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INFLUENCE OF RELATIVE HUMIDITY AND MEDIA ON GROWTH AND SPORULATION OF *COLLETOTRICHUM CAPSICI* F.SP. *CYAMOPSISICOLA* CAUSING ANTHRACNOSE OF CLUSTER BEAN

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ABSTRACT

In this paper, the effect of different relative humidity and media on the growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsisicola* was studied. Out of five relative humidity levels (viz.25,50,75,90and100 per cent) tested, 90 and 100 per cent relative humidity found most favourable for the fast growth and maximum spore production. Out of seven synthetic and non synthetic media tested, it was found that significantly maximum colony diameter and sporulation were recorded in potato sucrose agar medium followed by oat meal agar.

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INTRODUCTION

Clusterbean [*Cyamopsis tetragonoloba* (L.)Taub] is an important dry land, draught hardy, annual Kharif crop grown widely under rain fed (barani) condition for grain, green fodder, vegetable, green manuring and for seed purposes. It has a great industrial importance in recent years mainly due to presence of gum in its endosperms. Guar gum has several diversified uses in textile, paper, food processing, cosmetic etc. The crop suffers due to number of diseases like Vascular wilt, Charcoal rot, Powdery mildew Alternaria leaf blight and Anthracnose caused by *Colletotrichum capsici* (Syd.) Butler and Bisby f.sp. *cyamopsisicola* (Desai and Prasad, 1955). Out of which Anthracnose is the most important disease. This disease is characterized by black spots on leaves, petioles and stem.

MATERIAL AND METHODS

Five humidity level (viz.25,50,75,90and100 per cent RH) were tested, humidity level was maintained with H₂SO₄ and distilled water. The seeded and inoculated plates were kept in desiccators at different humidity levels. Observation on colony diameter and sporulation were recorded on the seven days of incubation. Humidity level was maintained as shown in Table 1

Table 1 Different Humidity levels with H₂SO₄ and distilled water

Humidity level (per cent)	H ₂ SO ₄	Distilled water
25	54ml	46ml
50	42ml	58ml
75	30ml	70ml
90	5ml	95ml
100	0ml	100ml

Seven media were used to find the influence of nutrient on the growth and sporulation of *C. capsici* f.sp. *cyamopsisicola* Isolated from infected plant parts. The media were Potato sucrose agar, Corn meal agar, Richard's agar, Martin's agar, Czapek's agar, Oat meal agar and Carrot agar. Media were prepared and sterilized in an autoclave and 20ml lukewarm medium were poured into each sterilized petri dish. Seven mm disc from 10 days old culture of *C. capsici* f.sp. *cyamopsisicola* were cut. One disc will placed in the centre of each petri dish and incubated at 25 ±2 °C.

Colony growth will be measured and cultural characters were recorded after 3rd, 5th and 7th days of incubation.

In the experiment three replications were maintained. For determination of spore production, 5mm disc will be cut with

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the help of sterilized cork borer and suspended in 10ml of water in a test tube. The disc was macerated and the suspensions were used for counting the spore per microscopic field.

RESULTS

The influence of different humidity levels on growth and sporulation of *C. capsici* f.sp. *cyamopsicola* is presented in Table 2.

Table 2 The influence of different humidity levels on the growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsicola*

Humidity level In %	Sporulation	Radial growth mm/day		
		3	5	7
25	Very poor	14	28	53
50	Medium	21	43	57
75	Medium	23	52	64
90	Abundant	23	55	66
100	Abundant	27	60	68
S.E.(m)±		1.54	4.316	2.423
C.D.(at 5%)		4.810	13.44	7.54

The result revealed that 90 and 100 per cent relative humidity is favorable for the fast growth (68 and 66mm) respectively and maximum number of spores per microscopic field. At 90 and 100 per cent humidity level the no of spores of *C. capsici* f.sp. *cyamopsicola* were almost at par. It indicate that the optimum humidity is between 90 and 100 per cent. The variation in growth and sporulation at various RH levels from 50 to 75 per cent is quit less which shows that the pathogen has adoptability the lower and higher limits of RH.(Fig 1 and 2)

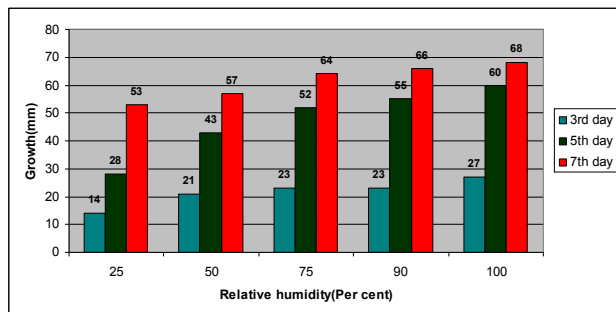
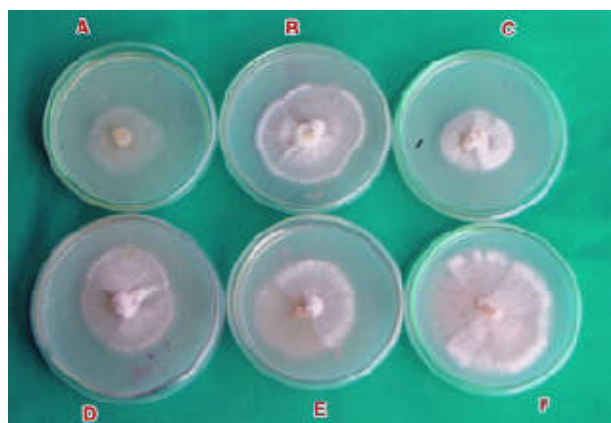


