



Diversity of fungal spores in pigeon pea field

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Abstract

The present investigation deals with the Diversity of fungal spores in pigeon pea field. 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 was 62368 spores/m³ belonging to 51 genera. Throughout the season *Cladosporium* was most dominant spore (29.51%). Variation was seen among the fungal spores with respect to seasonal changes. *Ulocladium*, *Hirudinaria*, *Stemphylium*, *Othia* like spores were unique during the season.

Keywords: aerobiology, pigeon pea, fungal spore, meteorological

1. Introduction

Air consists of huge amount of bio particles and chemicals. These bio particles include pollen grains, fungal spores, insect debris, plant parts, mites, etc. The concentration of fungal spores in environment is determined by day, time, meteorological conditions and seasonal variation.

The present investigation deals with the airspora over Pigeon pea. Pigeon pea (*Cajanus cajan* L.) Mill sp. Is one of the most important legume crops of the tropics and subtropics of Asia and Africa. It is not only an important source of protein, but also plays a vital role in atmospheric nitrogen fixation into soil. It is the second most important pulse crop in the country and also grown in some East African and south Asian countries. India is the largest producer (81.49 %) and consumer of pigeon pea in the world. Pigeon pea accounted for about 20 % of the total world's production of the pulses in the country during the year 2000-2001. Other major pigeon pea producing countries are Myanmar (10.02 %), Malawi (2.64 %) and Uganda (2.60 %). The production is highest in Uganda (1000 kg/ha) followed by Nepal (875 kg/ha) and India (728 kg/ha). add ref (Ghadge *et al.* 2008).

For the first growing pigeon pea favours moist condition and during the flowering and harvesting month dried condition followed. Different types of diseases affected on pigeon pea yield. Pigeon pea is affected by several fungal diseases like alternaria blight, phytophthora blight, collar rot, fusarium wilt, dry root rot, anthracnose, Cercospora leaf spot, Rust, Botrytis grey mold etc.

2. Materials & Methods

The aerobiological investigation were carried out by using volumetric tilak air sampler (Tilak & Kulkarni, 1970) ^[9] was fixed at Maliwada dist. Aurangabad, in the middle of Pigeon

pea field, at the height of 1.5 meter above the ground level. These slides were labelled with dates during 1 July 2016 to 31 December 2016.

3. Scanning

Scanning of slides was carried out under The Magnus Micro Image Projection System (MMIPS) with Trinocular Research Microscope. The fungal spores so trapped were identified based on morphological characters, visual identification by comparison with reference slides & also from the published available literature.

4. Result & Discussion

Total 51 fungal spores were noted during the investigation including pollen grains, insect part, and hyphal fragment. Total number of fungal spores during the month of July to December 2016 was 62368 spores/m³ ^[3]. October month shows highest volume of spores in the entire season (24732). Followed by November (20161), December (8427), September (6215), August (2137) and July (696).

The dominant fungal spore recorded during the month July to December 2016 (Fig no.2). Throughout the season *Cladosporium* was most dominant spore (29.51%). In the month of September *Cladosporium* showed highest percentage (60.28%). It requires cool, humid weather conditions for intense growth, spore release, germination and disease development. These fungi are active at low temperatures and high humidity (Rafal Ogórek *et al.*, 2012) ^[12]. The average humidity and temperature of the month was 91.76 and 25.47 respectively. July month showed the lowest percentage of *Cladosporium* 13.21%.

Rust spore was found to be second highest to the total airspora (11.18%). High amount of *Rust* were carried in July month

18.82% because minimum rainfall, wind and cloudiness encourage disease development (Agropedia 2012) [13]. While low amount of *Rust* shown in the month of September 6.06%. *Smut* consuming 10.98% of total airspora. December month shown 18.45% of *Smut* and 2.84% in the September. In the month of December average humidity and temperature was 48.12% and 21.41 % respectively. During dry condition the concentration of *smut* spore is peaked (Mishra 1987).

Followed by *Nigrospora* (8.05 %), maximum no of *Nigrospora* found the month of July (11.35%) because average temperature, humidity and rainfall was 24.87%, 92.06 %, 20.60 % respectively. In December month 3.34% of *Nigrospora* spores were noted.

Likewise *Curvularia* (8.04%), High percent of these fungi was accounted in October month 10.56% as in this month average temperature was 25.24%. The fungus is able to germinate and grow in a very wide range of temperature of 10 to 40⁰c (yunzhi zhu 2011). In the month of July 2.29 % of *Curvularia* occurred.

Alternaria contributed (6.50%) of the total airspora. In July month average humidity was 92.06%. In July month 9.48% of

Alternaria spores were noted. This fungi Sporulates finely in warm, humid conditions (Agropedia 2009). Minimum percent of *Alternaria* shown in the month of August 4.11%.

