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NEW DISEASE REPORT

First report of the rust *Pucciniastrum corni* on *Cornus kousa* in Korea

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Cornus kousa (Cornaceae), commonly known as kousa dogwood, is a small deciduous tree, native to East Asia. It is one of the most common ornamental trees in East Asia with white flowers and pink fruits in gardens and parks worldwide. In August 2016, several trees were found affected with a rust in a public garden in Jinju, Korea. Careful observation of the affected plants revealed that typical rust pustules of the uredinial stage were formed on the abaxial leaf surface with corresponding small yellowish to chlorotic or necrotic lesions on the upper surface (Figures 1–3). Severe infections often resulted in premature defoliation. In the course of our routine field surveillance, five additional samples of the rust have been collected in Pocheon, Wando and Jeju, and all the six specimens were deposited in the Korea University herbarium (Accession Nos. KUS-F18135, F22192, F29705, F30223, F30252 and F30851).



FIGURE 1 Rust disease caused by *Pucciniastrum corni* on *Cornus kousa*

Fresh collected leaves were examined under the light microscope. Uredinia were hypophyllous, subepidermal, scattered or grouped, bright yellow, round, and 100–200 μm in diameter (Figure 4). Urediniospores were ovate to ellipsoid, 16–26 × 12–16 μm, echinulate, pale yellow, and with short or rudimentary pedicels (Figure 5). Telia were amphigenous, but mostly hypophyllous, subepidermal, and pale yellow or brown. Teliospores were intercellular, globose, divided into 2–6 cells, and 16–26 μm. These characteristics were consistent with those of *Pucciniastrum corni* Dietel (Hiratsuka et al., 1992) and

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FIGURE 2 Uredinia of *Pucciniastrum corni* formed on the lower leaf surface



FIGURE 3 Uredinia and urediniospores of *Pucciniastrum corni*

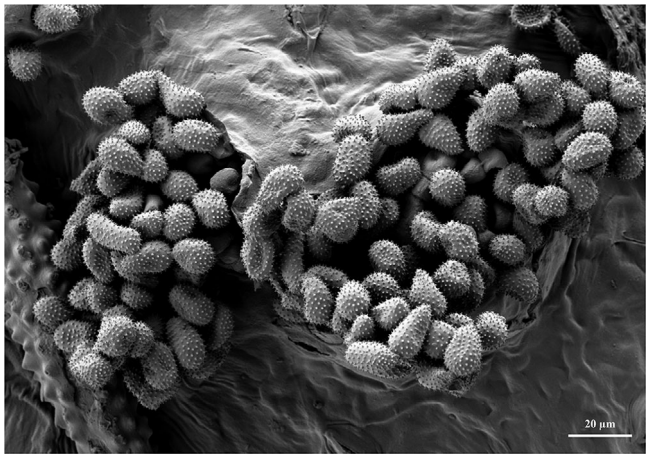


FIGURE 4 Uredinia of *Pucciniastrum corni* on *Cornus kousa*

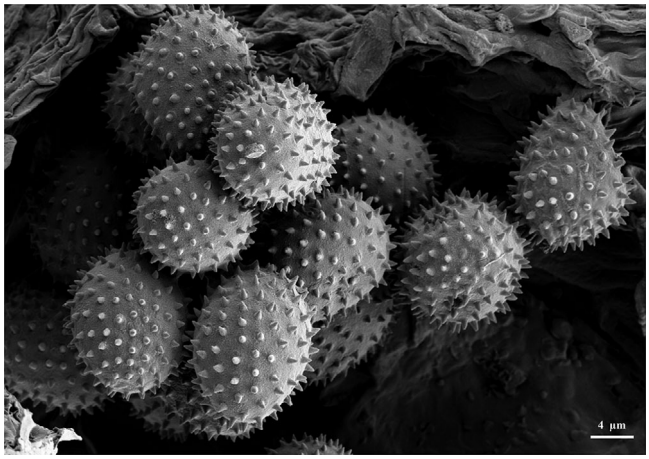


FIGURE 5 Urediniospores of *Pucciniastrum corni* on *Cornus kousa*

distinguishable from two *Thekopsora* species on *Cornus* species (Yang et al., 2015).

To confirm the morphology-based identification, G-DNA was extracted from two representative specimens (KUS-F29705 and F30252). PCR amplification was performed using the primer set ITS5u (Pfunder et al., 2001) and LR6 (Vilgalys & Hester, 1990) for a rDNA region covering the internal transcribed spacer (ITS) and partial large subunit (LSU). The resulting sequences were deposited to GenBank (Accession Nos. MW897712, MW897713 for ITS and MW897714, MW897715 for LSU) and compared with other reference sequences using BLASTn. Two rDNA regions of the Korean specimens showed 100% sequence identity with *P. corni* ex *Cornus kousa* (AB221436, AB221437 for ITS and AB221408, AB221409 for LSU). In neighbour-joining trees based on ITS (Figure 6A) and LSU (Figure 6B) sequences, the Korean isolates formed a well-supported clade with the reference sequences of *P. corni*.