Figure 1 The influence of different humidity levels on th growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsicola*



A = 25% B = 50% C = 75% D = 90% E = 100% F = Control

Figure 2 Effect of different humidity leves on the mycelial growth of *Colletotrichum capsici* f.sp. *cyamopsicola*

Growth of *Colletotrichum capsici* f.sp. *cyamopsicola* was studied on seven non synthetic and synthetic media. Colony growth and other characters of fungus was measured after 3rd, 5th and 7th day of incubation and results are presented in Table 3. It is clear from data presented in Table 3 that maximum colony diameter (62mm) was recorded in PSA medium after 7 days of incubation, followed by oat meal agar (49mm) and corn meal agar (48mm) and minimum colony diameter (25mm) was recorded on Czapek's agar medium. In potato sucrose agar and oat meal agar the colony growth was fluffy while in corn meal agar, Richard's agar, carrot agar, Czapek's agar, Martin's agar the growth of fungus was partially submerged. In Richard's agar longitudinal sectors were formed, while in Czepek's agar clear zonation and in Martin's agar thick concentric rings were formed. Maximum sporulation (62 conidia/microscopic field) was observed in PSA and minimum (25 conidia/microscopic field) in oat meal agar, while in corn meal agar, Richard's agar, carrot agar, Czapek's agar and Martins agar sporulation was not present. The fungus did not respond variously to the production of pigmentation which was dirty white or white (Table 3, Fig. 3 and 4).

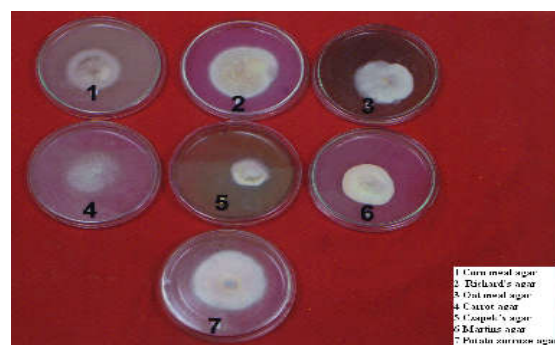


Figure 3 Effect of different synthetic and non synthetic media on the mycelial growth of *Colletotrichum capsici* f.sp. *cyamopsicola*

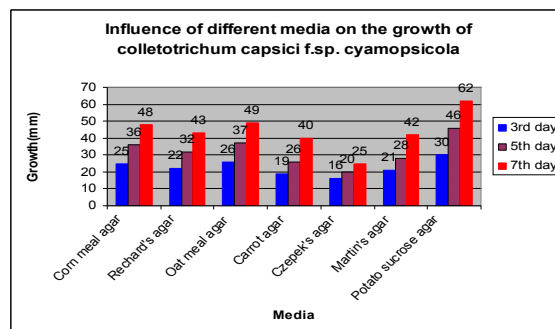


Figure 4 The influence of different media on growth of *Colletotrichum capsici* f.sp. *cyamopsicola*

DISCUSSION

Influence of different humidity levels on the growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsicola* was tested. It was found that 90 and 100 per cent relative humidity is favourable for the fast growth and maximum spore production. The minimum growth and poor sporulation was found in 25 per cent RH. (Chung and Lee, 1986) observed conidial germination of *Colletotrichum dematiumi* f.sp. *capsicum* at 90 per cent.

Table 3 Influence of different synthetic and non synthetic media on the growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsicola*

Name of media	Type of colony	No. of spores per microscopic field	Colour of colony	Pigmentation	Colony diameter (mm/day)		
					3	5	7
Corn meal agar	Partially submerged	NIL	Dirty white	-	25	36	48
Richard's agar	Partially Suppressed, longitudinal sector formed	NIL	White	-	22	32	43
Oat meal agar	Fluffy	25	Dirty white	-	26	37	49
Carrot agar	Partially suppressed	NIL	Dirty white	-	19	26	40
Czapek's agar	Partially suppressed, slow growing, forming zonation	NIL	Dirty white	-	16	20	25
Martins agar	Partially suppressed, thick concentric ring form	NIL	White	White to pinkish	21	28	42
PSA	Fluffy, thick	62	White	White to yellow	30	46	62
SE(m)± C.D. (at 5%)					4.49 1.44	8.04 2.58	9.09 2.91

In laboratory various factors govern the sporulation of the fungus. In the investigation seven synthetic and non synthetic medium were used. It was found that significantly maximum colony diameter was recorded in potato sucrose agar medium and minimum on Czapek's agar medium. Maximum sporulation was observed in potato sucrose agar, and minimum in oat meal agar while in corn meal agar, Rechar's agar, Czapek's agar and Martin's agar sporulation was not present. (Gupta, 1989 and Rao *et al.*, 1994) also recorded potato dextrose agar medium was best culture medium for growth and sporulation of *Colletotrichum sp.*. Similar observations were also reported by (Kushwaha and Joshi, 1963). However, (Sathe and Joshi, 1964) reported Rechar's solution and glucose peptone media supported good mycelial growth of *C.graminicola*, *C.falcatum* and *C.piperi*.

CONCLUSION

Cultural variability studies of the pathogen showed that among the synthetic and non synthetic media, significantly maximum colony diameter and sporulation were recorded in Potato sucrose agar medium. The best RH for growth and sporulation of *Colletotrichum capsici* f.sp. *cyamopsicola* were 90 and 100 per cent.

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