

## RESEARCH ARTICLE

# To study the pathogenicity of different isolated mycoflora in pigeonpea

■ S. N. Sharma

### SUMMARY

Pathogenicity test was carried out in the pots to detect the pathogenic nature of isolated fungal species. Pathogenicity Test was carried out by various methods-seed- inoculation method, soil inoculation method, leaf inoculation method. Test was carried out of pigeonpea variety UPAS-120. Pathogenicity and pathogenic behaviour of 15 fungal species isolated from pigeonpea seeds. Studying the pathogenic nature of the mycoflora by inoculation them wit seed, soil or leaf only 9 sp were found pathogenic. They were *fusarium moniliformae*, *Alternaria alternata*, *Aspergillus flavus*, *A. niger*, *A. candidus* *cladosporium cladosporoides*, *Curvularia lunata* and *Rhizctonia solani*. Eight of them were found seed borne and caused seed borne and caused seed and root-rot, seedling blight, necrosis of seedling ultimately resulted in seedling mortality. The fungi like *Fusarium moniliformae*, *Alternaria alternata*, *Aspergillus flavus*, *Rhizctonia solani* were also found soil borne and caused seed rot, root rot, seedling blight and seedling infection. Leaf inoculation with funagal species like *Alternaria alternata*, *Cladosporium cladosporoides*, *curvularia lunata* and *Rhizoctinia solani* showed leaf blight symptoms.

**Key Words :** Mycoflora, Inoculation , Pathogenicity, Mortality

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Pigeonpea (*Cajanus cajan* L.) important pulse crops grown in India. Legume seeds have comparatively higher protein content than non-legume plant. The high protein content makes them desirable crops in agriculture. The seeds of legumes are second only to cereals as the most important source of

food for humans and animals (National Academy of Sciences, 1979). Pathogenicity test was carried out in the pots to detect the pathogenic nature of isolated fungal species a number of worker have observed that the pathogenic behaviour of the fungi isolated n from pigeonpea seeds (Shukla and Bhargawa, 1976 and 1978). Pathogenicity of mycoflora are isolated from various methods. Seed-borne diseases have been found to affect the growth and productivity of crop plants (Kubiak and Korbas, 1999; Weber *et al.*, 2001 and Dawson and

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Bateman, 2001). Presence or absence of seed borne fungi on seed surface is one of the important aspects that determine the quality of seed. The present investigation deal to study the pathogenicity test of mycoflora isolated from variety of pigeonpea seeds UPAS-120.

## **MATERIAL AND METHODS**

The research work was carried out in the Department of Agricultural Botany, S.D.J Post Graduate College Chandeshwar Azamgharh. Pathogenicity test was carried out in the pots to detect the pathogenic nature of isolated fungal species. Pathogenicity test was carried out by various methods-seed- inoculation method, soil inoculation method, leaf inoculation method.

### **Seed inoculation method:**

Sterilization of the pots was done using 5.0 per cent formalin solution. These disinfected pots were filled with soil sterilized at 1.1kg/cm<sup>2</sup> pressure for 2 hrs. The seed of the variety UPAS-120 were inoculated with homogenous spore cum mycelia suspension, prepared from 7-10 days old cultivars. The pot sowing was done @seeds/pots and replicated four time for each treatment. The seeds were sterilized with 1.0 per cent chlorine for 10 minutes before inoculation and then transferred into sterilized flasks and incubated with 5ml. suspension of each fungus. Seeds were inoculated with equal quality of sterilized distilled water in case of control. The pots were kept in a polygreen house and observed critically for 30 days for (a) number of seeds germinated (b) number of seeds rotted (c) number of seedling diseased (d) pathogenic effect or any type of symptoms on seedlings.

