

Powdery Mildew of Japanese White Birch Caused by *Erysiphe betulina* in Korea¹

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ABSTRACT

Betula platyphylla var. *japonica* (Miq.) Hara, or Japanese white birch, is a tree which is widely distributed in East Asia. In July 2009, some young trees showing typical symptoms of powdery mildew disease on both sides of their leaves were first found at Hongneung Arboretum, Korea Forest Research Institute, Seoul, Korea. White superficial colonies developed amphigenously on affected leaves (Fig. 1A & B). Appressoria were multi-lobed to moderately lobed (Fig. 1C). Conidiophores were 60-100×10-14 µm, and composed of slightly curved to flexuous basal cells and one to three cylindrical cells (Fig. 1D & E). Conidia, devoid of fibrosin bodies, were oblong to cylindrical, with wrinkling surface, 32-42×12-16 µm, and producing perihilar germ tubes (Fig. 1F & G). Chasmothecia were spherical, 70-95 µm in diameter. Appendages were 8-18 per chasmothecium, 0.8-1.3 times as long as the chasmothecial diameter, nearly straight, 3.5-9 µm wide, thick-walled at the base, but thinner upwards, aseptate or occasionally uniseptate at the base, apex 3-5 times branched, tips of the ultimate branchlets recurved. Asci were 3-6 per chasmothecium, 50-67×35-43 µm, 5-8-spored. Ascospores were oval, 22-27×11-14 µm (Fig. 1H & I). Morphological characteristics of the material are in accordance with the previous records of *Erysiphe ornata* var. *ornata* (U. Braun) U. Braun & S. Takam. (formerly *Microsphaera ornata* var. *ornata* U. Braun). This variety differs from var. *europaea* having fewer (ca 4-10) and shorter appendages (Braun, 1987). The complete ITS region of rDNA from KUS-F24679 was amplified with primers ITS5 and P3 and sequenced, and the resulting sequence was deposited in GenBank (HM057441). A BLAST search showed that there was no comparable sequence of *E. ornata* and thus this was the first ITS sequence for the species submitted in GenBank. To infer the relationship between *E. ornata* var. *ornata* and other *Erysiphe* species, a phylogenetic tree (Fig. 2) was constructed using MEGA4, version 4.0 with neighbor-joining method and Tajima-Nei model. According to Braun (1987), *E. ornata* var. *ornata* on *Betula* spp. is widespread in North America, known in Asia (Central Asia, Siberia, Far East of Russia) and very rare in Eastern Europe. In China, *Microsphaera betulae* Magnus (actually *E. ornata* var. *ornata* in the current concept) on *Betula* spp. was recorded from Xinjiang by Zhao (1979) and from Inner Mongolia by Liu (1997). Interestingly, beginning in the 1990s there have been new records of *E. ornata* var. *ornata* on *Betula* spp. from Estonia, Poland, Serbia, Switzerland and Ukraine (see Farr and Rossman, n.d.). This suggests that *E. ornata* var. *ornata*, the North American powdery mildew fungus, has been spreading to Europe and Asia in recent years. This is the first confirmed report of *E. ornata* var. *ornata* in East Asia and the first record of *B. platyphylla* var. *japonica* as its host plant.

Keywords : Powdery mildew, Symptoms, Japanese white birch

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