

Note

## Occurrence of Anthracnose on Peach Tree Caused by *Colletotrichum* Species

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(Received on January 7, 2007; Accepted on February 22, 2008)

Anthracnose symptoms were frequently observed on fruits of peach trees grown in Yeongi in Korea during disease survey in August from 2000 to 2005. The disease incidence was as high as 40% at its maximum in the orchards investigated. A total of 24 isolates of *Colletotrichum* species were obtained from the anthracnose symptoms, out of which 20 were identified as *Colletotrichum gloeosporioides* and the four remaining ones as *C. acutatum* based on their morphological and cultural characteristics. Two isolates of each *C. gloeosporioides* and *C. acutatum* caused anthracnose symptoms on the fruits by both wound and unwound inoculation, which were similar to those observed in the orchard. The symptoms appeared more rapidly by the wound inoculation than by the unwound inoculation. There was no difference in pathogenicity between the *C. gloeosporioides* and *C. acutatum* isolates tested. In Korea, only *C. gloeosporioides* has been recorded as the causal fungus of anthracnose of peach tree. This is the first report that *C. acutatum* also causes anthracnose of peach tree in Korea.

**Keywords :** anthracnose, *Colletotrichum acutatum*, *Colletotrichum gloeosporioides*, fruit, pathogenicity, peach tree

Peach tree [*Prunus persica* (L.) Batsch] is widely grown in the world. In Korea, peach tree is mostly cultivated in the central regions as one of the economic fruit trees. Peach fruits are mostly harvested in August in these regions. Anthracnose symptoms were frequently observed on fruits of peach trees grown in Yeongi in Korea during disease survey in August from 2000 to 2005. The symptoms appeared as sunken, circular, brown necrotic spots on the fruits at the early stages (Fig. 1A and 1B). Lesions turned into dark brown discoloration with concentric zones and enlarged at the later stages of the disease development (Fig. 1C and 1D). Orange conidial masses were produced on the lesions. Incidence of the disease reached up to 40% of infected fruits in the orchards investigated.

A total of 24 isolates of *Colletotrichum* species were

obtained from anthracnose symptoms on the peach fruits. Morphological and cultural characteristics of the isolates were examined for their identification. Of the 24 isolates, 20 were identified as *Colletotrichum gloeosporioides* (Penz.) Penz. & Sacc., and the four remaining ones as *C. acutatum* Simmonds ex Simmonds. The morphological characteristics of *C. gloeosporioides* and *C. acutatum* examined by the authors were similar to those described by Sutton (1992) (Table 1).

Colonies of *C. gloeosporioides* on potato dextrose agar (PDA) consisted of gray to dark gray aerial mycelium in tufts (Fig. 2A). Conidia of the fungus were straight, cylindrical, apex obtuse, base truncate (Fig. 2B) and measured 12.0-20.0×4.0-6.0 μm. Appressoria of the fungus were brown to dark brown, ovate, obovate, clavate, sometimes lobed (Fig. 2C) and measured 7.5-20.0×6.0-10.0 μm.

