First report of black leaf mold by *Cladosporium tenuissimum* on *Paulownia fortunei*

Liu Yuelian¹ · Zhong Feiteng¹ · Lu Shili¹ · Chen Jie¹ · Lin Pinling¹ · Lin Xiao¹ · Jiang Hongbin¹ · Zhang Xuhong¹

Received: 2 April 2021 / Accepted: 22 July 2021 / Published online: 23 August 2021
© Società Italiana di Patologia Vegetale (S.I.Pa.V.) 2021

Keywords *Paulownia fortunei* · Black leaf mold · *Cladosporium tenuissimum*

Paulownia trees [*Paulownia fortunei* (Seem.) Hemsl.] have good-quality wood and high economic value. In November 2020, black leaf mold was observed in about 1000 seedlings (disease incidence of about 80%) in a 1.20 ha nursery in Zhanjiang (21°17'51"N, 110°18'16"E), China. Early symptoms appeared on affected leaves as punctate black mold. The mildew stain gradually covered both sides of leaves. Three samples of symptomatic leaves were collected in the field. Margins of the diseased tissue were cut into 2 mm × 2 mm pieces. The surfaces were disinfected with 75% ethanol for 30 s and 2% sodium hypochlorite for 60 s. Single-spore isolates were obtained in vitro on potato dextrose agar (PDA) containing 0.2% chloramphenicol and incubated at 28 °C. Olive–green velvety colonies appeared on the third day. Conidiophores with thick walls were septate and unbranched, and had a size of 70–140 µm. Ramoconidia were cylindrical to clavate and had a size of 12.8–20.5 µm × 4.5–5.8 µm. Conidia were single-celled, lemon-shaped, and smooth-walled, in chains, and had a diameter of 3–5.5 µm. The morphological characteristics of isolates were consistent with those of *Cladosporium tenuissimum* Cooke (Bensch et al. 2012). The molecular identification of three representative isolates (CIP-1, CIP-2, and CIP-3) was performed through sequencing the nuclear ITS–rDNA region with ITS1 and ITS4 primers (White et al. 1990). The sequences of isolates were deposited in the GenBank (GenBank accession Nos. MW478318, MW478319, and MW478320). The BLASTn search of sequences (MF473305, MH383051, and MW646381) showed 100% identity with *C. tenuissimum*. Meanwhile, the isolates (CIP-1, CIP-2, and CIP-3) were preserved in glycerol (15%)

at –80 °C in the China General Microbiological Culture Collection Center, Peking, China, CGMCC No: 2020CIP-1, 2020CIP-2, and 2020CIP-3. The pathogenicity test was performed thrice. The inoculation and control groups ($n = 5$ plants each) were sprayed with the spore suspension of isolates (1×10^5 per mL) and sterile distilled water, respectively. Plants with three leaves were grown in pots in a greenhouse at 28 °C. After seven days, the inoculation group had black mold, whereas the control group remained healthy. Reisolates from the inoculation group were identified as *C. tenuissimum*. *C. tenuissimum* was reported to cause leaf spot on castor in Zhanjiang, China (Liu et al. 2019). To our knowledge, this is the first report of *C. tenuissimum* as causal agent of black mold on *P. fortunei* in China and worldwide (Farr and Rossman 2021).

References

- Bensch K, Braun U, Groenewald JZ, Crous PW (2012) The genus *Cladosporium*. *Stud Mycol* 72:(1):1–401
- Farr DF, Rossman AY (2021) Fungal Databases, U.S. National Fungus Collections, ARS, USDA. Retrieved April 26, 2021
- Liu YL, Yin XG, Lu JN, Li Y, Zhou YH (2019) First report of castor leaf spot caused by *Cladosporium tenuissimum* in Zhanjiang, China. *Plant Dis* 103(2):375
- White TJ, Bruns T, Lee S, Taylor J (1990) In: PCR protocols: A guide to methods and applications. Academic Press, San Diego, CA, p 315

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

✉ Liu Yuelian
mushwoman@126.com

¹ Guangdong Ocean University, Zhanjiang 524088, China