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Brown Rot of Apricot and Mume Caused by *Phomopsis vexans*

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Brown rot symptoms severely occurred on fruits of apricot and mume grown in Changnyeong, Suwon and Yeongi in Korea during a disease survey in June 2002. A total of 32 isolates of *Phomopsis* sp. was obtained from the fruit rot symptoms. All isolates were identified as *Phomopsis vexans* based on their morphological and cultural characteristics. Four isolates of the fungus were tested for pathogenicity to fruits of apricot and mume by artificial inoculation. All isolates induced brown rot symptoms on the fruits of apricot and mume by wound inoculation. Unwounded inoculation also induced symptoms on mume fruits but not on apricot fruits. The symptoms on the fruits induced by artificial inoculation were similar to those observed in the orchard. The pathogenicity tests revealed that mume was more susceptible to the pathogen than apricot. This is the first report of brown rot of apricot and mume caused by *P. vexans*.

Keywords : apricot, brown rot, mume, pathogenicity, *Phomopsis vexans*

Apricot (*Prunus armeniaca* L.) and mume (*Prunus mume* Sieb. & Zucc.) are grown in the temperate regions. In Korea, the trees are cultivated in the garden or orchard, and their fruits are mainly used as ingredients for beverages or alcoholic drinks. Brown rot symptoms were frequently observed on fruits of apricot and mume trees grown in Changnyeong, Suwon and Yeongi in Korea during a disease survey in June 2002. The symptoms appeared as circular to irregular brown spots on fruits of the trees at the early stage. Lesions turned sunken, had dark brown discoloration, and became irregularly enlarged up to 1.0-2.5 cm at the later stage of the disease development (Fig. 1A and C). Severely diseased fruits became completely rotten and dried (Fig. 1B and D), and readily fell. Incidence of the disease reached up to 40% infected fruits in four orchards investigated.

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A total of 32 isolates of *Phomopsis* sp. was obtained from fruit rot symptoms of apricot and mume. Pycnidia on the symptoms were black, globose to irregular with ostioles, and measured 220-650 × 180-360 μm. Conidiophores were hyaline, simple or branched, sometimes septate, and measured 10-20 × 1-3 μm. Alpha-conidia were hyaline, fusoid to illipsoidal, mostly two-guttulate, and measured 5-9 × 2-3 μm. Beta-conidia were hyaline, filiform, curved, rarely straight, and measured 12.5-32.5 × 0.6-1.2 μm. Colonies on potato dextrose agar (PDA) consisted of white to gray floccose aerial mycelium with numerous pycnidia scattered irregularly on the medium. All isolates were identified as *Phomopsis vexans* (Sacc. & Syd.) Harter based on morphological and cultural characteristics (Fig. 2 and Table 1). The morphological characteristics of *P. vexans* examined by the authors were consistent with those described by previous workers (Bello and Sisterna, 2000; Punithalingam and Holliday, 1972).

Four isolates of *P. vexans* were tested for pathogenicity to fruits of apricot and mume by artificial inoculation with conidial suspensions (3-4 × 10^6 conidia/ml) prepared from 20-day-old PDA cultures. The fruits of apricot and mume used for pathogenicity tests were surface-sterilized with 1% sodium hypochlorite for 3 minutes and washed in sterile distilled water three times. Inoculation was made by dropping 20 μl of conidial suspension on the fruits unwounded and wounded 1-2 mm deep at five close points using a pin. The same quantity of sterile distilled water was used for the control fruits. The inoculated fruits were placed in a humid plastic box (30 × 24 × 9 cm) at 26°C. Disease rating was made based on the degree of rot symptoms induced 8 days after inoculation. The inoculation test was performed with three replicates. All the tested isolates of *P. vexans* induced brown rot symptoms on the fruits of apricot and mume by wound inoculation (Table 2). Unwounded inoculation also induced symptoms on mume fruits but not on apricot fruits. The symptoms on the fruits induced by artificial inoculation were similar to those observed in the orchard (Fig. 1E-G). The isolates which induced symptoms on the fruits were re-isolated from the symptoms. The pathogenicity tests revealed that mume was more susceptible to the pathogen than

