

Note

Leaf Blight of *Fatsia japonica* caused by *Phytophthora cactorum*

Byung-Soo Kim^{1*}, Yang-Sook Lim² and Jeong-Hoon Kim¹

¹Department of Horticulture, Kyungpook National University, Daegu 702-701, Korea

²Cheongdo Peach Experiment Station, Cheongdo, Gyeongbuk 714-851, Korea

(Received on March 9, 2005; Accepted on May 25, 2005)

A leaf blight caused by a species of *Phytophthora* was found on fatsia plants (*Fatsia japonica* Decne et Planch.) growing in an apartment garden in Daegu, Korea in late April to May, 2003. The species of *Phytophthora* isolated from the diseased plants produced sporangia and sex organs on V8 juice agar medium. Sporangia were papillate, ovoid to subspherical, and caducous with a pedicel. The dimensions of the sporangia were $31.2\text{-}46.8 \times 23.4\text{-}33.2 \mu\text{m}$ in range, $39.6 \pm 4.1 \times 28.3 \pm 2.8 \mu\text{m}$ in average \pm standard deviation, l/b ratio approximately 1.40, with papillae about $3.6 \mu\text{m}$ high, and pedicels $0.9\text{-}5.8 \mu\text{m}$ long. Oogonia were spherical, $25.0\text{-}32.5 \mu\text{m}$ in range with an average of $28.2 \pm 2.3 \mu\text{m}$ in diameter. Antheridia were predominantly paragynous, globose to ovoid, $8.8\text{-}13.8 \times 7.5\text{-}10.0 \mu\text{m}$ with an average of $10.9 \pm 1.2 \times 9.2 \pm 1.1 \mu\text{m}$. Oospores in the oogonia were aplerotic or plerotic, and $20.0\text{-}25.0 \mu\text{m}$ in diameter with an average of $23.5 \pm 1.5 \mu\text{m}$. Pathogenicity of the isolate was confirmed on detached leaves of fatsia. The disease was observed only in April and May of 2003 when the weather was unusually wet. It then diminished with increase of temperature in the year and did not appear again on the same plants in 2004. Thus, the fungus appeared to be a relatively weak pathogen of fatsia.

Keywords : fatsia, Japanese aralia, ornamentals, paper plant

Fatsia japonica Decne et Planch. is an indigenous ever-green distributed along the Southern coast and islands in Korea. Fatsia is often grown as a foliar ornamental in greenhouses or as an indoor plant in other areas of Korea. A leaf blight and petiole rot disease was found on young leaves of suckers of *Fatsia japonica* plants growing in an apartment garden in Daegu in May 2003. The major symptoms were blight lesions at the margins of palmate leaves and petiole rot (Fig. 1). The disease appeared in late May, then slowly diminished with increase of temperature, and disappeared in hot summer. A species of *Phytophthora* was isolated from the lesions. The isolate produced sporangia and sex organs on V8 juice agar plates and even

more sporangia formed when mycelial pieces were put in water. The sporangia formed in water 3 to 4 days after immersion were papillate, ovoid to subspherical, and caducous with a pedicel (Fig. 2A, B, C). Sporangia were $31.2\text{-}46.8 \times 23.4\text{-}33.2 \mu\text{m}$ in range, $39.6 \pm 4.1 \times 28.3 \pm 2.8 \mu\text{m}$ in average \pm standard deviation, l/b ratio approximately 1.40, with papillae about $3.6 \mu\text{m}$ high, and pedicels $0.9\text{-}5.8 \mu\text{m}$ long (Table 1). Oogonia were spherical, $25.0\text{-}32.5 \mu\text{m}$ in range with an average of $28.2 \pm 2.3 \mu\text{m}$ in diameter. Antheridia were predominantly paragynous, globose to ovoid, $8.8\text{-}13.8 \times 7.5\text{-}10.0 \mu\text{m}$ with an average of $10.9 \pm 1.2 \times 9.2 \pm 1.1 \mu\text{m}$. Occasionally a few amphigynous were also observed. Oospores in the oogonia were aplerotic or plerotic, and $20.0\text{-}25.0 \mu\text{m}$ in diameter with an average of $23.5 \pm 1.5 \mu\text{m}$ (Fig. 2D). Oospores appeared to germinate readily, so that many empty, light brown oogonia, 'ghosts', with antheridia were found.