### **Soil inoculation method:**

Pots washed with 5.0 per cent solution of formalin were filled with sterilized soil. The inoculums was prepared through growing pure cultures of the isolated fungi on corn meal sand medium [3.0% corn meal(W/V) in 5:1 parts of sand soil mixture] for 30 days. The inoculums was mixed @5.0% (w/w) in sterilized soil, 15 days before sowing of seeds in pots. In control pots fungal inoculums was mixed. The healthy seeds and surface sterilized seed of variety UPAS-120 were sown at the rate of 5 seeds/pots in four replication in each treatment. The pots were kept in polygreen house and observation were made on seed germination, seedlings

emergence and effects produced by each fungus on seeds. Symptoms on seedling were recorded for 30 days after sowing. The seedling showing symptoms on shoot and or root were considered as diseased. Rotted seeds were taken out and examined for the presence of fungi involved.

### **Leaf inoculation method:**

Seedling were raised from sterilized seeds of variety UPAS-120 in pots filled with sterilized soil. Foliar inoculation was made on 30 days old plants. Spore cum mycelia suspension of each fungus was sprayed on these plants by an atomizer. The suspension was prepared through scraping of fungal inoculums of 7 to 10 old day cultures. In order to provide sufficient moisture to the fungus for causing infection, inoculated plants were kept in humid chamber for 48 hr and then they were transferred to the natural environment. Simultaneously control plants were sprayed with sterilized distilled water. Observation were made daily for appearance for symptoms produced by inoculating fungi.

## **RESULTS AND DISCUSSION**

Pathogenicity and pathogenic behaviour of 15 fungal species isolated from pigeonpea seeds were tested through 3 methods namely seed inoculation, soil inoculation and foliar inoculation and observation recorded are being presented.

### **Seed inoculation:**

A perusal of Table 1 indicated that out of 14 fungal sp. Inoculated, seven sp. Namely *Fusarium moniliformae*, *Alternaria alternate*, *Aspergillus flavus*, *A. niger*, *A. candidus*, *A. sydowi*, *A. candidaus*, *A. Fumigatus* and *Rhizoctonia solani* were found pathogenic. They caused seed rot, seedling mortality, root rot, seedling blight and necrosis of radicles (Table 1).

### **Soil inoculation:**

The pathogenic behaviour of the 14 fungal sp. Tested by sowing the surface sterilized seeds of variety UPAS-120 in pots containing soil pre- inoculated with each fungus and results are given In Table 2, only 4 fungal sp. Namely *Fusarium moniliformae*, *Alternaria alternata*, *Aspergillus flavus* and *Rhizoctonia solani* were found pathogenic. They caused seed rot, rot rot and seedling blight resulting in reduction in germination of seeds symptoms appeared by each pathogenic fungi

(Table 2).

**Leaf inoculation:**

In this method to study pathogenicity of different fungi, leaves of 30 days old plant raised in sterilized soil from surface sterilized soil from surface sterilized seeds were inoculated. Result indicates that *Alternaria alternata*, *Cladosporium cladosporoides*, *Curvularia lunata* and *Rhizoctonia solani* produced leaf spots.

Remaining 10 fungal sp. Did not produced any symptoms on the leaves (Table 3).

Test was carried out of pigeonpea variety UPAS-120. Pathogenicity and pathogenic behaviour of 15 fungal species isolated from pigeonpea seeds. Studying the pathogenic nature of the mycoflora by inoculation them wit seed, soil or leaf only 9 sp were found pathogenic. They were *Fusarium moniliformae*, *Alternaria alternata*, *Aspergillus flavus*, *A. niger*, *A. candidus*

**Table 1: Effect of *in vitro* seed- inoculation with different fungi on seeds and seedling raised on pots of 20 seeds**

