

First report of hog-plum (*Spondias pinnata*) leaf spot disease

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Abstract Hog-plum is a tree species with edible fruits. The plant is naturally distributed in the tropical areas of the Indian subcontinent. Our effort to introduce it in the semi-arid conditions of western India failed as the plants developed severe shot-hole type leaf spot symptoms. Association of a fungus with the disease was detected and its pathogenicity was established. The pathogen was identified to the genus level (*Colletotrichum*) based on the morphological and molecular markers.

Keywords *Glomerella cingulata* · rDNA

Hog-plum (*Spondias pinnata*) is a deciduous, glabrous tree with edible fruit, growing up to 25 m in height. The unripe fruits are sour, whilst ripe ones are sweet-sour with a hard stone. The fruits are used as a vegetable and flavouring in curry (Chadah and Patel 2007) and the leaves are aromatic and astringent. The bark has traditional medicinal properties and was recently found to have hypoglycaemic, antioxidant and free radical scavenging activities (Mondal and Dash 2009; Hazra et al. 2008). The tree is found wild or cultivated throughout the tropical Indian subcontinent and also in the Andaman Islands and Sri Lanka, but is seldom found in

western India. Hence, with a view to possible introduction of the species to western India with semi-arid conditions, attempts were made to grow hog-plum in a nursery in Anand (22°29'2.1" N, 73°22'14.6" E), Gujarat. The saplings, however, developed severe leaf spot symptoms during July–November, 2008 and did not survive.

Mature leaves developed disease symptoms whilst young, emerging leaves remained uninfected. Initially, minute, pin head like, reddish brown lesions were observed on the lamina. These enlarged in diameter with a dull centre and brown margin. However, unlike similar leaf spot diseases of other species, black dots representing fungal reproductive structures were absent. Later the central portion of the lesion dislodged to produce a shot hole appearance (Fig. 1), with multiple lesions merging to create larger lesions in some cases.

Leaf pieces were removed from the margins of the lesions, surface sterilised, plated on potato dextrose agar (PDA) and incubated at 25°C in the dark. A fungus was repeatedly isolated from such tissues. In culture, the fungus initially produced white mycelia which after 4–5 days turned blackish and after 7 days of incubation appeared reddish brown due to copious sporulation. Conidia were produced in globose acervuli. The conidia were hyaline, cylindrical, obtuse at both ends, single celled. Those from leaf surfaces were 11.5–14 (13) × 2.5–4 (3) µm in size and 13–15.5 (14) × 2.5–5 (4) µm when produced on PDA. Setae were not observed on the leaf surfaces or in culture. On a glass slide, the conidia germinated by hyaline, septate, germ tubes which usually terminated at a dark coloured, globose to elongated appressorium (Fig. 2). Usually, germ tubes emerged from both ends of the conidia. Sclerotia did not form on the culture plates till 15 days of incubation.

The ITS1–5.8S rRNA–ITS2 gene (~1,200 bp) of the selected fungus was sequenced and the sequence was deposited in GenBank (Accession No. GU980708.1). It shared high

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Fig. 1 Disease symptoms on hog-plum leaf

(98–100%) similarity (BLASTN algorithm) with *Colletotrichum gloeosporioides*, *C. fragariae* and *C. musae*. The specimen was submitted to CABI, UK for identification. However, based on morphological and ITS sequence data, the fungus was identified only to the genus level. We propose the pathogen be named as *Colletotrichum* sp. and be placed within the species aggregate *Glomerella cingulata*. The isolate was deposited at IARI, New Delhi and IMI, UK with accession numbers ITCC6480 and IMI500055, respectively.

To test the pathogenicity of the fungus, surface sterilised mature healthy leaves were spot inoculated with a drop of conidial suspension (1.5×10^6 conidia mL^{-1} of sterile water) from 7 to 10 days old culture. Five leaves, one each from 5 plants from the same nursery were used. Five leaves were kept as control (which received sterile water). The leaves were placed in a sterile Petri plates lined with moist blotting papers and incubated in the dark at 25°C. After 3–5 days of incubation, the inoculated leaves developed dark spots at the site of inoculation. However, control leaves remained healthy. The same fungus was re-isolated from the inoculated leaves showing disease symptoms.

Colletotrichum has a wide host range causing mostly anthracnose and leaf spot symptoms. Though Rodrigues and Samuels (1999) recorded it on *Spondias mombin* in Brazil, the present study constitutes the first report of the fungus on *S. pinnata*. The disease caused by this pathogen is

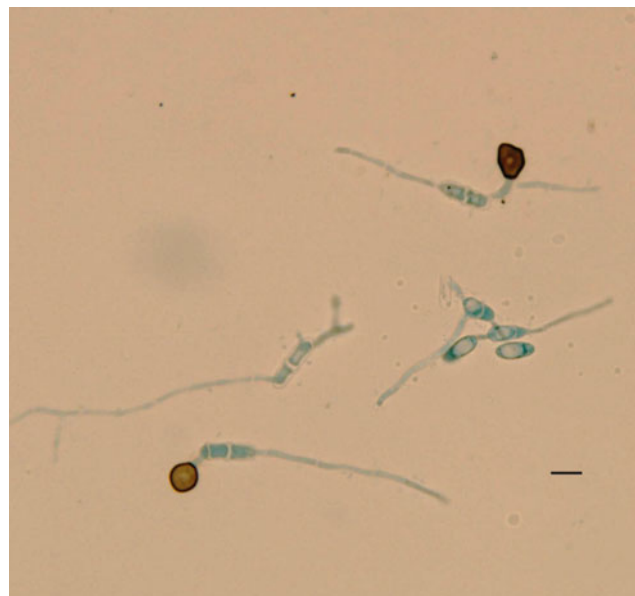


Fig. 2 Germinating conidia of *Colletotrichum* sp. (ITCC6480, IMI500055) on a glass slide. Bar represents 10 μm

a key reason behind the failure of plant establishment under semi-arid western Indian conditions.

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