

A CASE STUDY

ADVANCE RESEARCH JOURNAL OF
C R P
IMPROVEMENT
Volume 6 | Issue 1 | June, 2015 | 56-58
..... e ISSN-2231-640X

DOI :
10.15740/HAS/ARJCI/6.1/56-58
Visit us: www.researchjournal.co.in

Morphological and cultural characters of *Colletotrichum gloeosporioides* causing anthracnose of pomegranate

■ N.M. JAGTAP¹, C.V. AMBADKAR¹ AND G.A. BHALERAO

AUTHORS' INFO

Associated Co-author :

¹College of Agriculture (V.N.M.K.V.),
OSMANABAD (M.S.) INDIA

Author for correspondence:

G.A.BHALERAO

Department of Agronomy, College of
Agriculture (V.N.M.K.V.),
OSMANABAD (M.S.) INDIA
Email: gajubhalerao278@gmail.com

ABSTRACT : *In vitro* studies on morphological and cultural characters of *Colletotrichum gloeosporioides* was carried out in the Department of Plant Pathology, College of Agriculture, Osmanabad during the year 2011-12. The culture of *C. gloeosporioides* exhibited diversity with respect to cultural characters like type of the growth, mycelial colour, pigmentation and sporulation on different media. The maximum radial growth of *C. gloeosporioides* was recorded on potato dextrose agar (90.00 mm), followed by oat meal agar (86.00 mm), host leaf extract agar (81.60 mm), Richards's agar (80.60 mm), malt extract agar (80.40mm) and Sabouraud dextrose agar (80.00mm). The least radial growth was recorded in Czapek (Dox) agar (74.60 mm). The non-synthetic / semi synthetic media recorded maximum growth compared to synthetic media. Mycelium colour varied from white to black. The growth varied from flat, raised fluffy to sparse. Pigmentation in the media also varied from brown to black and light pink to orange. Sporulation also showed greater variation in different media, ranging from excellent to poor sporulation. Excellent sporulation was recorded on potato dextrose agar and moderate sporulation in Oatmeal agar and Richards's agar. Poor sporulation was recorded in malt extract agar and Czapek (Dox) agar.

KEY WORDS : *Colletotrichum gloeosporioides*, Morphological, Cultural characters, Pomegranate

How to cite this paper : Jagtap, N.M., Ambadkar, C.V. and Bhalerao, G.A. (2015). Morphological and cultural characters of *Colletotrichum gloeosporioides* causing anthracnose of pomegranate. *Adv. Res. J. Crop Improv.*, 6 (1) : 56-58.

Paper History : Received : 23.02.2015; Accepted : 21.05.2015

Pomegranate (*Punica granatum* L.) belongs to the family Punicaceae and is believed to have flourished in the garden of Eden, ever since the first human life appeared on earth. It is the most favoured table fruit in tropical and sub tropical regions. It is a high value crop both economically and nutritionally. The area under pomegranate cultivation in India is more than 1.07 lakh hectares with 7.43 lakh tones production. Maharashtra is the leading state in India and about 76.42 per cent area of pomegranate cultivation in India is concentrated in

Maharashtra. The area under pomegranate in Maharashtra is 82.0 thousand hectares with 4.92 lakh tones production in the year 2010-2011. The other states growing pomegranate commercially are Karnataka, Gujarat, Andhra Pradesh, Tamil Nadu and Rajasthan (Anonymous, 2011). Pomegranate is susceptible to many diseases which affect the fruit quality and yield. However, during recent years pomegranate cultivation in Maharashtra has been threatened due to incidence of anthracnose disease caused by *Colletotrichum*

gloeosporioides (Penz.).The disease has resulted in enormous losses to pomegranate fruits which makes the fruits unfit for consumption and market. Therefore, the present investigation on anthracnose of pomegranate caused by *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc. was planned to study the morphological and cultural characters of the fungus. In order to culture the fungus in the laboratory, it is necessary to furnish those essential elements and compounds in the medium, for their growth and other life processes. All media are not equally good for fungi, nor there can be a universal substrates or artificial medium, upon which all fungi grow. So, different media including both synthetic and non-synthetic were tried for *Colletotrichum gloeosporioides* in the present experiment.

RESEARCH PROCEDURE

The cultural characters of single spore isolate of *C. gloeosporioides* were studied on five non-synthetic/ semi-synthetic and two synthetic solid and liquid media.

Non-synthetic or semi synthetic media :

- Potato dextrose agar
- Oatmeal agar
- Malt extract agar
- Host leaf extract agar
- Sabouraud dextrose agar

Synthetic media :

- Richards' agar
- Czapek (Dox) agar

The composition and preparation of the above mentioned synthetic and semi- synthetic media were obtained from Ainsworth and Bisby's 'Dictionary of the Fungi' by Ainsworth (1971) and plant pathological methods, fungi and bacteria by Tuite (1969). The composition of the media is given in Table A.

