



First report of *Podosphaera xanthii* causing powdery mildew on red chilli pepper in Vietnam

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Capsicum frutescens (red chilli pepper) is one of the most important and widely grown spice crops in Vietnam. Typical symptoms of powdery mildew were first observed on *C. frutescens* grown under glasshouse conditions at the National University of Agriculture in 2014. White fungal colonies were observed on both sides of mature and young leaves (Fig. 1a). Later, during a field survey in spring 2015, powdery mildew was observed on field-grown *C. frutescens*, affecting up to approximately 35% of the plants. Although powdery mildew on *C. frutescens* mainly attacks foliage and stems, if left untreated the disease can significantly slow plant growth and reduce yield. A representative specimen was deposited in the Plant Protection Research Institute Herbarium in Hanoi.

Microscopic examination showed conidiophores with a catenaceous form of conidiogenesis, composed of (2-)2-3(-4) cells, and measuring (81-)83-110(-122) μm long. Foot-cells of conidiophores measured (29-)31-51(-56) \times (10-)10-11(-12) μm (Fig. 1b). Conidia produced in chains were variable in shape, doliiiform, ellipsoid to ovoid, and measured (25-)28-34(-37) \times (15-)17-21(-23) μm with a length/width ratio of (1.2-)1.4-1.8(-2.0). Conidia had distinct fibrosin bodies (Fig. 1c) and germinated with *brevitubus* sub-type of *Fibroidium*-type germ tubes (Fig. 1d). No chasmothecia were found. Appressoria on mycelium had a nipple shape. The morphological characteristics were consistent with descriptions of *Podosphaera xanthii* (Braun & Cook, 2012). To confirm the identity of the causal fungus, the complete ITS region of rDNA from the representative specimen was amplified with universal primer pair HF1/HR4 (Tam *et al.*, 2015) and directly sequenced. The resulting sequence of 525 bp (GenBank Accession No. KR779868) was compared to other GenBank sequences using BLAST analysis and revealed a 99% sequence identity with *Podosphaera xanthii* isolates (KM505135, KP120971) on other hosts from the region (Cho *et al.*, 2015; Liu & Kirschner, 2015).

Pathogenicity was confirmed through inoculation tests by gently pressing diseased leaves of *C. frutescens* onto young leaves of five three-week-old potted seedlings of *C. frutescens*. Five non-inoculated seedlings were used

as controls. The plants were maintained in a glasshouse at 26-28°C. Inoculated leaves developed symptoms after seven days, whereas the control plants remained symptomless. The fungus present on the inoculated leaves was morphologically identical to that observed on the original diseased leaves with the same PCR sequence following the above described protocol, thereby fulfilling Koch's postulates.

Previous literature reports different powdery mildews on *Capsicum* species, including *Leveillula braunii* in Israel, *L. taurica* in Canada and India, and *Oidiopsis sicula* in Thailand (Voytyuk *et al.*, 2009; Yáñez-Morales *et al.*, 2009). Although, *P. xanthii* has been found on many hosts in different families throughout the world (Braun & Cook, 2012), to our knowledge this is the first report of *P. xanthii* infection of *C. frutescens* in Vietnam, as well as in the world. The disease seems to be a potential threat to spice production from *C. frutescens* in Vietnam.

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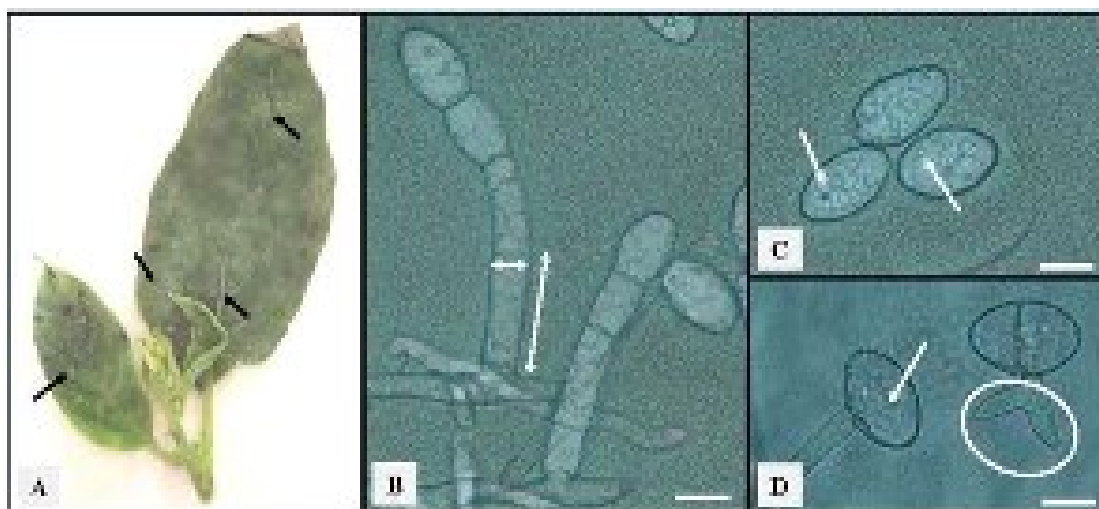


Figure 1

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