Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Powdery Mildew Caused by *Podosphaera xanthii* on *Benincasa hispida* in Korea

I. Y. Choi,^{1,2,†} H. J. Ju,^{1,2} K. J. Lee,³ and H. D. Shin⁴

¹Department of Agricultural Biology, Jeonbuk National University, Jeonju 54896, Korea

²Department of Agricultural Convergence Technology, Jeonbuk National University, Jeonju 54896, Korea

³Division of Biotechnology, College of Environmental and Bioresource Sciences, Jeonbuk National University, Iksan 54596, Korea

⁴Division of Environmental Science and Ecological Engineering, Korea University, Seoul 02841, Korea

Funding: Funding was provided by the Korea Institute of Planning and Evaluation for Technology in Food, Agriculture and Forestry (IPET) through Crop Viruses and Pests Response Industry Technology Development Program, funded by Ministry of Agriculture, Food and Rural Affairs (MAFRA) (project no. 320043-05). Plant Dis. 105:3757, 2021; published online as <https://doi.org/10.1094/PDIS-02-21-0253-PDN>. Accepted for publication 26 April 2021.

Benincasa hispida (Thunb.) Cogn. (syn. *B. cerifera* Savi, *Cucurbita hispida* Thunb.), called wax gourd or ash gourd, is a cucurbitaceous vine grown for medicinal purposes and commercial value of its large fruits in Southeast Asia (Al-Snafi 2013). During the summer and autumn of 2020, leaves of wax gourd were observed to be affected by a powdery mildew with a 100% disease incidence in an experimental plot of Jeonbuk National University (35°50'55"N, 127°07'48"E), Korea. Fungal colonies were initially circular to irregular, forming white patches on both sides of the leaves and young stems, finally covering entire leaves and causing premature senescence of the leaves and poor growth. A representative voucher specimen was deposited in the Korea University herbarium (KUS-F32171). At least 30 measurements were taken for each asexual diagnostic feature. Conidiophores arising from superficial hyphae were straight, 100 to 210 µm long, and produced three to seven immature conidia in chains with a crenate outline. Foot cells were cylindrical, 46 to 74 × 10 to 12 µm, followed by one to two shorter cells. Conidia were ellipsoid-ovoid to barrel-shaped, 30 to 40 × 18 to 23 µm with a length/width ratio of 1.4 to 2.0, and contained conspicuous fibrosin bodies. Germ tubes

were produced from a lateral position on conidia. The sexual stage was not observed during the growing season. The morphological characteristics of the fungus were compatible with those of *Podosphaera xanthii* (Castagne) U. Braun & Shishkoff (Braun and Cook 2012), a well-known cucurbitaceous powdery mildew. DNA was extracted from mycelium, and primer sets ITS1F/PM6 and PM3/TW14 were used for amplification of ITS1-5.8S-ITS2 regions and the 5' end of 28S rDNA gene, respectively (Takamatsu and Kano 2001). Sequences determined in this study were deposited in GenBank under the accession numbers MW559231 and MW559420. Sequences for ITS regions and 28S rDNA gene showed 99.78 and 99.07% similarity, respectively, with those of *P. xanthii* (MH465242, MH465243, and MT250855 for ITS; and MK357436 and MT826247 for 28S rDNA). Pathogenicity was confirmed twice by pressing a diseased leaf onto young leaves of five wax gourd plants. Five noninoculated plants were used as controls. Inoculated leaves developed symptoms after 5 days, whereas the control plants remained symptomless. The fungus present on the inoculated plants was identical morphologically to that originally observed on diseased plants. *Sphaerotheca fuliginea* (syn. *P. xanthii*) on *B. hispida* has been listed in Hungary, India, Japan, Singapore, and Taiwan so far (Farr and Rossman 2021). Recently, the identity of *P. xanthii* on *B. hispida* in Taiwan was confirmed with morphological examination and molecular analysis by Wu and Kirschner (2017). To our knowledge, this is the first report of powdery mildew caused by *P. xanthii* on *B. hispida* in Korea. Because wax gourd production has only recently started on a commercial scale in the southern part of Korea, powdery mildew infections pose a serious threat to the safe production of the fruits, especially in organic farming, where chemical control options are limited.

References:

- Al-Snafi, A. E. 2013. Int. J. Pharm. Sci. Res. 12:165.
- Braun, U., and Cook, R. T. A. 2012. Taxonomic Manual of the Erysiphales (Powdery Mildews), CBS Biodiversity Series No. 11. CBS, Utrecht, The Netherlands.
- Farr, D. F., and Rossman, A. Y. 2021. Fungal Databases, Syst. Mycol. Microbiol. Lab., ARS, USDA. Retrieved January 23, 2021, from <https://nrt.ars-grin.gov/fungaldbases/>.
- Takamatsu, S., and Kano, Y. 2001. Mycoscience 42:135.
- Wu, T. U., and Kirschner, R. 2017. Mycol. Iran. 4:85.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: *Cucurbita hispida*, wax gourd, ash gourd, *Benincasa cerifera*

[†]Indicates the corresponding author.
I. Y. Choi; iychoi@jbnu.ac.kr