

DISEASE NOTE

First Record of Sooty Spot Caused by *Cladosporium cladosporioides* on Mango (*Mangifera indica* L.) in Egypt

Abd El-Ghany, K.M.  and Kamhawy, M.A. 

Received: 24 January 2023 / Accepted: 08 March 2023 / Published online: 09 March 2023.

©Egyptian Phytopathological Society 2023

Mango (*Mangifera indica* L.) is an economically important fruit tree belonging to family Anacardiaceae, grown in the tropical and sub-tropical areas of the world. It is usually grown in the nursery and marketed as a scion seedling. Mango fruits are consumed due to their high nutritional values, delicious taste, and excellent flavour. In January 2022, abundant fungal infection appeared in scattered areas on the leaves of mango seedlings at a commercial seedlings production nursery in Ismailia Governorate, which is considered one of the most important districts for mango production.

The development of symptoms occurred when seedlings were covered during low winter temperatures with a plastic sheet (polyethylene), which leads to more internal moisture around the seedlings. More than 70% of seedlings in the nursery showed symptoms of the disease. Symptoms appeared in the form of small, irregular shaped necrotic black spots on the upper surface of the leaf, while on the lower surface of the leaf corresponding black spot, appeared as a branched network of mycelium, the color of which ranged from gray to dark gray (Fig. 1A and B).

To determine the etiology of this pathological phenomenon, diseased leaves were used for isolation by using potato dextrose agar (PDA) medium and incubated at 25°C for 5 days. The colonies showed mycelium, olive-green to brown, with a velvety texture (Fig.2A). The fungus colonies were isolated from all samples and on the basis of their cultural and morphological characteristics, the isolated fungus was identified as *Cladosporium cladosporioides* (Fresenius) de Vries, according to the descriptions of (Tashiro, *et al.*, 2013). The pure culture of the fungus was prepared by the single spore technique.

The representative isolate *Cladosporium cladosporioides* EGYARC1 conidiophores are solitary, straight to slightly curved, olivaceous-brown, narrowly cylindrical to subcylindrical-oblong. Ramoconidia are oblong to cylindrical, with an average length and width of (14.73 µm [10.97 to 24.47 µm] × 3.48 µm [3.25 to 4.60 µm]). Conidia are catenated, in long branched chains that were readily disarticulate, single celled, and subspheric to limoniform, olivaceous to olive-brown in color with visible scars and denticle-like extensions projections were quite typical of the *Cladosporium* genus. The mean diameters of length and width of conidia are (5.95 µm [4.58 to 7.27 µm] × 3.7 µm [2.82 to 4.60 µm]) (Fig.2B, C, D and E).

To confirm the identification, the ITS region was amplified by PCR and sequenced using the primer set ITS1/ITS4, by following the method described by White *et al.*, (1990). The sequence was compared with the existing sequences in GenBank, and the result BLAST searches showed 99.79 to 100% identity with the sequence of *Cladosporium cladosporioides* (Fresenius) de Vries (GenBank Accession No. KT959335.1 and KT959303.1), which confirmed the morphological identification. The ITS sequence was deposited in GenBank (ITS, OP854844).

A pathogenicity assay was carried out to confirm Koch's postulates. Five seedlings of healthy 1-year-old *M. indica* (var. Sukkary), originated from seeds, were inoculated with a 5 mm-mycelial plug of *C. cladosporioides* from a 5-day-old culture grown on potato dextrose agar medium. Inoculation was done on the surfaces of young leaves. The leaves of five control seedlings were inoculated with sterile PDA plugs. All seedlings were covered with plastic bags and removed two days after inoculation. All seedlings were kept under greenhouse conditions at 25°C under natural daylight conditions. 15 days after inoculation, the inoculated plants showed typical symptoms similar to those previously observed in the nursery, while the control plants remained healthy. The experiment was performed twice. Koch's postulates were fulfilled when typical colonies of *C. cladosporioides* were successfully re-isolated from the leaves showing the same symptoms.

To the best of our knowledge, this is the first report of *C. cladosporioides* causing sooty spot disease on mango (*Mangifera indica*) seedlings in Egypt.

Keywords: Mango, *Mangifera indica*, Sooty Spot, *Cladosporium cladosporioides*, Leaf Spot

*Correspondence: Abd El-Ghany, K.M.

E-mail: khaled.abdelghany@arc.sci.eg

Khaked M Abd El-Ghany

 <https://orcid.org/0000-0001-6752-8385>

Mahmoud A. Kamhawy

 <https://orcid.org/0000-0001-9287-1361>

Plant Pathology Research Institute, Agricultural Research Center, 12619, Giza, Egypt.

Fig. (1): Natural infection of sooty spot. **A:** The upper surface of the leaf. **B:** The lower surface of the leaf of mango seedling showing the disease symptoms.