Sporulation count :

Sr. No.	Score	Grade	Conidia/microscopic field.
1.	++++	Excellent	> 75
2.	+++	Good	50-75
3.	++	Moderate	25-50
4.	+	Poor	1-25
5.	-	No sporulation	-

RESEARCH ANALYSIS AND REASONING

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads :

Spore morphology :

In the present study conidia of *C. gloeosporioides* obtained from infected fruit and from culture were measured and compared in respect of their spore morphology. The conidia were oblong or cylindrical or slightly dumbel, hyaline, aseptate with rounded ends and one to two oil globules. Conidia on the culture media were found to be in reddish mass. They were rarely found in aggregates. The conidia collected from potato dextrose agar measured 11.48-20.01 $\mu\text{m} \times 4.25-6.62 \mu\text{m}$ and

Sr. No.	Different media	Mycelium				
		Radial growth (mm)#	Colour	Type of growth	Pigmentation	Sporulation
Non-synthetic media						
1.	Host leaf extract agar	81.60	Ash	Flat growth circular	Black	++
2.	Malt extract agar	80.40	Light white and black	Sparse irregular	Brown to black	+
3.	Oatmeal agar	86.00	Intermixed black and white	Sparse circular	White	+++
4.	Potato dextrose agar	90.00	Intermixed black and white	Fluffy raised circular	Light pinkish	++++
5.	Sabouraud dextrose agar	80.00	Black and white	Fluffy raised circular	White	++
Synthetic media						
6.	Czapek (Dox) agar	74.60	Intermixed white and black	Fluffy raised irregular	Reddish orange	+
7.	Richards's agar	80.60	White	Fluffy raised irregular	Pinkish orange	+++

#Mean of five replications

Sporulation	Conidia /microscopic field (400 X)
++++	>75
+++	50 - 75
++	1-25
-	No conidia

average being $15.74 \times 5.43 \mu\text{m}$ whereas the conidia from host fruit measured $11.24\text{-}19.65 \mu\text{m} \times 4.35\text{-}6.45 \mu\text{m}$ and average being $16.80 \mu\text{m} \times 6.40 \mu\text{m}$. Diversity in cultural and morphological characters of *C. gloeosporioides* were studied in five non-synthetic / semi synthetic and two synthetic media at room temperature $27 \pm 1^\circ\text{C}$ as described in “Material and Methods” and the results obtained are presented in Table 1. The radial growth, colony characters and sporulation of the fungi were recorded, when the maximum growth was attained on any one of the tested media. The effect of different culture media on the growth of fungi differed significantly. Maximum radial growth of *C. gloeosporioides* was recorded on potato dextrose agar (90.00 mm), which was found to be significantly superior to all other media followed by oat meal agar (86.00mm), host leaf extract agar (81.60mm), Richards’s agar (80.60 mm), malt extract agar (80.40mm), Sabouraud dextrose agar (80.00mm), and were at par with each other. The least radial growth was recorded in Czapek (Dox) agar (74.60 mm). The non-synthetic / semi synthetic media recorded maximum growth compared to synthetic media. Mycelium colour varied from white to black. The growth varied from flat, raised fluffy to sparse. Pigmentation in the media also varied from brown to black and light pink to orange. Sporulation also showed greater variation in different media, ranging from excellent to poor sporulation. Excellent sporulation was recorded on potato dextrose agar and moderate sporulation in Oatmeal agar and Richards’s agar. Poor sporulation was recorded in malt extract agar and Czapek (Dox) agar. Present studies are in accordance to the better performance of *Colletotrichum gloeosporioides* on PDA which may be attributed to inherent complex nature of material supporting good fungal growth owing to provision of some additional nutrients as reported by Ekbote *et al.* (1997), Sudhakar (2000); Jayalakshmi *et al.* (2012); Prashantha *et al.* (2013a and b); Akhtar (2000) and Prashanth (2007). The present studies are in accordance to Prashanth (2007) who reported that maximum radial growth was recorded in potato dextrose agar medium.

LITERATURE CITED

- Ainsworth, G.C. (1971). *Ainsworth and Bisby's Dictionary of the fungi*. (VIth Ed.) Commonwe. Mycol. Inst., Kew, Surrey, England, 663 pp.
- Akhtar, K.P. (2000). Fresh potato extract the best source for the growth of *Colletotrichum gloeosporioides* causing anthracnose of mango and *Fusarium subglutinans* isolated from malformed inflorescence of mango. *Pakistan J. Phytopathol.*, **12** (2) : 134-136.
- Anonymous (2011). Area under pomegranate cultivation in India and Maharashtra. *National Horticulture Board*: pp. 114-115.
- Ekbote, S.D., Padaganur, G.M., Patil, M.S. and Chattannavar, S.N. (1997). Studies on the cultural and nutritional aspects of *Colletotrichum gloeosporioides*, the causal organism of mango anthracnose. *J. Mycol. Pl. Pathol.*, **27** : 229-230.
- Jayalakshmi, K., Nargund, V.B., Raju, J. and Benagi, V.I. (2012). *In vitro* management of anthracnose of pomegranate incited by *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc. *Internat. J. Plant Protec.*, **5**(2) : 304-307.
- Prashanth, A. (2007). Investigation on anthracnose [*Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc.] of pomegranate (*Punica granatum* L.). M.Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA).
- Prashantha, A., Sataraddi, Arun R., Patil, S.V., Lokesh, M.S., Gurumurthy, S.B. and Chandan, K. (2013a). Morphological, cultural and physiological characterization of *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc., the cause of anthracnose of pomegranate (*Punica granatum* L.). *Internat. J. Plant Protec.*, **6**(2) : 247-252.
- Prashantha, A., Sataraddi, Arun R., Patil, S.V., Lokesh, M.S., Chandan K. and Gurumurthy, S.B. (2013b). Effect of chemicals inducing systemic resistance and efficacy of bioagents and botanicals against pomegranate (*Punica granatum* L.) anthracnose (*Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc.). *Internat. J. Plant Protec.*, **6**(2):289-292.
- Sudhakar (2000). Biology and management of *Stylosanthes* anthracnose caused by *Colletotrichum gloeosporioides* (Penz.) Penz. and Sacc. M.Sc. (Ag.) Thesis, University of Agricultural Sciences, Dharwad, KARNATAKA (INDIA).
- Tuite, J. (1969). *Plant pathological methods: Fungi and bacteria*. Burgess Publishing Co., Minneapolis, U.S.A., 239 pp.