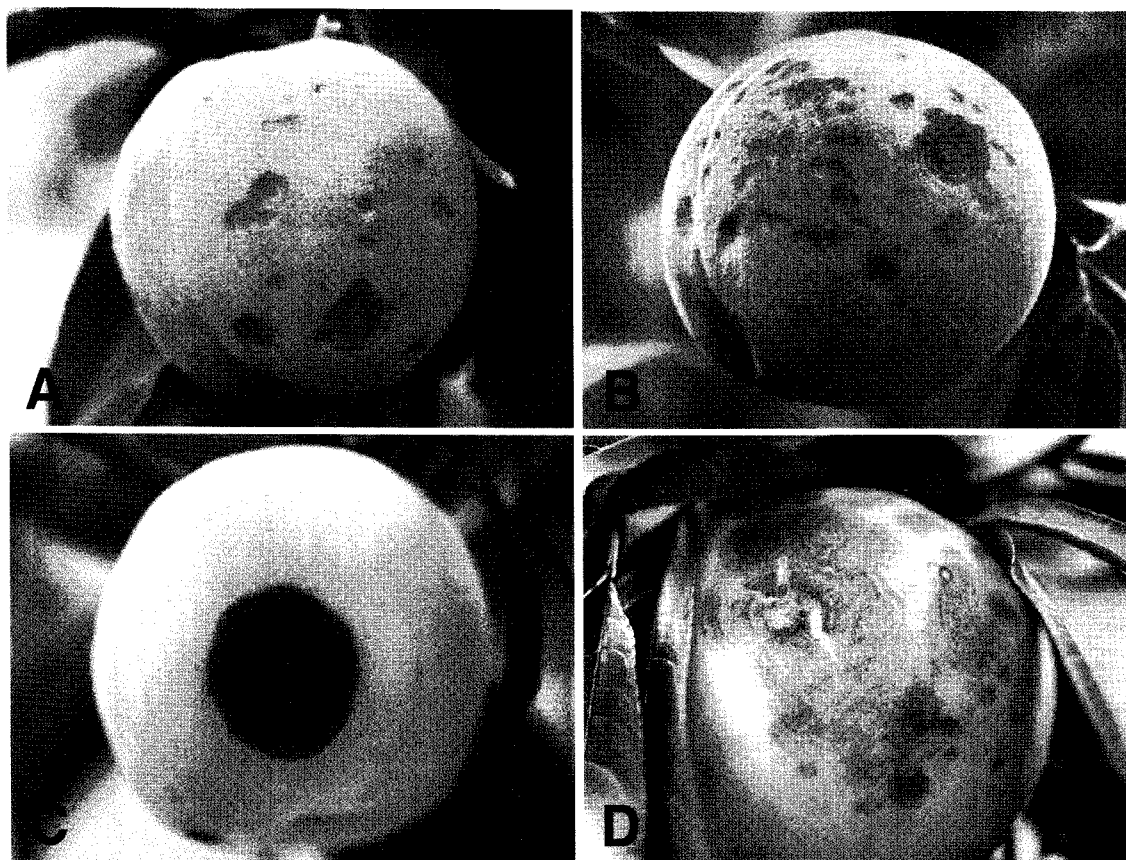
Colonies of *C. acutatum* on PDA were pale to dark gray, and orange conidial masses were scattered on the surface of cultures (Fig. 2D). Conidia of the fungus were straight, fusiform, abruptly tapered at each end (Fig. 2E) and measured 9.5-18.0×3.0-5.0 μm. Appressoria were pale to dark brown, ovate to clavate, slightly irregular or lobed (Fig. 2F) and measured 6.5-12.5×5.0-8.0 μm.

Two isolates of each *C. gloeosporioides* and *C. acutatum* were tested for pathogenicity on peach fruits (cultivar Yumyeong) by artificial inoculation with conidial suspensions (3-4×10<sup>6</sup> conidia/ml) prepared from 20-day-old PDA cultures. Inoculation was made by dropping 20 μl of conidial suspension on the peach fruits unwounded or wounded 1-2 mm deep at five close points using a pin. The same quantity of sterile distilled water was used as the control. 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 on the fruits five days after inoculation. The inoculation test was performed with three replicates.

All the tested isolates of *C. gloeosporioides* and *C. acutatum* induced anthracnose symptoms on the peach fruits by both wound and unwound inoculation (Table 2). The symptoms appeared more rapidly by the wound inoculation than by the unwound inoculation. There was no difference in pathogenicity between *C. gloeosporioides* and

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**Fig. 1.** Anthracnose symptoms on peach fruits observed in the orchard. A and B, scattered lesions on fruits at the early stages; C, an enlarged lesion with concentric zones; D, combined lesions at the late stages.

