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Fungal airspora over *Cajanus cajan* L. field.

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Abstract:

Present investigation deals with the fungal airspora over *Cajanus cajan* L. field. The study was carried out by using Volumetric Tilak Air Sampler in two kharif season i.e. from 1st July 2017 to 23rd Dec 2017 and from 1st July 2018 to 26th Dec 2018. During the study 51 airborne components were collected including insect parts, mycelium, protozoan cyst, pollen grains. *Cladosporium* spore was the most dominant spore throughout the season.

Keywords: aerobiology, *Cajanus cajan*, fungal spore.

Introduction:

Aerobiology is the scientific multidisciplinary biological science having broad range of application in several fields like ecology, mycology and plant pathology, palynology, biochemistry, immunology and clinical medicine, microbiology, veterinary science, meteorology, melissopalynology, aerobiophysics, forestry, allergy, phytogeography, entomology, air pollution, bio deterioration and cosmology. Aerobiological investigation can be mostly divided into two viz., Indoor or Intramural Aerobiology and Outdoor Extramural Aerobiology. Intramural aerobiology includes with the problem of contagious diseases by airborne materials inside a close system such as building, hospitals, glass houses, milling and other working areas whereas extramural aerobiology is deals with the distribution and survey of biological materials in the open environments which are fields and forests (Thongram Kamala Devi ,2008).

Pulses play a significant role for all categories of people because of its rich protein content. India is the largest producer, consumer as well as importer of pulses in

the world (Ambreesh Singh Yadav, et. al., 2019) *Cajanus cajan* L. commonly known as Pigeon pea is a very ancient pulse crop in India. *Cajanus cajan* L. occupies an important place in rainfed agriculture. It is attacked by various airborne as well as soil borne diseases.

In India pulses are one of the most crucial parts of diet as it is very much important source of protein. *Cajanus cajan*L. is the second most important crop in the country. India ranked first in area and production 79.65% and 67.28% respectively of the world's acreage and production. In India, productivity of *Cajanus cajan* L. was 587 kg/ha (FAO stat, 2014) The major Pigeon pea producing States of India are Maharashtra, Madhya Pradesh, Karnataka, Uttar Pradesh, Gujarat and Jharkhand (Dr. A. K. Tiwari, et.al. 2017). These statescontribute to nearly 85% of the total area and production of the crop. In spite of its long duration and the attainment of grain development stage long after the rainy season is over, farmers prefer *Cajanus cajan* L. specially in low rain fall areas as the crop is drought tolerant (Varma Poornima,2019). As compared to 2015-16 the production of *Cajanus cajan*L. increased significantly in Maharashtra in 2016-17 (Varma Poornima, 2019).

*Cajanus cajan*L.is suffers from various types of pathogenic diseases such as Wilt, Sterility Mosaic Diseases, Phytopthora Blight, Alternaria blight, Powdery mildew. Airborne fungal diseases are very much difficult once it sets in the field. An airborne fungal disease causes loss and productivity of the crop. There are various pathogenic fungi which required undergoing aerobiological phases in the course of their life cycle such as release, transport and deposition of spores. In several leaves inhabiting fungi 90% of the spores are released by a source which gets deposited within the field and is responsible for spreading of disease in the crop field.

Material method:

The investigations were carried out for two consecutive kharif seasons of 2017 and 2018 year by employing volumetric Tilak Air Sampler in the *Cajanus cajan* L. field. The Air sampling was initiated about 7 days before sowing of *Cajanus cajan*L. seeds and

continued about 7 days after harvesting of the crop. The fungal airspora collected wascorrelated with meterological factors such as temperature humidity and rain fall.

Scanning:

Scanning of slides was carried out under the Magnus micro image projection systems (MMIPS) with trinocular research microscope. The fungal spores so trapped were identified based on morphological characters, visual identification by comparision with reference slides and also from the published available literature.