Besides these spores, *Helminthosporium* (4.28%), *Basidiospore* (4%), *Periconia* (3.50%), and *Pithomyces* (2.68%) *Torula* (2.45%), *Hypoxlon* (1.25%), *Cercospora* (1.25%), *Bispora* (1.16%), *Heterosporium* (0.90%), *Didymospharia* (0.56%), *Dreschlera* (0.49%), *Spegazzinia* (0.44%), *Hysterium* (0.42%), *Diplodia* (0.41%), *leptospheria* (0.4%), *Epicoccum* (0.21%), *Protozoan cyst* (0.2%), *Xylaria* (0.17%), *Aspergillispores* (0.16%), *Corynyspora* (0.13%), *Teichospora* (0.09%), *Beltraniella* (0.07%), *Tetracoccosporium*, *Bertia* (0.05%), *Ascomycetes* (0.03%), *Fusarium*, *Hendersonia*, *Pseudotorula*, *Tetraploa*, (0.01%)r respectively.

Some fungal spores like *Beltrania*, *Chaetomium*, *Melanospora*, *Botrydiplodia*, *Sporarmia*, *Haplosporella*, *Memnoniella*, *Cordana*, *Trichoconis*, *Masserina*, *Pleospora*, and *Physarum* are gained in very less volume. In the pigeon pea field existence of *Ulocladium*, *Hirudinaria*, *Stemphyllium*, *Othia* like spores were unique during the season.

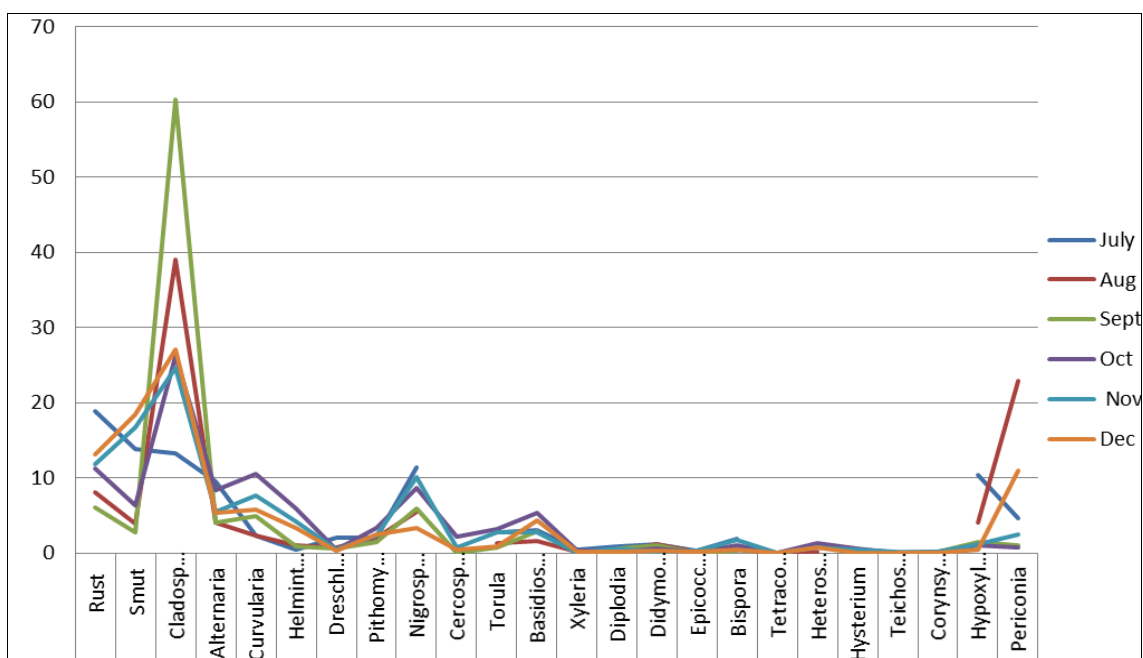


Fig 1: Monthly percent contribution of fungal spore during July to December 2016.