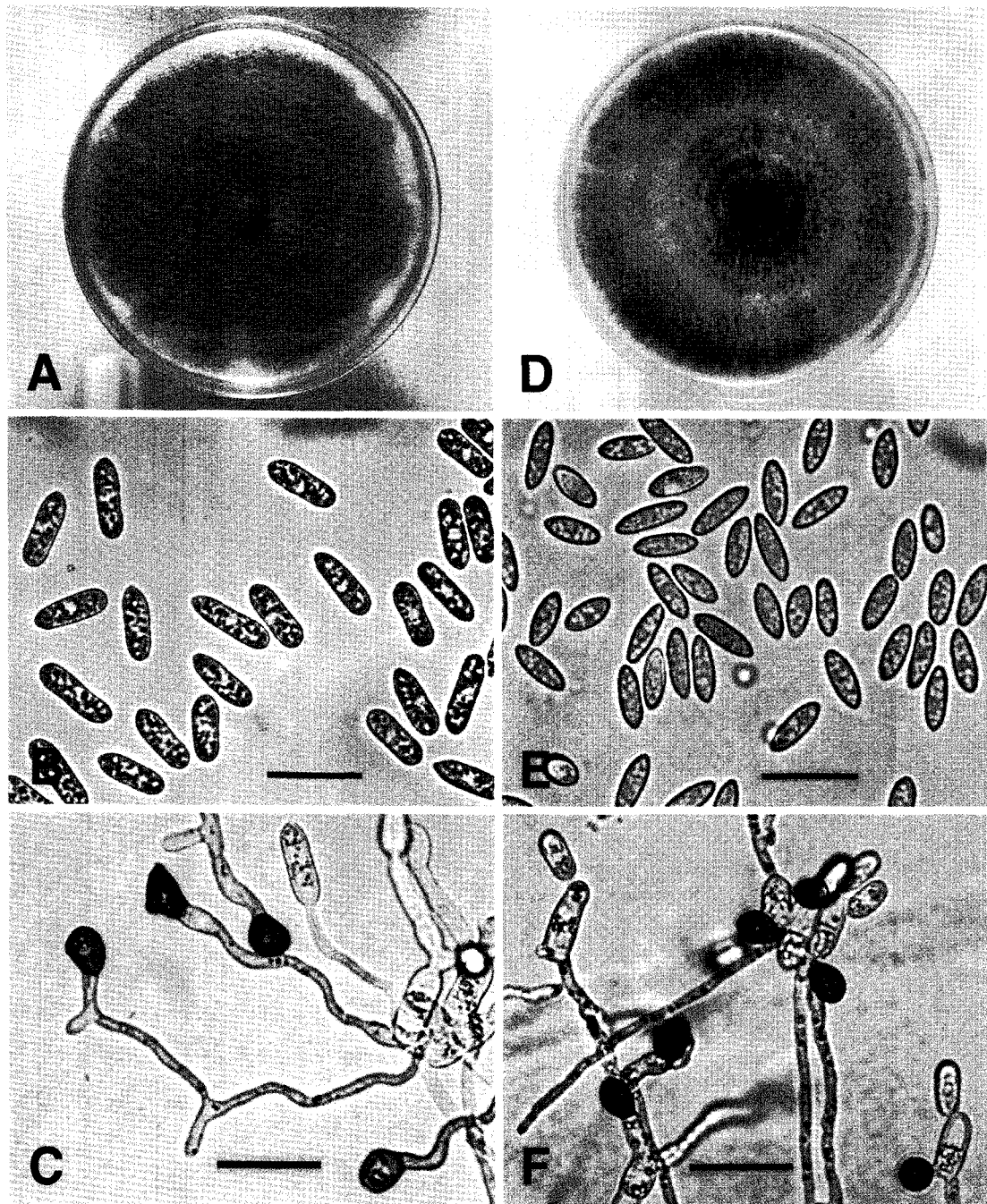
**Table 1.** Morphological characteristics of *Colletotrichum gloeosporioides* and *C. acutatum* isolated from peach fruits

