Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Apiospora* Mold on Sugarcane in China Caused by *Apiospora arundinis* (*Arthrinium arundinis*)

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Sugarcane (*Saccharum officinarum* L. cv. Badila) is a chewing cane cultivar in southern China. Since the first case of poisoning caused by the consumption of moldy sugarcane was confirmed in northern China in 1972, cases have occurred almost every year. It has been confirmed that *Arthrinium* is the pathogen that primarily occurs during improper postharvest storage (Liu et al. 1984). In 2019, 10 moldy sugarcane stems (cv. Badila) were collected from Tang County, Baoding City, Hebei Province, China. The sugarcane flesh turned dark and was grayish-white, red, or reddish-brown. Some of them smelled musty. Symptomatic stems were surface disinfected using 75% ethanol and peeled aseptically. Small sections (3 mm³) were placed on potato dextrose agar amended with 0.01% chloramphenicol and incubated at 26 ± 2°C. Six fungal isolates were obtained from three sugarcane stems, a positive sample rate of 30%, and identified as the same fungus on the basis of morphological features owing to their formation of flat colonies that were initially white and later turned grayish white with moderate amounts of aerial mycelia. The mycelia consisted of smooth, hyaline, branched, and septate hyphae. The conidiophores were hyaline or pale brown and produced conidiogenous cells. The conidiogenous cells were pale brown, smooth, ampulliform, and 5.5 to 11.2 µm long (*n* = 50). The conidia were brown, smooth, ellipsoidal to spherical, spherical in surface view, 4.5 to 7.4 µm in diameter, and 3.3 to 4.4 µm wide with a pale equatorial slit (*n* = 50). The morphological characteristics of the one representative isolate, named LX1918, were identical to those of *Arthrinium arundinis* (Corda) Dyko & B. Sutton (*Apiospora arundinis* [Corda] Pintos & P. Alvarado) (Crous and Groenewald 2013; Pintos and Alvarado 2021). Genomic DNA was extracted from the mycelia to further identify the isolate. The internal transcribed spacer region

(ITS rDNA), the translation elongation factor 1- α gene (TEF1), and the β -tubulin gene (TUB2) were amplified using the primers ITS1/ITS4, EF1-728F/EF-2, and T1/Bt2b (O'Donnell et al. 1997, 1998; White et al. 1990), respectively. BLASTn analysis of the ITS (556 bp, GenBank accession no. MW534386), TEF1 (434 bp, MW584370), and TUB2 (775 bp, MZ090019) sequences of isolate LX1918 showed that they were 99.43, 99.52, and 99.74% similar to the published sequences of isolate CBS 106.12 (KF144883, KF145015, and KF144973), respectively. To confirm Koch's postulates, pathogenicity tests were conducted in triplicate by inoculating the aseptic wounds with a conidial suspension (10⁵/ml) of the isolate in healthy sugarcane stems. The controls were inoculated with sterile water. The sugarcane stems were incubated at 26 ± 2°C and 86% relative humidity in the dark. Obvious moldy symptoms appeared several days after the sugarcane stems had been inoculated. The sugarcane flesh turned reddish brown. In contrast, the control stems were asymptomatic. *Ap. arundinis* (*Ar. arundinis*) was reisolated from the inoculated and moldy sugarcane. In addition, 3-nitropropionic acid could be detected using HPLC-MS after the fungus had been cultured on potato yeast sucrose agar for 14 days. Previous studies had confirmed that 3-nitropropionic acid produced by *Ar. sacchari*, *Ar. saccharicola*, and *Ar. phaeospermum* is the causal agent of poisoning caused by the consumption of moldy sugarcane (Hu et al. 1986; Liu et al. 1988). To our knowledge, this is the first report of *Ap. arundinis* (*Ar. arundinis*) as the causal agent of infected sugarcane and its production of 3-nitropropionic acid, which is toxic to humans. Therefore, the confirmation that *Ap. arundinis* (*Ar. arundinis*) infects sugarcane will expand our understanding of this pathogen and provide fundamental knowledge about the control of *Apiospora* mold to decrease the incidents of 3-nitropropionic acid poisoning.

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