



First report of *Phytophthium vexans* causing root rot disease on durian in Vietnam

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Durian (*Durio zibethinus*) is one of the most economically important fruit crops in Vietnam and is widely grown in the Central Highlands and the South, with a total area of 47,295 ha under cultivation in 2019. This plant is infected by a wide range of diseases, with oomycetes (such as *Phytophthora palmivora*) considered the most serious pathogens, causing leaf blight, fruit rot, trunk cankers, crown and root rot (Drenth & Guest, 2004). In 2019, a survey conducted in durian-growing regions showed that approximately 10% of durian trees had symptoms of root rot, yellow leaves and wilting. Samples of dead roots, showing typical symptoms (Fig. 1) were collected from 125 trees growing in different areas. These samples were tested for the presence of oomycetes by baiting with rose flower petals and *Phytophthium* was detected in 94% of the samples using light microscopy. *Phytophthium*-infected rose petals associated with samples from 17 infected trees growing in different locations were directly plated onto selective medium for oomycetes (V8 juice medium containing 0.01g/l benomyl and 0.02 g/l rifampicin). Seventeen cultures were purified by the single zoospore method (Ho & Ko, 1997). These isolates showed the same cultural and morphological characteristics. A representative isolate PPRI1908.5 was chosen for future experiments and stored in the culture collection of the Plant Protection Research Institute of the Vietnam Academy of Agricultural Sciences.

Fungal colonies of PPRI1908.5 on potato dextrose agar (PDA) were white, cottony and fast-growing, covering a 9 cm petri-dish after 4 days. The morphological description was made from a four-day-old culture growing on PDA after flooding with sterile distilled water and maintained at 4°C for 1 hour then incubated at 25°C for three days. Sporangia were globose or subglobose with or without papilla, (13.8-) 17.9-24.7 (-27.5) µm diameter (Fig. 2). Oogonia and antheridia originate from the same hyphae. Oogonia were smooth, globose, terminal and measured (15-) 17.1-22.9 (-26.3) µm in diameter. Antheridia were cylindrical, elongate, often monoclinal and broadly attached to the oogonia (Fig. 2). The nuclear ribosomal internal transcribed spacer (ITS) of isolate PPRI1908.5 was sequenced using the ITS4 and ITS5 primers (White *et al.*, 1990) and an assembled sequence was deposited in GenBank (Accession No. MN757909). BLAST analysis showed that the ITS sequence of PPRI1908.5 had 99.3-99.9% identity to strains of *Phytophthium vexans* (HQ643400 - authentic strain (de Cock *et al.*, 2015), KX068705, MK567961 and MH236243). Isolate PPRI1908.5 was identified as *P. vexans* based on the ITS sequence analysis and morphological characteristics (van der Plaats-Niterink, 1981).



Figure 1

To fulfil Koch's postulates, *P. vexans* PPRI1908.5 was used to inoculate one-year-old potted durian plants (cv. Monthong). One hundred milliliters of a zoospore suspension of *P. vexans* (10⁵ zoospores/ml) were added to soil in each pot (30 cm diameter, 25 cm height). The same volume of sterile water was used for controls. The durian plants were placed in a glasshouse at 25°C for 14 days. The experiment was repeated three times. The symptoms of root rot were visually observed 10 days post-inoculation with leaf drop and the same pathogen was re-isolated from symptomatic roots. No pathogens were isolated from the roots of the mock-inoculated plants.

This is the first report of *P. vexans* causing root rot disease on durian in Vietnam. The disease spread widely during the rainy season from June to September, leading to a significant reduction in durian production. This finding is vital in the development of a successful disease management strategy in Vietnam.

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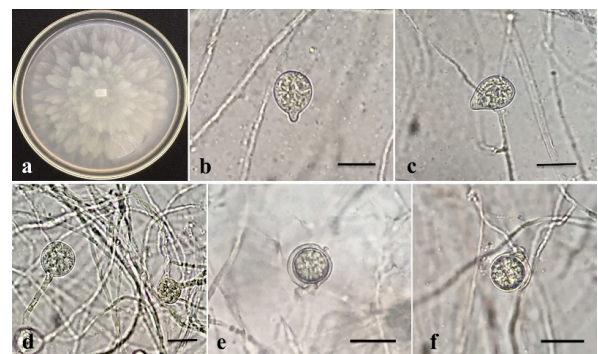


Figure 2

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