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Leaf Spot and Blight of Peony caused by *Phytophthora cactorum*

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Leaf spot and blight disease of tree peony (*Paeonia suffruticosa* Andr.) was found in an apartment garden in Daegu in May 2003 for the first time in Korea. The causal organism was identified as *Phytophthora cactorum* (Leb. And Cohn) Schroeter. The causal fungus was homothallic, and produced distinctively papillate, ovoid to subspherical, and caducous sporangia with pedicel. Sporangia that formed in water measured 23.4-42.9× 21.5-35.1 μm in range with an average of 35.3±4.6× 26.9±3.6.0 μm, l/b ratio=1.31, papillae approximately 3.7 μm high, and pedicels 2.8 μm long. Oogonia were spherical and 21.5-37.1 μm in diameter with an average of 29.6±4.9 μm. Oospores were spherical, mostly plerotic, and light orange brown when mature, and measured 19.5-31.2 μm in diameter with an average of 25.2±4.4 μm. Antheridia were almost ovoid or club-shaped and 11.7-15.6×9.8-11.7 μm in size.

Keywords **:** *Paeonia suffruticosa, Phytophthora catorum,* taxonomy, landscape plant.

The tree peony (*Paeonia suffruticosa* Andr.) is a deciduous shrubby landscape plant commonly planted in home gardens in Korea. A leaf blight disease was found on peony plants growing in an apartment garden in Daegu, in May 2003. The disease caused spots and blights on the biternate leaves (Fig. 1). A species of *Phytophthora* was isolated from the lesions. The isolate readily produced sporangia and sex organs on V8 juice agar plates when cultured under a 12-h fluorescent light. Sporangia were papillate, ovoid to subspherical, and caducous with pedicel. More abundant sporangia were produced when mycelial pieces were placed in water. Sporangia that formed in water measured 23.4-42.9×21.5-35.1 in range with an average of 35.3±4.6 ×26.9±3.6.0 μm, l/b ratio=1.31, papillae approximately 3.7 μm high, and pedicels 2.8 μm long (Fig. 2A, B). Oogonia were spherical and 21.5-37.1 μm in diameter with an average of 29.6±4.9 μm (Fig. 2C, D). Oospores were spherical, mostly plerotic, and light orange brown when mature, and measured 19.5-31.2 μm in diameter with an average of 25.2±4.4 μm. Antheridia were almost ovoid, mating with oogonia paragynously, and measured 11.7-

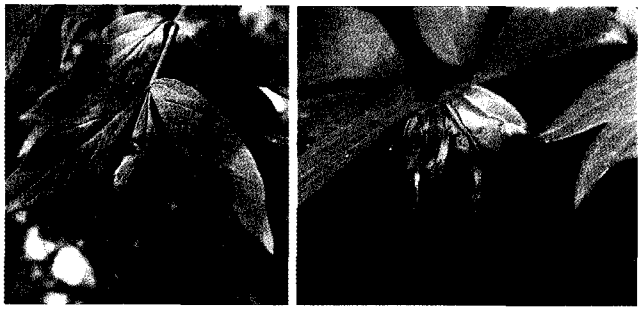

Fig. 1. Leaf blight symptoms on peony leaves.

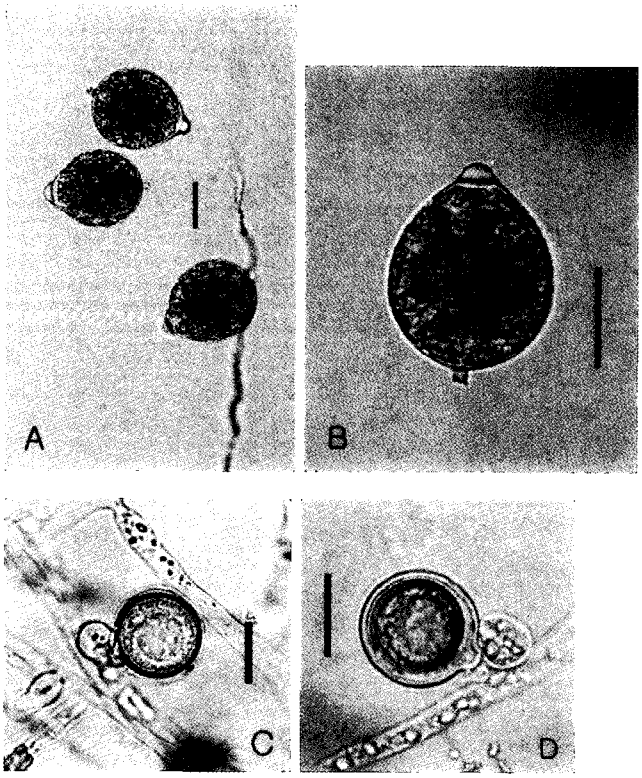

Fig. 2. *Phytophthora cactorum* infecting tree peony. (A-B) Sporangia; (B-C) Sex organs; (D) Bar = 20 μm.