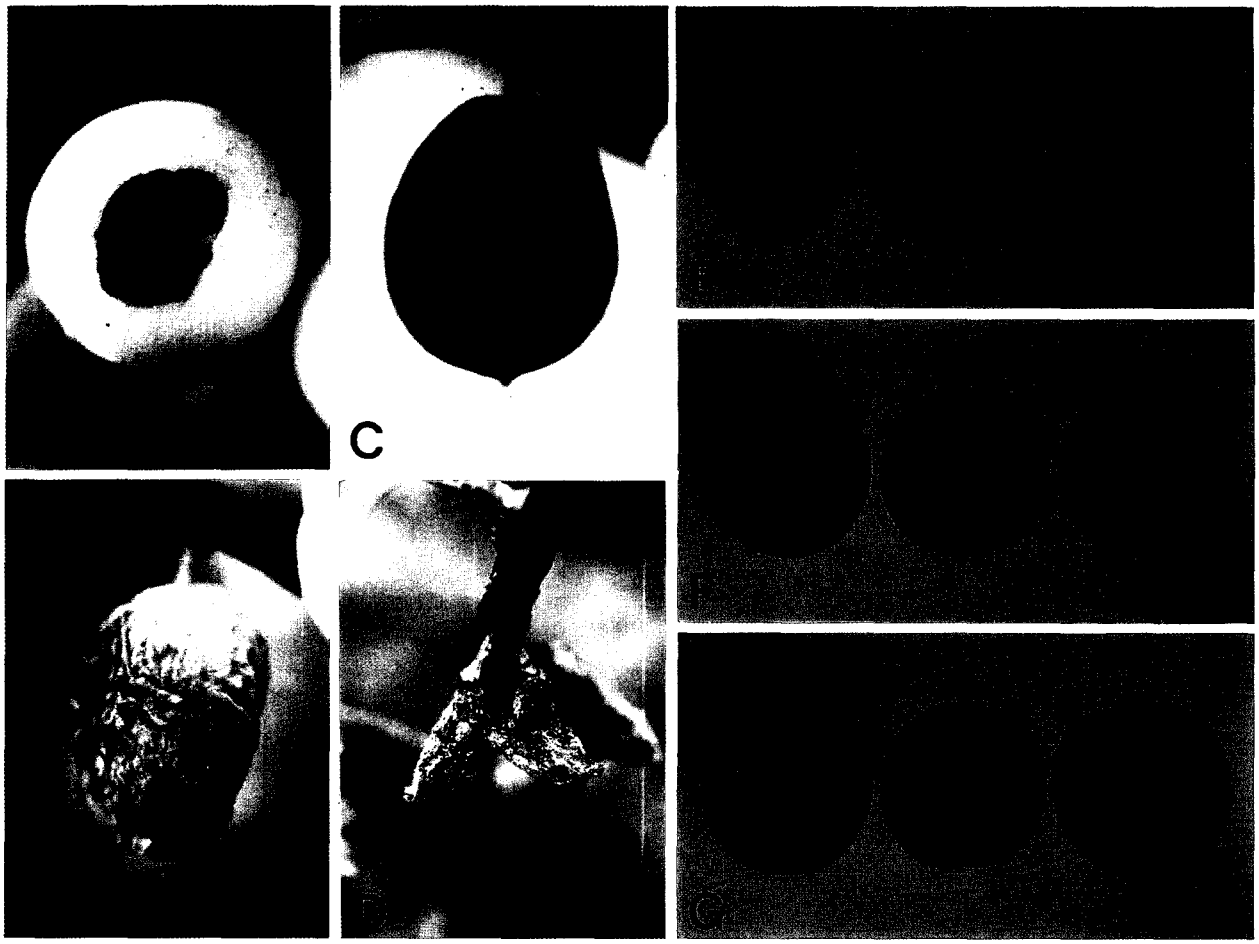

Fig. 1. Brown rot symptoms of apricot and mume in the orchard (**A-D**) and the disease symptoms induced by artificial inoculation with *Phomopsis vexans* isolates (**E-G**). A and B, lesions on apricot fruits; C and D, lesions on mume fruits; E and F, lesions on apricot and mume fruits 8 days after wound inoculation; G, lesions on mume fruits 8 days after unwounded inoculation.