The disease symptoms were not reproduced when the foliage of the potted plants was sprayed with a zoospore suspension and incubated in a humidity chamber made of two plastic buckets, one for bottom and the other for cover. However, pathogenicity of the *Phytophthora* isolate was confirmed by inoculation and incubation of detached leaves. Young detached leaves were placed in a plastic humidity box ($23 \times 18 \times 13 \text{ cm}$) and inoculated by pricking the leaves with a fine needle and placing mycelial plugs cut from the 7-day old culture on the abaxial side of leaves so that the sporulating side of the mycelial plugs may face the leaf surface. Water-soaking lesions appeared 4 days after inoculation around the mycelial plugs. Difficulty in reproducing the symptom seems to be associated with the relatively weak pathogenicity to fatsia of the pathogen. The disease was observed only in late April to May 2003 when the weather was unusually wet, then disappeared as the temperature increased, and never appeared thereafter in 2003 and 2004. The frequent rain and wet weather from April to May in 2003 probably predisposed the fatsia plants to the disease.

Mycelia grew best at 30°C and did not grow at 5°C and at 40°C (Fig. 3). When we followed keys and descriptions for identification of *Phytophthora* (Ho, 1981; Ho et al., 1995; Jee et al., 2000; Katsura, 1972; Newhook, 1978; Stamps et

*Corresponding author.

Phone) +82-53-950-5729, FAX) +82-53-950-5722

E-mail) bskim@knu.ac.kr



Fig. 1. Symptoms on *Fatsia japonica* plants caused by *Phytophthora cactorum*. (A) and (B), Leaf and petiole rot, (C) and (D), petiole rot.

al., 1990; Waterhouse, 1963, 1970) on the basis of the morphological characteristics observed, the isolate was identified as *Phytophthora cactorum* (Leb. and Cohn) Schroeter. A disease on *Fatsia japonica* caused by *P. cactorum* has been reported in Argentina (Erwin and Ribeiro, 1996). Occurrence of the disease has not been reported so far in Korea (Jee et al., 2000; Korean Society of Plant Pathology, 1998). Therefore, we report here the first observation of the occurrence of this disease in Korea.

References

- Erwin, D. C. and Ribeiro, O. K. 1996. *Phytophthora diseases worldwide*. APS Press. St. Paul, Minnesota, USA.
- Ho, H. H. 1981. Synoptic keys to the species of *Phytophthora*. *Mycologia* 73:705-714.
- Ho, H. H., Ahh, F. J. and Chang, H. S. 1995. The genus *Phytophthora* in Taiwan. Institute of Botany, Academia Sinica. Monograph Series 15. 86pp.
- Jee, H. J., Cho, W. D. and Kim, C. H. 2000. *Phytophthora diseases in Korea*. National Inst. Agr. Sci. Tech., RDA, Suwon, Korea.
- Katsura, K. 1972. *Phytophthora diseases of plants, Theory and Practice*. Yokendo, Tokyo, Japan.
- Korean Society of Plant Pathology. 1998. *List of plant diseases in Korea*. 3rd edition. Korean Society of Plant Pathology.
- Newhook, F. J., Waterhouse, G. M. and Stamps, D. J. 1978. Tabular key to the species of *Phytophthora* de Bary. *Mycol. Pap.* 143. Commonw. Mycol. Inst. Kew, Surrey, U.K. 20pp.
- Stamps, D. J., Waterhouse, G. M., Newhook, F. J. and Hall, G. S. 1990. Revised tabular key to the species of *Phytophthora*.

