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Powdery Mildew of *Acer takesimense* Caused by *Sawadaea polyfida* in Korea

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Acer takesimense Nakai, called Seom-Danpung-Namu in Korean, is native to Ulleung island, which is about 120 km east of the Korean Peninsula. Though the tree is also found in some islands of the southern part of the Korean Peninsula, its geographical distribution is very limited. There have been no previous records of plant diseases from this species up to now (Farr and Rossman, 2010). In October 2008, a severe outbreak of a powdery mildew was observed on several trees of *A. takesimense* planted along the road in Ulleung island, Korea. A representative voucher specimen is deposited at Korea University (KUS-F23868). Powdery mildew infections were prominent on both leaf surfaces, which were covered by dense white mycelial mats with abundant chasmothecia (Fig. 1A & B).

Fresh materials were water-mounted and examined for identification of the pathogen. Photos were taken using a Zeiss Axio Imager microscope. Macroconidiophores were 80–120×7–10 μm, producing macroconidia in chains with sinuate edge-lines, with a basal septum 5–16 μm away from the branching point of the mycelium. Macroconidia were lemon-shaped, 22–30×12–15 μm, containing conspicuous fibrosin bodies. Microconidiophores were 25–55×3.5–5 μm, producing (1–)3–4 microconidia in chains. Microconidia were broadly ellipsoidal to subglobose, 7–11×5–7.5 μm, containing conspicuous fibrosin bodies. Chasmothecia were 120–210 μm in diam., blackish brown, depressed globose. Appendages were about 100–180 in number, less than half of the chasmothecial diameter in length, (1–)2–3 times branched from the middle of the stalk, uncinate to circinate at the apex, hyaline, aseptate, thick-walled at the base and thinner upwards. Asci were 10–26 per chasmothecium, 60–75×32–46 μm, 8-spored. Ascospores were ellipsoid-ovoid, 20–25×12–16 μm (Fig. 1C).

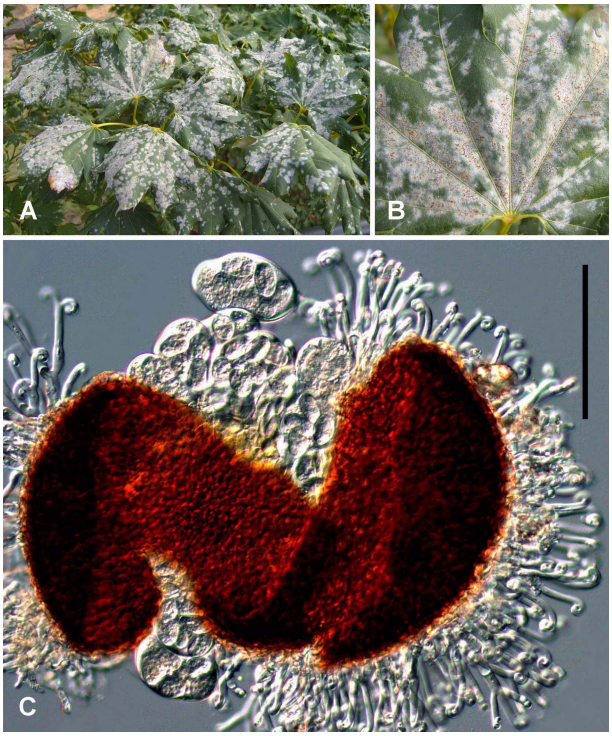

Fig. 1. Powdery mildew of *Acer takesimense* caused by *Sawadaea polyfida*. Note heavy infections (A) and formation of chasmothecia on mycelial mats (B). (C) Mature chasmothecium of *S. polyfida* producing many asci with eight ascospores each (bar=100 μm).

The complete ITS region of rDNA from KUS-F23868 was amplified with primers ITS5 and P3 as described by Takamatsu et al. (2009) and sequenced. The resulting sequence of 473 bp was deposited in GenBank with accession number of GU989322. Phylogenetic analysis was performed using MEGA4 with neighbor-joining method and Tajima-Nei distance calculation. A BLAST search in GenBank revealed that the Korean isolate shared a high sequence similarity (approximately 99%) with *S. polyfida* isolated from *Acer* species from Japan (Fig. 2).

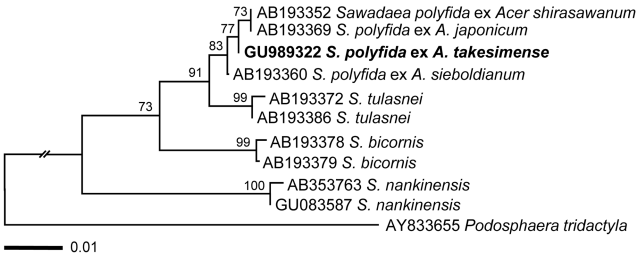

Fig. 2. Phylogenetic relationship between *Sawadaea polyfida* on *Acer takesimense* and other *Sawadaea* species, inferred by neighbor-joining method using the ITS rDNA region. Numbers above the branches represent the bootstrap values. Bar = Number of nucleotide substitutions per site.

Based on these morphological and molecular data, the fungus was identified as *Sawadaea polyfida* (C.T. Wei) R.Y. Zheng & G.Q. Chen (Hirose et al., 2005; Zheng and Yu, 1987). This is the first record of powdery mildew infections on *A. takesimense* in the world as well as in Korea. This record supports the idea of Hirose et al. (2005) that *S. polyfida* is an East Asian powdery mildew species. Our field observations suggest that powdery mildew infections pose a serious threat to health and beauty of this ornamental tree.

References

Farr, D. F. and Rossman, A. Y. 2010. Fungal Databases, Systematic Mycology and Microbiology Laboratory, ARS, USDA. Retrieved March 11, 2010, from http://nt.ars-grin.gov/fungaldatabases/

Hirose, S., Tanda, S., Kiss, L., Grigaliunaite, B., Havrylenko, M. and Takamatsu, S. 2005. Molecular phylogeny and evolution of the maple powdery mildew (*Sawadaea*, *Erysiphaceae*) inferred from nuclear rDNA sequences. *Mycol. Res.* 109:912–922.

Takamatsu, S., Heluta, V., Havrylenko, M. and Divarangkoon, R. 2009. Four powdery mildew species with catenate conidia infect *Galium*: molecular and morphological evidence. *Mycol. Res.* 113:117–129.

Zheng, R. Y. and Yu, Y. N. (eds). 1987. *Flora Fungorum Sinicorum. Vol. 1, Erysiphales.* Science Press, Beijing, China. 552 pp.

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