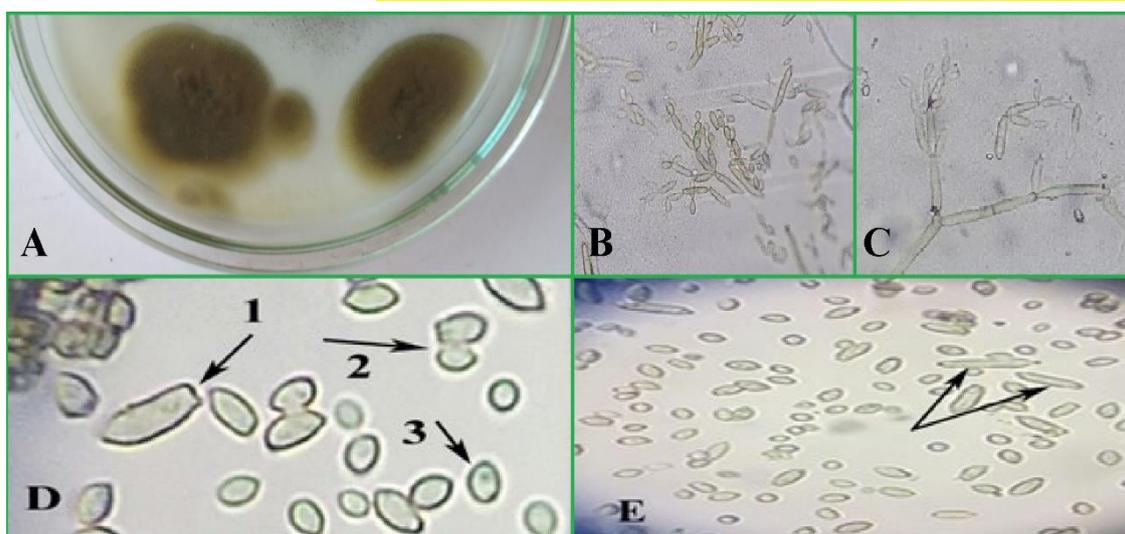
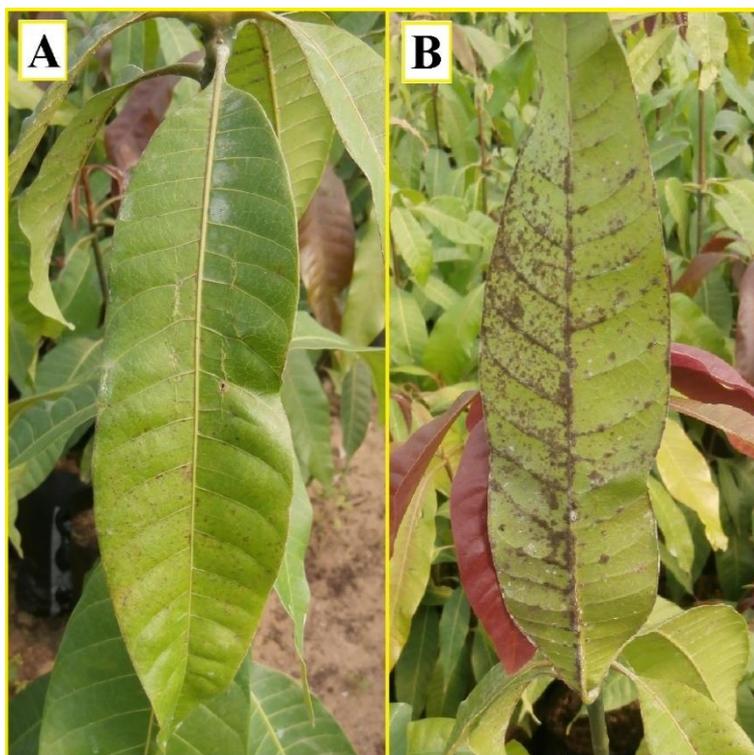


Fig. (2): (A) Colony of *Cladosporium cladosporioides* EGYARC1 (OP854844) on PDA, isolated from diseased leaves showing an olive-green to brown color. (B-E) Conidia with conidiophores. (B) Conidial chains. (C) Conidiophore. (D) D-1, Denticle shaped projections. D-2, Sub-spherical conidia. D-3, Lemon-shaped conidia. E: Ramoconidia.

REFERENCES

Tashiro, N.; Noguchi, M.; Ide, Y. and Kuchiki, F. 2013. Sooty spot caused by *Cladosporium cladosporioides* in postharvest Satsuma mandarin grown in heated greenhouses. *J. Gen. Plant Pathol.*, 79:158-161.

White, T.J.; Bruns, T.D.; Lee, S.B. and Taylor, J.W. 1990 Amplification and Direct Sequencing of Fungal Ribosomal RNA Genes for Phylogenetics. In: Innis, M.A., Gelfand, D.H., Sninsky, J.J. and White, T.J., Eds., *PCR Protocols: A Guide to Methods and Applications*, Academic Press, New York, 315-322.



Copyright: © 2022 by the authors. Licensee EJP, EKB, Egypt. EJP offers immediate open access to its material on the grounds that making research accessible freely to the public facilitates a more global knowledge exchange. Users can read, download, copy, distribute, print, or share a link to the complete text of the application under [Creative commons BY NC SA 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

