

## SUMMARY

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*Colletotrichum* Corda is an important fungal genus comprising of many pathogenic species causing diseases in cereals, legumes, fruits, vegetables, forest trees, humans and animals. Its taxonomy is confusing and the characters used in its identification are shape and size of conidia, appressoria, setae, sclerotia, and chlamydospores. Knowledge of host plant and perfect state also contribute immensely to its taxonomy. Presently genetic characters of fungi are widely used in its taxonomy especially when the morphotaxonomic characters are insufficient for segregation of individuals.

Objectives of the present study were to investigate morphological and cultural characters of commonly available *Colletotrichum* isolates of different species collected from several places of India and testing their pathogenicity on common crop species. To further this cause, the use of random amplified polymorphic DNA (RAPD) markers for discrimination of *Colletotrichum* species was also undertaken. Light microscopic studies coupled with Camera Lucida drawings were made and photomicrographs of important morphotaxonomic characters were taken.

1. Five species of *Colletotrichum* comprising of fifteen isolates viz., *C. capsici* (ITCC No. 4764, 4871, 5008, 5107, 5227), *C. dematium* (ITCC No. 4970, 5306), *C. falcatum* (ITCC No. 4800, 4803, 4893), *C. gloeosporioides* (ITCC No. 4573, 5132, 5213, 5255) and *C. lindemuthianum* (ITCC No. 4765) were obtained from the Indian Type Culture Collection. Another ten isolates (ITCC No. 6082-05, 6083-05, 6084-05, 6085-05, 6086-05, 6087-05, 6088-05, 6089-05, 6090-05,

6091-05) were collected from different places of India. As a result of this investigation, it was observed that ten isolates collected from field comprised of four species of *Colletotrichum* viz., *C. dematium* (6088-05), *C. falcatum* (6085-05, 6086-05, 6087-05), *C. gloeosporioides* (6082-05, 6083-05, 6084-05) and *C. lindemuthianum* (6089-05, 6090-05, 6091-05).

2. Colour and appearance of *Colletotrichum* isolates were found to be variable within a species and it was not possible to correlate colour and the appearance of the colonies with any of the characters studied.
3. The host range of *C. capsici* isolate ITCC No. 5008 was identified as broad and it also infected chilli and soybean in addition to *Melia* leaves.
4. The measurements of conidia and appressoria for *C. capsici* were found to be larger than that observed by earlier workers. The description of the fungus *C. capsici* was amended in respect to conidia and appressoria.
5. Isolates of *C. dematium* grouped together with *C. capsici* isolates in RAPD profiles indicating relatedness of both species as observed by Noble and Richardson and von Arx.
6. Conidial dimensions of *C. dematium* observed in the present study were found to be larger than described by earlier workers. Hence, the description of the *C. dematium* was amended for its conidial size.
7. Present studies also revealed that conidial and appressorial dimensions of *C. falcatum* were more than those observed by previous workers. Therefore, the limits of the conidia and appressoria of *C.*

*falcatum* have been expanded and the description of the fungus was amended.

8. RAPD profile of *C. gloeosporioides* isolates showed that these are highly variable in nature. The hyper variability may be due to the fact that these have been isolated from different host plant species. In the present study, wider conidial dimensions were also observed. Therefore, description of *C. gloeosporioides* was amended for its conidial size.
9. In the case of *C. lindemuthianum*, broader range of conidia and appressoria were observed. Hence, the description of *C. lindemuthianum* was amended.
10. Sclerotia of some species act as propagules, which survive adverse environmental conditions. They readily produced colonies when plated in fresh media plates. Some isolates produced sclerotia abundantly and very few conidia.
11. Survival on wide host range was observed as another method of pathogenic fitness.
12. Clustering of *Colletotrichum* isolates with respect to RAPD profiles could not be correlated with the geographical origin of the isolate.
13. In the primer studies, use of primers OPN3 and OPN11 was found to be a suitable tool for differentiation of *Colletotrichum* species.