Table 1. Morphological characteristics of *Phomopsis vexans* isolated from fruits of apricot and mume

Characteristics		Present isolates	Bello and Sisterna (2000)	Punithalingam and Holliday (1972)
Pycnidia	Shape	Black, globose to irregular with ostioles	Black, globose to irregular	Black, globose to irregular with ostioles
	Size (μm)	220-650 × 180-360	Up to 300	Up to 350 μm wide
Conidiophores	Shape	Hyaline, simple or branched, sometimes septate	–[a]	Hyaline, simple or branched, sometimes septate
	Size (μm)	10.0-20.0 × 1.0-3.0	–	10-16 μm long
Alpha-conidia	Shape	Hyaline, fusoid to ellipsoidal, two-guttulate, rarely three-guttulate	One-celled, hyaline, ellipsoidal	Fusoid to ellipsoidal, two-guttulate, rarely three-guttulate
	Size (μm)	5.0-9.0 × 2.0-3.0	4.5-10.3 × 1.8-2.1	5.0-9.0 × 2.0-2.5
Beta-conidia	Shape	Hyaline, filiform, curved, rarely straight	One-celled, hyaline, filiform, straight or curved	Hyaline, filiform, curved, rarely erect
	Size (μm)	12.5-32.5 × 0.6-1.2	16.8-27.5 × 1.0	20.0-30.0 × 0.5-1.0

[a] – = Not described.

