The first report of powdery mildew on Malus prunifolia caused by Podosphaera leucotricha in Korea

Jin-Hyeuk Kwon1*, Chang-Seuk Park1 and Jinwoo Kim2

1Gyeongsangnam-do Agricultural Research and Extension Services, Jinju 660-360, Korea
2Department of Applied Biology, Gyeongsang National University, Jinju 660-701, Korea

(Received on July 14, 2010; Accepted on October 12, 2010)

Pear-leaf crabapple [Malus prunifolia (Willd.) Borkh.], native to China, is widely grown in Korea as street or garden trees or as rootstocks. Powdery mildew consisting of thin white mycelial mats with abundant conidia has been observed annually since 2008 on the leaves and petioles of pear-leaf crabapple growing at the Gyeongsangnam-do Agricultural Research and Extension Services in Jinju, Korea. Powdery mildew is known from many rosaceous hosts including apple tree and crabapple worldwide. Voucher specimen was deposited at Korea University (KUS-F25290), Seoul, Korea. Detailed microscopic examinations of a representative specimen were performed using a scanning electron microscope (SEM; LEO 1420VP, LEO Electron Microscopy Ltd., Cambridge, UK) and a light microscope (Axioplan 2, Carl Zeiss, Jena, Germany). White conidia and conidiophores were noted in lesions from the leaves and petioles, which subsequently darkened and eventually died (Fig. 1A and B). The hyphae were colorless, septate, sometimes geniculate, and up to 10 µm wide. The hyphal appressoria were poorly developed. Conidiophores were 98-185×9-12 µm, producing conidia in chains with crenate edge-lines followed by two to four straight cells, with a basal septum at the branching point of the mycelium. Conidia were ellipsoidal, 22-31×12-20 µm, containing conspicuous fibrosin bodies (Fig. 1C-E).

In the absence of chasmothecia, a partial internal transcribed spacer (ITS) rDNA sequence was amplified from the isolate and sequenced using the primers ITS1 and ITS4 as described by White et al. (1990). The resulting 562-bp sequence has been deposited in GenBank Accession No. HM242221. Phylogenetic analysis was performed with MEGA4 software using the neighbor-joining method and Tajima-Nei distance model. A comparison of ITS rDNA sequences showed 100% similarity with sequences from Podosphaera leucotricha. In the phylogenetic tree (Fig. 2), the isolate infecting M. prunifolia was placed in a clade comprising reference isolates of P. leucotricha retrieved from GenBank. On the basis of its mycological characteristics and molecular data of the fungus, the causal agent was identified as P. leucotricha (Ellis & Everh.) Salmon described by Shin (2000) and Kapoor (1967). To our knowledge, this is the first report of the presence of P. leucotricha on pear-leaf crabapple in Korea (Shin, 2000; The Korean Society of Plant Pathology 2009). Recent occurrence of the disease suggests that P. leucotricha can be spreading widely and posing a serious threat to health of pear-leaf crabapple in Korea.

Acknowledgment

This work was carried out with the support of Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ007345) Rural Development Administration, Korea.

References


*Corresponding author (kwon825@korea.kr)