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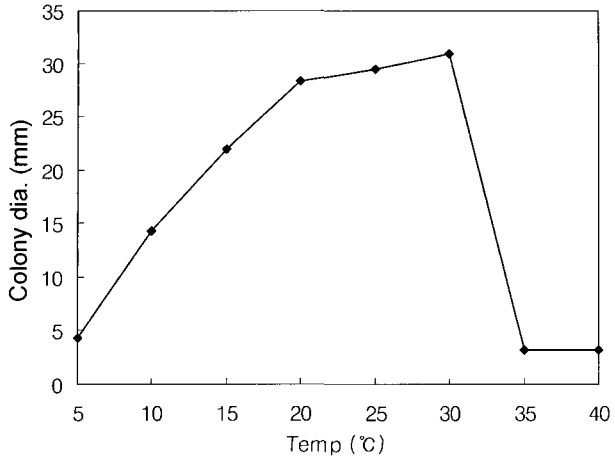

Fig. 3. Mycelial growth on PDA of *P. cactorum* isolated from peony according to temperature 8 days after inoculation.

isolate were consistent with that of *P. cactorum.*

The effect of temperature on mycelial growth was studied. Mycelial plugs 5 mm in diameter were punched out from actively growing mycelial colonies on V8 juice agar by a cork borer. PDA plates were inoculated with the mycelial plugs, one mycelial plug each on a plate. The PDA plates were incubated in eight different temperature regimes (5, 10, 15, 20, 25, 30, 35, 40°C). Colony diameter measured 8 days after inoculation is shown in Fig. 3. The isolate grew well at a temperature range of 20-30°C, and best growth of mycelia was obtained at 30°C. Optimum temperature for *P. cactorum* is known to be 25°C (Erwin and Ribeiro, 1996). Thus, the optimum temperature for mycelial growth of the isolate in this study appears to be a little higher than as previously reported. In the current study, however, the difference in mycelial growth between 25 and 30°C was very small and statistically not significant. Very limited growth was observed at 5°C, and there was no growth at 35 and 40°C.

Pathogenicity of the isolate was tested by inoculation of peony shoots with a zoosporangial suspension. The isolate was first cultured on V8 juice agar plates for 6 days, then the culture plates were flooded with sterile distilled water and incubated under continuous fluorescent light irradiation for 3 days for sporulation thereafter. A sporangial suspension at 10^4 sporangia per ml was prepared by collecting the sporangia from the culture and diluting with distilled water. Young fresh leaves of a peony growing in a garden were inoculated by spraying with the sporangial suspension on 09 September 2003. The inoculated leaves were covered with plastic film bag to keep them moist for 2 nights. Disease symptoms appeared 7 days after inoculation and progressed with time. The causal fungus was re-isolated from the lesions.

When the keys and descriptions were followed for the identification of the species (Erwin et al., 1983; Erwin and Ribeiro, 1996; Ho, 1981, 1992; Ho et al., 1995; Katsura, 1972; Newhook et al., 1978; Stamps et al., 1990; Waterhouse, 1963, 1970), the isolate was identified as *P. cactorum.* Dimensions of sporangia and sex organs were consistent with the previous records (Erwin and Ribeiro, 1996). Leaf spot and blight of peony has been reported in Japan (Katsura, 1972), the United States and Canada (Erwin and Ribeiro, 1996). This is the first report of the occurrence of the disease in Korea.

The disease first occurred after the rainy days in early May 2003, continued causing damage until the end of August, and diminished with the decrease in temperature from September. The diseased plants were planted on the

Table 1. Characteristics of *Phytophthora* sp. causing leaf blight on tree peony

Organ	Characteristics
Mycelium	Hyaline, coenocytic, mature mycelium 5.0-7.5 μm thick Best growth at 30°C, no growth at 35°C or over Homothallic
Sporangium	Formed in water Ovoid to subspherical Caducous on simple sympodial sporangiophores Dimension 23.4-42.9×21.5-35.1 μm, average 35.3±4.6×26.9±3.6.0 μm l/b ratio: 1.31 Papilla approximately 3.7 μm high Pedicel approximately 2.8 μm long
Oogonium	Globose, 21.5-37.1 μm , average 29.6±4.9 μm in diameter
Oospore	Light orange brown when mature, mostly plerotic in oogonium 19.5-31.2 μm , average 25.2±4.4 μm
Antheridium	Ovoid, mostly paragynous 11.7-15.6×9.8-11.7, average 13.3±1.6×11.2±0.9 μm
Pathogenicity	Pathogenic on tree peony

north side of a 15-story apartment building. Therefore, the plants were growing tenderly due to the shade of the building. Wet weather and plant tissues may have predisposed the plants to the disease.

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