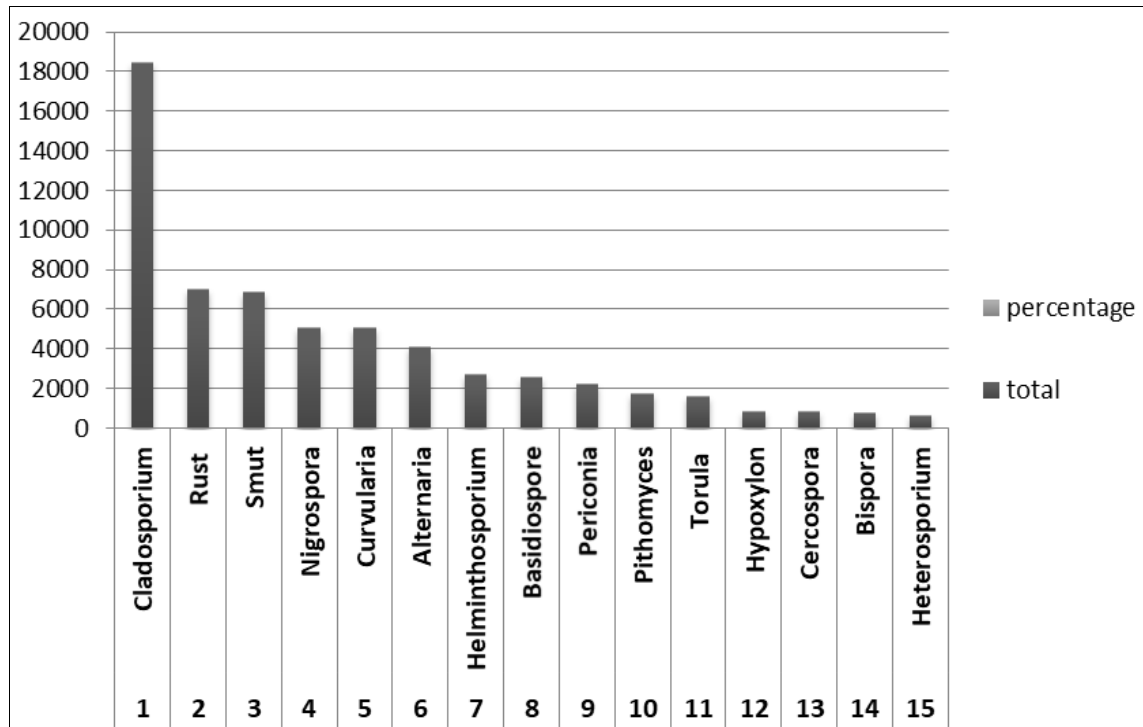
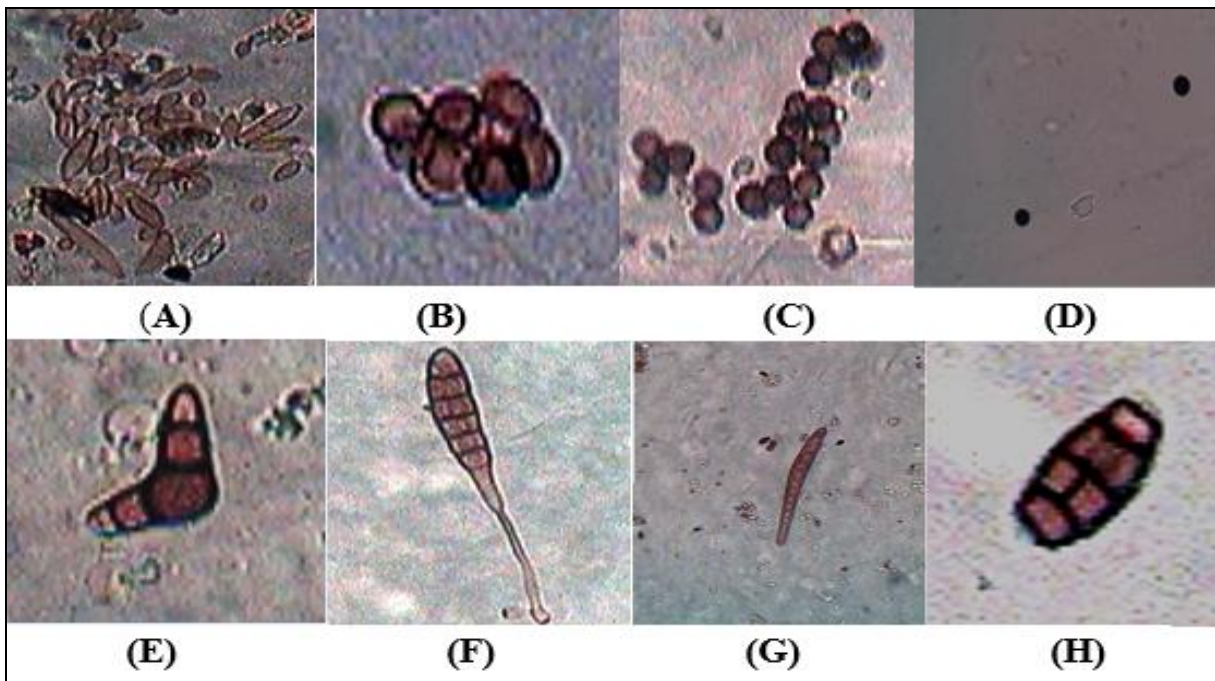


Fig 2: Dominant fungal spore type Recorded during the season



A-Cladosporium, B-Rust, C-Smut, D-Nigrospora, E-Curvularia, F-Alternaria, G-Helminthosporium, H-Pithomyces

Fig 3: Photo plates of dominant fungal spores

5. Conclusion

Variation was seen among the fungal spores with respect to seasonal changes. The average temperature during July to December was 25.83, average humidity 74.46 and rainfall was 23.85. Increased humidity, adequate temperature and dense rainfall have been found to increase spore load in the atmosphere. Other crops such as Bajara, Soya bean, Cotton,

Vegetables like Coriander, Fenugreek and Trees like Tamarinds, Custard apple, Neem, and Curry Tree were also important for dispersal of inoculums.

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