<i>Colletotrichum</i> species	Structure	Characteristics		
		Present isolates	Sutton (1992)	
<i>C. gloeosporioides</i>	Conidium	Shape	Straight, cylindrical, apex obtuse, base truncate	Straight, cylindrical, apex obtuse, base truncate
		Size ( $\mu\text{m}$ )	12.0-20.0 $\times$ 4.0-6.0	12.0-17.0 $\times$ 3.5-6.0
	Appressorium	Shape	Brown to dark brown, ovate, obovate, clavate, sometimes lobed	Sepia brown, ovate, obovate, clavate, sometimes lobed
		Size ( $\mu\text{m}$ )	7.5-20.0 $\times$ 6.0-10.0	6.0-20.0 $\times$ 4.0-12.0
<i>C. acutatum</i>	Conidium	Shape	Straight, fusiform, abruptly tapered at each end	Straight, fusiform, abruptly tapered at each end
		Size ( $\mu\text{m}$ )	9.5-18.0 $\times$ 3.0-5.0	8.5-16.5 $\times$ 2.5-4.0
	Appressorium	Shape	Pale to dark brown, ovate to clavate, slightly irregular or lobed	Pale to dark brown, ovate to obovate, clavate, slightly irregular or lobed
		Size ( $\mu\text{m}$ )	6.5-12.5 $\times$ 5.0-8.0	8.5-10.0 $\times$ 4.5-6.0

*C. acutatum* isolates tested. The symptoms on the fruits induced by the artificial inoculation were similar to those observed in the orchard. The two *Colletotrichum* species which induced symptoms on the fruits could be re-isolated

from the symptoms.

*C. gloeosporioides* [teleomorph: *Glomerella cingulata* (Stonem.) Spauld. & Schrenk] is recorded as a causal fungus of anthracnose of peach tree (Cho and Shin, 2004;



**Fig. 2.** Morphological and cultural features of *Colletotrichum gloeosporioides* (A-C) and *C. acutatum* (D-F) isolated from peach fruits. A and D, 20-day-old colonies grown on PDA at 24°C under alternating cycles of 12 h NUV light and 12 h darkness; B and E, conidia (scale bar=20 µm); C and F, appressoria (scale bar=20 µm).

Farr et al., 1989; Ogawa et al., 1995; The Phytopathological Society of Japan, 2000). *Gloeosporium laeticolor* Berk. is also recorded as a causal fungus of the disease (Cho and Shin, 2004; Ogawa et al., 1995; The Phytopathological Society of Japan, 2000). However, this fungus was proved to be a synonym of *C. gloeosporioides* (Arx, 1957; Arx,

1970). Ogawa et al. (1995) reported that *C. gloeosporioides* and *C. acutatum* cause anthracnose of peach tree. In Korea, only *C. gloeosporioides* has been recorded as the causal fungus of anthracnose of peach tree (Cho and Shin, 2004). This is the first report that *C. acutatum* also causes anthracnose of peach tree in Korea.

**Table 2.** Pathogenicity of *Colletotrichum gloeosporioides* and *C. acutatum* isolates on peach fruits by artificial inoculation

<i>Colletotrichum</i> species	Isolate	Lesion diameter (mm) <sup>a</sup> on peach fruits after inoculation	
		Wounded	Unwounded
<i>C. gloeosporioides</i>	C00-32	15.7a±1.5	15.0a±1.7
<i>C. gloeosporioides</i>	C00-38	22.3a±6.4	13.3a±1.5
<i>C. acutatum</i>	C05-03	16.0a±2.6	9.7a±4.0
<i>C. acutatum</i>	C05-06	19.0a±4.4	11.0a±3.0
Control		–	–

<sup>a</sup>Lesion diameter was measured five days after inoculation. The data represent means±standard deviations of three replicates. In a column, means followed by a common letter are not significantly different at the 5% level by DMRT. – = no symptom.

### Acknowledgements

This study was supported by the National Institute of Agricultural Science and Technology, RDA, Republic of Korea.

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