Result and Discussion:

During the present investigation total number of spores were catched in two kharif seasons i.e. 2011002/m^3.47 spore types were collected as well as 4 types of other parts such as mycelium, pollen grain, insect parts (insect wing, insect scale)and protozoan cyst.Maximum number of aerospora were recorded from the class Deuteromycotina (65.98%) followed by Basidiomycotina (29.54%), Ascomycotina (3.66%), Myxomycotina (0.0041%) and other part noted (0.8%). Highest percent and total contribution was observed of *Cladosporium*(24.48%)with total 492324 /m^3 followed by *Rust* 12.60% with total 253582/m^3, *Smut* spore (12.19%) with the total 245238 /m^3 , *Curvularia* (8.23%) with total 165676 /m^3 , *Nigrospora*(7.94%) with total 159810 /m^3 . The lowest total and percent contribution of *Masserina*and *Stemphyllium* were noted i.e. 266 m/^{3} (0.013%)*Haplosporella* (0.009%) 182/m^3,*Pleospora* (0.005%) 112 /m^3, *Physarum*(0.0041 %) 84/m^3(Table no.1.). Kshirsagar et. al., (2012) reported total percent contribution of *Cladosporium* 16.76%. Prakash Om et al., (2014) observed 50 fungal spores which belonges to Deuteromycetes and contributed 69.9% and in present study 20 fungal spores which belonges to Deuteromycetes and contributed 65.98%. Ghatge et al., (2013) mentioned 25 species of Deuteromycetes, Phycomytes 6, Ascomycetes 12 and Basideomycetes 5 species from Kadegaon Tehsil, District Sangli MS, India. Roopshree et al., (2014) recorded percent contribution of different airspora i.e. *Cladosporium* spp. (58.9%), *Smut* (12.3%,) *Alternaria* spp. (8.2%), *Basidiospores* (3.8%),

Helminthosporium spp (3.0%), *Ascospores* (2.0%) and *Curvularia* spp. (1.6%), *Aspergillus* spp (1.5%).Gadekar S.S. (2014)captured 63 fungal spore types and other components like hyphal fragments, pollen, protozoan cyst, insect parts. Deuteromycotina paid about 60.19% as a dominant group subsequently Ascomycotina, Basidiomycotina, other types, Phycomycotina, other types i.e. 13.25%, 21.35%, 2.5%, 0.54% and 2.96% respectively.

Table no.1- Total and percent contribution of airspora collected from *Cajanus cajan* L. field.

Sr. No	Type of spore	Total	Percentage
1	*Rust*	253582	12.6
2	*Smut*	245238	12.19
3	*Basidiospore*	95284	4.73
4	*Cladosporium*	492324	24.48
5	*Nigrospora*	159810	7.94
6	*Alter aria*	141260	7.02
7	*Aspergilli*	6874	0.34
8	*Bispora*	17024	0.84
9	*Curvularia*	165676	8.23
10	*Dreschlera*	9814	0.48
11	*Helminthosporium*	103824	5.16
12	*Torula*	45766	2.27
13	*Heterosporium*	16548	0.82
14	*Pseudotorula*	420	0.02
15	*Beltrania*	1022	0.05
16	*Beltraniella*	1414	0.07
17	*Epicoccum*	3486	0.17
18	*Fusarium*	2016	0.1
19	*Corynyspora*	2870	0.14
20	*Hendersonia*	2170	0.1

21	*Periconia*	74326	3.69
22	*Hypoxylon*	22218	1.1
23	*Tetracoccosporium*	1344	0.066
24	*Spegazzinia*	8456	0.42
25	*Leptosporella*	4760	0.23
26	*Hysterium*	8022	0.39
27	*Sporarmia*	448	0.02
28	*Protozoan Cyst*	4732	0.23
29	*Pollen Grain*	4788	0.23
30	*Diplodia*	9198	0.45
31	*Pithomyces*	55580	2.76
32	*Stemphyllium*	266	0.013
33	*Mycellium*	6048	0.3
34	*Teichospora*	2268	0.11
35	*Melanospora*	532	0.026
36	*Didymosphaeria*	10948	0.54
37	*Pleospora*	112	0.005
38	*Chaetomium*	1274	0.06
39	*Insect part*	574	0.028
40	*Bertia*	3598	0.17
41	*Haplosporella*	182	0.009
42	*Masserina*	266	0.013
43	*Tetraploa*	476	0.023
44	*Othia*	308	0.015
45	*Xyleria*	1596	0.079
46	*Ascomycetes*	1260	0.062
47	*Cercospora*	20706	1.02
48	*Memnoniella*	140	0.0069
49	*Harknessia*	56	0.0027
50	*(M)Physarum*	84	0.0041
51	*Diplocladiella*	14	0.00069

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