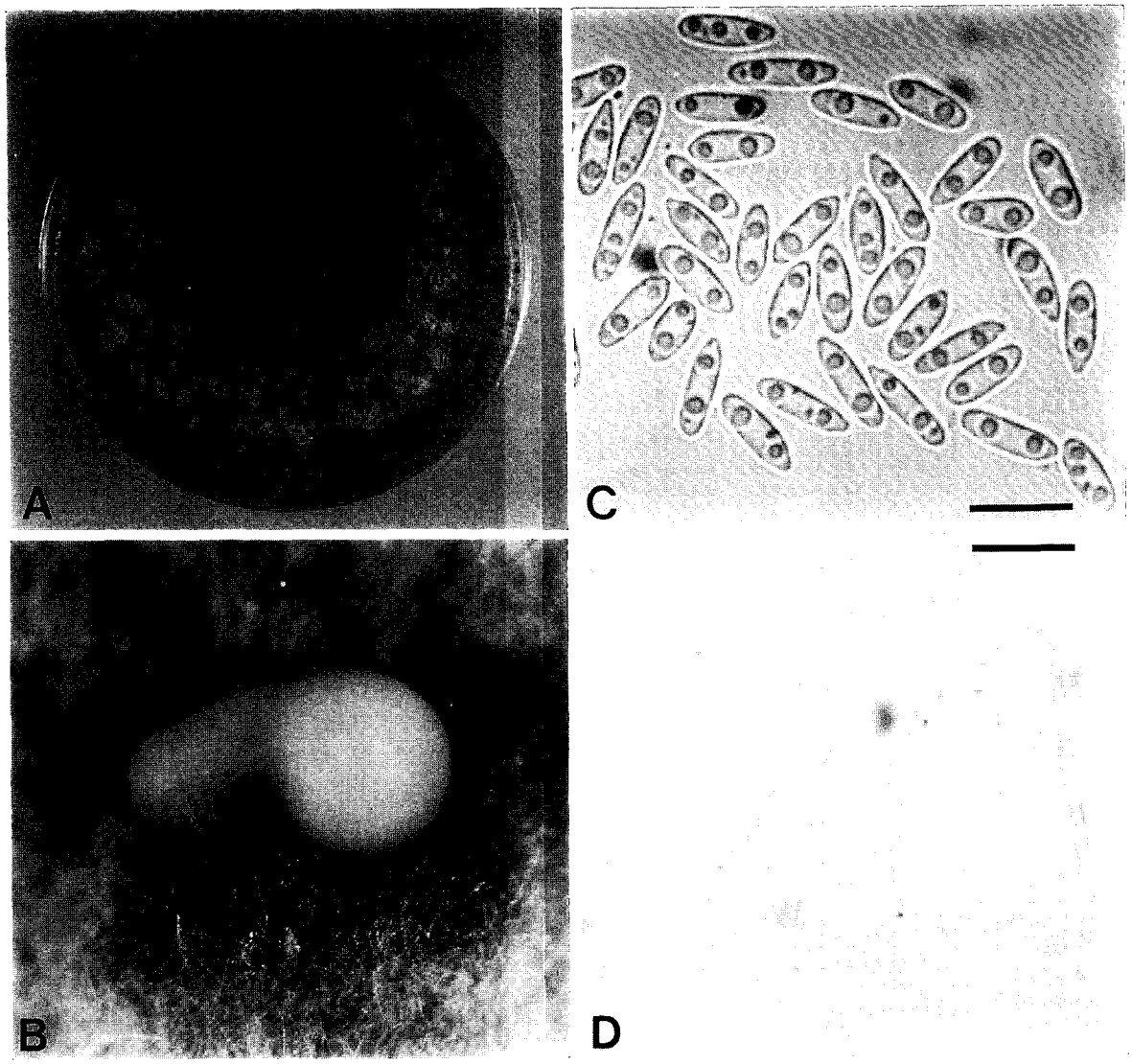

Fig. 2. Morphological and cultural features of *Phomopsis vexans* isolated from fruits of apricot and mume. **A**, a 15-day-old colony on PDA at 26°C under alternating cycles of 12 hour NUV light and 12 hour darkness; **B**, a conidial mass discharged from a pycnidium in PDA culture; **C**, α-conidia (scale bar = 8 μm); **D**, β-conidia (scale bar = 8 μm).

Table 2. Pathogenicity of *Phomopsis vexans* isolates to fruits of apricot and mume by artificial inoculation

Isolate	Virulence of isolates			
	Apricot		Mume	
	Wounded	Unwounded	Wounded	Unwounded
PC02-67	+[a]	–	++	+
PC02-89	+	–	++	+
PC02-96	+	–	++	+
PC02-101	+	–	++	+
Control	–	–	–	–

[a] Disease severity was rated 8 days after inoculation. ++ = above 11 mm of lesion diameter; + = 5-10 of lesion diameter; – = no symptom.

apricot.

A preliminary study on the disease occurrence and identification of the disease pathogen was previously reported by the present authors (Kim et al., 2002). *P. vexans* was reported to cause blight on leaves and twigs of apricot (Bello and Sisterna, 2000), as well as fruit rot or leaf spot of eggplant (Farr et al., 1989; Punithalingam and Holliday, 1972). Brown rot of apricot caused by *Phomopsis* sp. has been previously reported in Korea (Ryu et al., 1993). *Phomopsis perniciosa* Growe has also been found to cause fruit rot and branch canker of apricot (Garic and Arsenijevic, 1990). The fungus has narrower α-conidia and wider β-conidia as compared to the conidial size of *P. vexans*. Thus, *P. perniciosa* is considered to be another

pathogen of apricot different from *P. vexans*. There has been no report on brown rot of mume. This study is the first report of *P. vexans* causing brown rot on fruits of apricot and mume.

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