	1092	1.01%	1.70%	1.35%
<i>Helminthosporium gossypii</i>	3294	1568	5.29%	2.45%	3.87%
<i>Ramularia areola</i> G. F. Atk.	4242	5936	6.88%	9.29%	8.08%

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References

- [1] Butler, E. J. 1918 Fungi and disease in plant (Thacker spink and Co-Culcutta) 368-370
- [2] Dutta, A.K. and Jha K. 1979 A note on the occurrence of the areolate mildew of cotton in Bihar. Phytopathology, 32, 465-467.
- [3] Jon – Enrilich and Frederic, E 1932 Aerolate mildew of cotton. Phytopath, 22, 229-240
- [4] Gokhale, V. P. and Moghe, P.G. 1964 Cotton (Ramularia areola) J Cotton Res. 26-31.
- [5] Govindrao, P. and Subbaiah, J 1954 Grey mildew Cotton and its control. Andhra Journal of Agric (Nov. issue) 127-33.
- [6] Meteorological records from cotton research centre, Somanthpur.]
- [7] Tilak S.T. and B.V. Srinivasulu (1967) Air spora of Aurangabad. Ind. J. Microbiology. 7:167-170.
- [8] Uppal B.N. 1984 Diseases of Cotton in India I.C.C.C. Bombay.
- [9] Tilak, S.T. 1988 Aerobiology Air monitoring.

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." IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 13.2 (2018): 13-14.