Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Blight on *Pinellia ternata* (Banxia) Caused by *Choanephora cucurbitarum* in China

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Pinellia ternata (Thunb.) Makino ex Briet. (banxia, crow-dipper) is a perennial herbaceous plant native to China, Japan, and Korea. A member of the family Araceae, it is considered an invasive weed in parts of Europe and North America. In August 2020, *P. ternata* plants showing blight symptoms (8% incidence in a 30-ha field) were observed, near Qianjiang City (30°50'N, 112°92'E), Hubei Province, China. Brown water-soaked lesions first appeared on flowers, followed by flower blight and leaf and stem rot during periods of more than 80% humidity. White, cottony mycelia grew from rotted tissues and produced sporangiophores with brown to black sporangia. To identify the causal agent, 12 diseased samples were surface disinfested with 0.5% sodium hypochlorite and 75% ethyl alcohol, plated on potato dextrose agar (PDA), and maintained at 25°C. Ten fungal isolates were selected by hyphal-tip isolation and placed on fresh PDA. White fungal colonies grew rapidly that later turned pale yellow and produced abundant sporangia in 13 days. Sporangiophores were smooth, hyaline, aseptate, and produced monosporous sporangia.

Sporangia were ellipsoid, indehiscent, pediculate, brown to dark brown, 8 to 16 × 14 to 21 μm ($n = 50$) in size, with visible longitudinal striations. Sporangia with a few or many sporangiospores were subglobose, pale brown to brown, and 55 to 165 μm ($n = 40$) in diameter. Sporangiospores were broadly ellipsoid, brown to pale brown, striate, 8 to 12 × 15 to 25 μm ($n = 30$) in size, with hyaline polar appendages. Based on these morphological characteristics, the fungus was identified as *Choanephora cucurbitarum* (Berk. & Ravenel) Thaxt. (Kirk 1984). To confirm the identification, the strain QJFY1 was chosen for DNA sequencing. The internal transcribed spacer (ITS) region of rDNA and large subunit (LSU) region of ribosomal RNA were amplified with primers ITS1/ITS4 and NL1/LR3 (Walther et al. 2013), and the amplicons were sequenced. BLAST analysis of the 593-bp sequence (accession no. MW295532) and the 699-bp sequence (accession no. MW341527) showed ≥99.5% identity with *C. cucurbitarum* strain CBS 674.93 (GenBank accession nos. JN943006.1 and JN939195.1). Based on morphological and molecular characteristics, the fungus was identified as *C. cucurbitarum*. Koch's postulates were fulfilled by inoculating flowers of three healthy 30-day-old *P. ternata* plants with 50 μl of inoculum suspension (1×10^4 conidia/ml) obtained from 13-day-old cultures of *C. cucurbitarum* isolate QJFY1. Another three plants treated with sterile distilled water served as controls. All plants were placed in a greenhouse with relative humidity of 90% for 2 days and thereafter placed in the glasshouse at 25 ± 1°C. After 3 days, symptoms similar to those seen under field conditions were observed on inoculated plants, and noninoculated plants remained healthy. *C. cucurbitarum* was reisolated and identified by molecular characteristics (ITS and LSU) from inoculated plants. The experiment was repeated thrice with similar results. To our knowledge, this is the first report of *Choanephora* blight caused by *C. cucurbitarum* on *P. ternata* in China and worldwide. Hubei Province is one of the most important banxia-producing areas in China, and *C. cucurbitarum* can pose a new threat to banxia production. Our results provide a basis to develop effective measures to manage this disease.

References:

- Kirk, P. M. 1984. Mycol. Pap. 152:1.
Walther, G., et al. 2013. Persoonia 30:11.

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