P. corni was originally described as a rust on *Cornus officinalis* in Japan (Dietel, 1905) and has been recorded on *C. brachypoda*, *C. florida* and

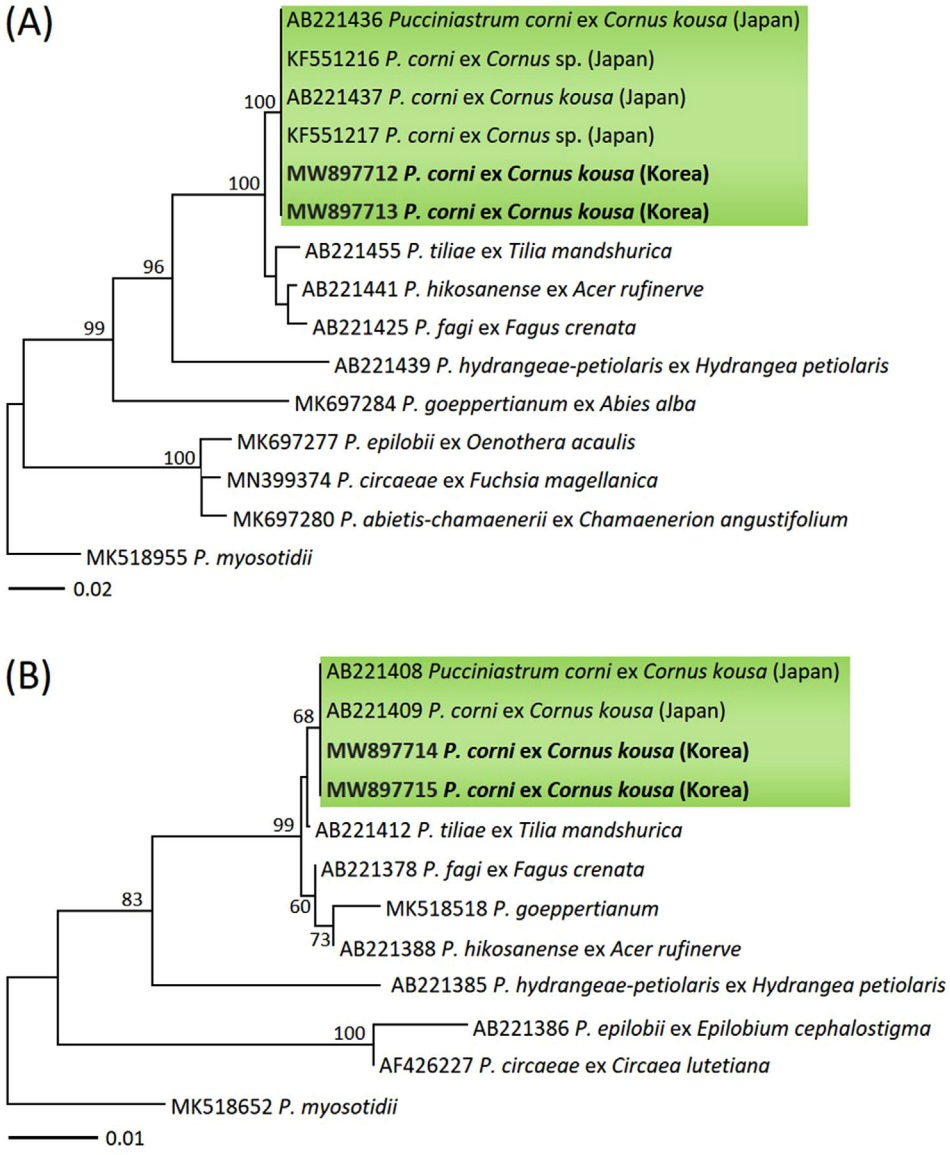


FIGURE 6 Phylogenetic relationship between *Pucciniastrum corni* and related rust fungi retrieved from GenBank, inferred by the neighbour-joining method using complete ITS (A) and partial LSU (B) rDNA sequences. Bootstrap values based on 1,000 replications indicated at the branches. The Korean isolates described in this study are shown in bold

C. kousa in Japan (Farr & Rossman, 2021), but the rust species previously identified as *P. corni* on *C. controversa* and *C. macrophylla* in China has recently been corrected as *Thekopsora triangula* (Yang et al., 2015). To our knowledge, this is the first report of *P. corni* on *C. kousa* in Korea. This rust fungus has been reported to produce spermogonial and aecial stages on *Abies firma* (Hiratsuka et al., 1992), which is originally distributed in Japan and now planted in Korea. Therefore, further studies on the life cycle of this rust in Korea should be followed.

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