Sr. No.	Fungal sp.	No. of seeds germinated	No. of seeds rotted	No. of seedling affected	Pathogenic effect
1.	<i>No fungus control</i>	20	-	-	No effect
2.	<i>Fusarium moniliformae</i>	14	6	4	Seed rot, seedling mortality, necrosis of radicle
3.	<i>Alternaria alternata</i>	15	5	5	Seed rot, seedling blight
4.	<i>Aspergillus flavus</i>	16	4	5	Seed rot, seedling mortality
5.	<i>A.niger</i>	16	4	-	Seed rot
6.	<i>A.fumigatus</i>	15	5	-	Seed rot
7.	<i>A.candidus</i>	19	1	-	Seed rot
8.	<i>Cladosporium</i>	18	2	-	No effect
9.	<i>Curvularia lunata</i>	20	-	-	No effect
10.	<i>Rhizoctonia solani</i>	16	4	5	Seed rot, seedling blight
11.	<i>Drechslera testramua</i>	20	-	-	No effect
12.	<i>Penicillium oxalicum</i>	20	-	-	No effect
13.	<i>Mucor sp.</i>	20	-	-	No effect
14.	<i>Rhizopus nigricans</i>	20	-	-	No effect
15.	<i>Chaetomium globosum</i>	20	-	-	No effect

**Table 2: Effect of different fungal species on seed and seedlings grown in pots containing inoculated soil (20 seeds sown)**

Sr. No.	Fungal sp.	No. of seeds germinated	No. of seeds rotted	No. of seedling affected	Pathogenic effect
1.	No inoculaion control	20	-	-	No effect
2.	<i>Fusarium moniliformae</i>	18	2	4	Seed rot, seedling blight
3.	<i>Alternaria alternata</i>	16	4	4	Seed rot, seedling infection
4.	<i>Aspergillus flavus</i>	18	2	5	Seed rot, seedling blight
5.	<i>A.niger</i>	20	-	-	No effect
6.	<i>A.fumigatus</i>	20	-	-	No effect
7.	<i>A.candidus</i>	20	-	-	No effect
8.	<i>Cladosporium</i>	20	-	-	No effect
9.	<i>Curvularia lunata</i>	20	-	-	No effect
10.	<i>Rhizoctonia solani</i>	16	4	5	Seed rot, seedling blight
11.	<i>Drechslera testramua</i>	20	-	-	No effect
12.	<i>Penicillium oxalicum</i>	20	-	-	No effect
13.	<i>Mucor sp.</i>	20	-	-	No effect
14.	<i>Rhizopus nigricans</i>	20	-	-	No effect
15.	<i>Chaetomium globosum</i>	20	-	-	No effect

**Table 3: Effect of leaf inoculation with different fungal species on seedling grown in pots**

Sr. No.	Fungal species	Effect on leaves
1.	Control	No effect
2.	<i>Fusarium moniliformae</i>	No effect
3.	<i>Alternaria alternata</i>	
4.	<i>Aspergillus flavus</i>	No effect
5.	<i>A.niger</i>	No effect
6.	<i>A.fumigatus</i>	No effect
7.	<i>A.candidus</i>	
8.	<i>Cladosporium</i>	
9.	<i>Curvularia lunata</i>	
10.	<i>Rhizoctonia solani</i>	No effect
11.	<i>Drechslera testramua</i>	No effect
12.	<i>Penicillium oxalicum</i>	No effect
13.	<i>Mucor sp.</i>	No effect
14.	<i>Rhizopus nigricans</i>	No effect
15.	<i>Chaetomium globosum</i>	No effect

*cladosporium cladosporoides*, *Curvularia lunata* and *Rhizctonia solani*. Eight of them were found seed borne and caused seed borne and caused seed and root-rot, seedling blight, necrosis of seedling ultimately resulted in seedling mortality. The fungi like *Fusarium moniliformae*, *Alternaria alternata*, *Aspergillus flavus*, *Rhizctonia solani* were also found soil borne and caused seed rot, root rot, seedling blight and seedling infection. Leaf inoculation with funagal species like *Alternaria alternata*, *Cladosporium cladosporoides*, *curvularia lunata* and *Rhizoctinia solani* showed leaf blight symptoms. Similar work related to the present investigation was also carried out by Patil *et al.* (2012) and Paul (1973)

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