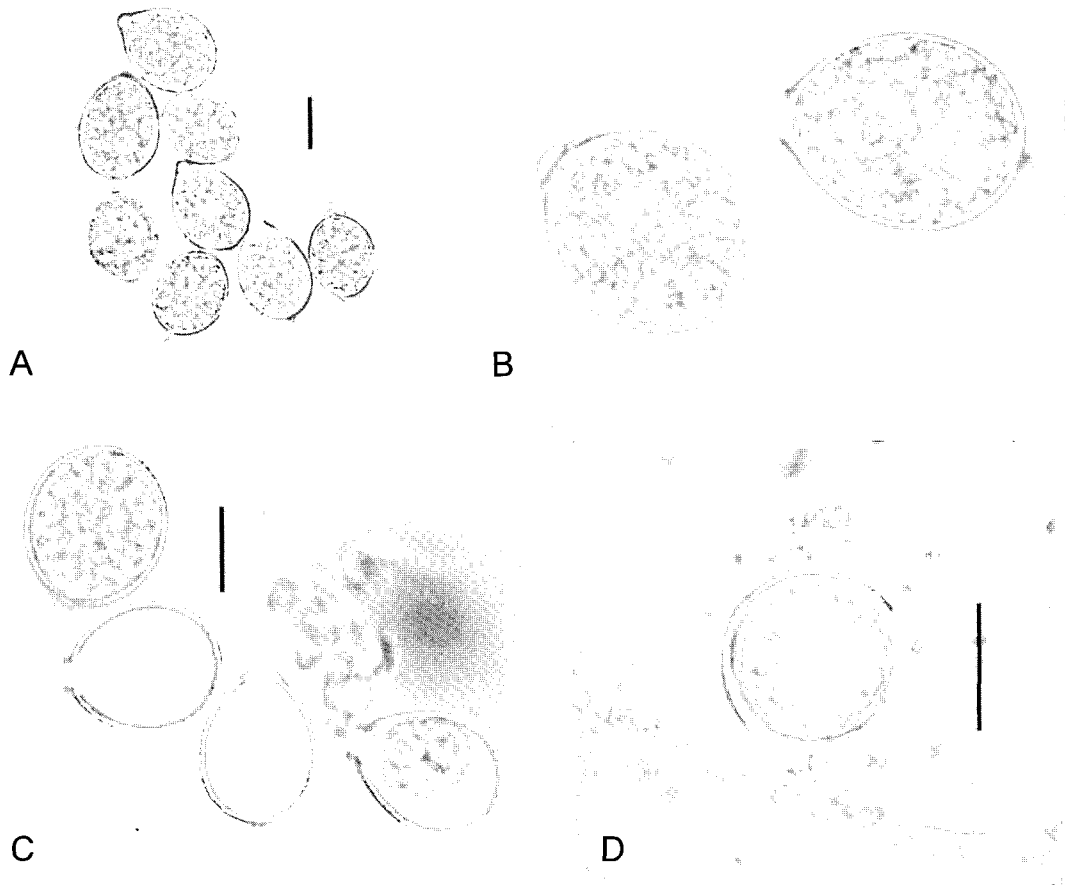


Fig. 2. Morphological characteristics of *Phytophthora cactorum* isolated from fatsia plants. (A-B), Sporangia; (C) Release of zoospores from the sporangia (indirect germination); (D) Oogonium and antheridium. Bars = 20 μm .

Table 1. Characteristics of *Phytophthora cactorum* causing leaf blight on *Fatsia japonica*

Organ	Mycological characteristics
Mycelium	Hyaline, coenocytic, mature mycelium 5.0-7.5 μm thick Best growth at 30°C, no growth at 40°C Homothallic
Sporangium	Formed both on V8 juice agar and in water Ovoid to subspherical Caducous on simple sympodial sporangiophores Dimension 31.2-46.8 \times 23.4-33.2 μm , average 39.6 \pm 4.1 \times 28.3 \pm 2.8 μm l/b ratio: 1.40 Papilla approximately 3.6 μm high Pedicel approximately 2.9 μm long
Oogonium	Globose, 25.0-32.5 μm , average 28.2 \pm 2.3 μm in diameter
Oospore	Light orange brown when mature, mostly plerotic in oogonium 20.0-25.0 μm , average 23.5 \pm 1.5 μm
Antheridium	Ovoid, mostly paragynous 8.8-13.8 \times 7.5-10.0, average 10.9 \pm 1.2 \times 9.2 \pm 1.1 μm
Pathogenicity	Pathogenic on <i>Fatsia japonica</i>

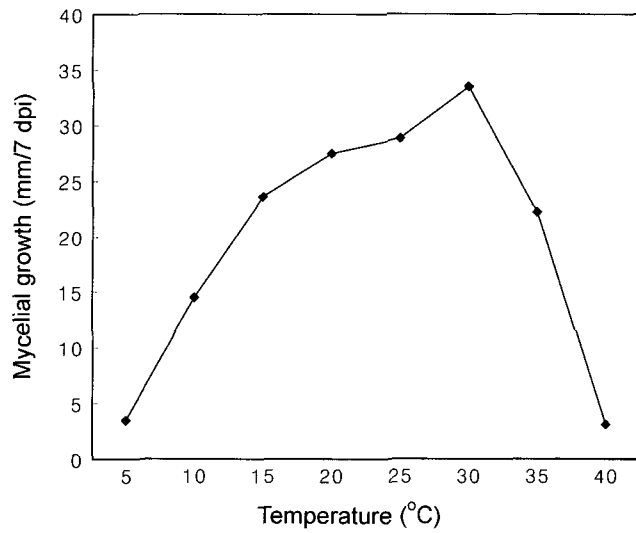


Fig. 3. Radial mycelial growth of the *Phytophthora cactorum* isolated from fatsia as influenced by temperature.

- Mycol. Pap.* 162. Commonw. Agric. Bur. Int. Mycol. Inst. Kew, Surrey, U.K. 28pp.
- Waterhouse, G. M. 1963. Key to the species of *Phytophthora* de Bary. *Mycol. Pap.* 92. Commonw. Mycol. Inst. Kew, Surrey, U.K. 22pp.
- Waterhouse, G. M. 1970. The genus *Phytophthora* de Bary. *Mycol. Pap.* 122. Commonw. Mycol. Inst. Kew, Surrey, U.K. 104pp.