Mycobiology 30(1): 57-59 (2002)

Anthracnose of May Lily Caused by *Colletotrichum liliacearum*

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(Received January 2, 2002)

Anthracnose symptoms severely occurred up to 100% on leaves of May lily grown in four locations in Korea during a disease survey in 2001. The symptoms appeared as circular to irregular spots with brown to dark brown discoloration on leaves of the plant, and severely infected leaves blighted. A total of 35 isolates of *Colletotrichum* sp. was obtained from the spotted lesions and identified as *Colletotrichum liliacearum* based on the morphological and cultural characteristics. Leaf spots similar to the original anthracnose symptoms were induced on the host leaves by artificial inoculation with the isolates of the fungus. This is the first report that *C. liliacearum* causes anthracnose of May lily.

KEYWORS: Anthracnose, *Colletotrichum liliacearum*, May lily

May lily (*Convallaria keiskei* Miq.) is a native flowering plant of Korea and assumed to be distributed in the other countries of Asia. The plant has been grown in open fields or greenhouses in Korea. In 2001, severe outbreaks of anthracnose symptoms on leaves of the plant were observed in the open fields in Gapyeong, Yangpyeong, Pyeongchang and Hamyang areas during a disease survey. Incidence of the disease on the host plants in the surveyed locations ranged from 30 to 100%.

The symptoms appeared as circular to irregular, small spots with brown to dark brown discoloration on leaves of the plant at the early stage (Fig. 1A). Yellowish haloes often formed at the margins of the lesions. As the disease developed, the spotted lesions irregularly enlarged with dark brown to black discoloration at the margin or center of the leaves and coalesced at the late stage (Fig. 1B and C). Sometimes concentric spots with dot-like acervuli developed in the lesions. Severely infected leaves blighted with discoloration, and the diseased plants died (Fig. 1D and E). A preliminary study on the disease occurrence was previously reported (Kim *et al.*, 2001).

A total of 35 monoconidial isolates of *Colletotrichum* sp. was obtained from the spotted lesions on leaves of May lily. All the isolates were identified as *Colletotrichum liliacearum* Ferr. based on the morphological and cultural characteristics (Table 1 and Fig. 2). Colonies grown on potato dextrose agar (PDA) formed gray mycelium and dark stromata with conidial masses shown as concentric circles (Fig. 2A). Setae produced in PDA culture were dark brown to black, 1~4 septate and measured 42~174 × 4~6 μm (Fig. 2B). Conidia were hyaline, aseptate, falcate, fusiform, tapered gradually to each end and measured 14~24 × 3~4 μm (Fig. 2C). Appressoria were dark brown to black, mostly lobed, rarely circular to clavate and measured 6~19 × 5~10 μm (Fig. 2D). The morphological and cultural characteristics of the isolates were similar to those described by Sutton (1992).

Isolates of the fungus, C01-01, C01-11, C01-13 and C01-25 which originated from Gapyeong, Yangpyeong, Pyeongchang and Hamyang, respectively, were used for pathogenicity tests to healthy plants of May lily. Conidial suspensions (2~3 × 10^6 conidia/m*l*) were prepared from 20 to 30-day-old PDA cultures of each isolate. Twenty milliliter of each conidial suspension was sprayed onto the May lily plants. Control plants were treated with sterile distilled water. The plants were placed in dew chambers with 100% relative humidity at 26°C for two days, then moved into the greenhouse. The inoculation test was performed in three replicates. All the isolates induced anthracnose symptoms on the host leaves similar to those observed in the fields within 15 days after inoculation. The fungus was re-isolated from lesions on the leaves of the plants artificially inoculated.

There has been no detailed report that *C. liliacearum* causes anthracnose of May lily although the fungus was recorded as a pathogen of the plant in China (Tai, 1979). *C. lilii* Plakidas ex Boerema and Hamers was proposed as a causal fungus of black scale of lily bulbs (Plakidas, 1944) and recognized as a species distinct from other *Colletotrichum* spp. (Boerema and Hamers, 1988). *C. liliacearum* and *C. lilii* were referred to the same species and as synonyms of *C. dematium* (Pers. : Fr.) Grove (Arx, 1957). However, Sutton (1992) described that *C. liliacearum* is the distinct and first available name although Sobers and Plakidas (1962) suggested that the non-pathogenic forms be placed in *C. liliacearum* and the pathogenic ones in *C. lilii.* Consequently the present isolates from leaves of May lily correspond to *C. liliacearum* based on the Sutton's description (1992).

Farr *et al.* (1989) recorded *C. dematium* and *Gloeospo-*

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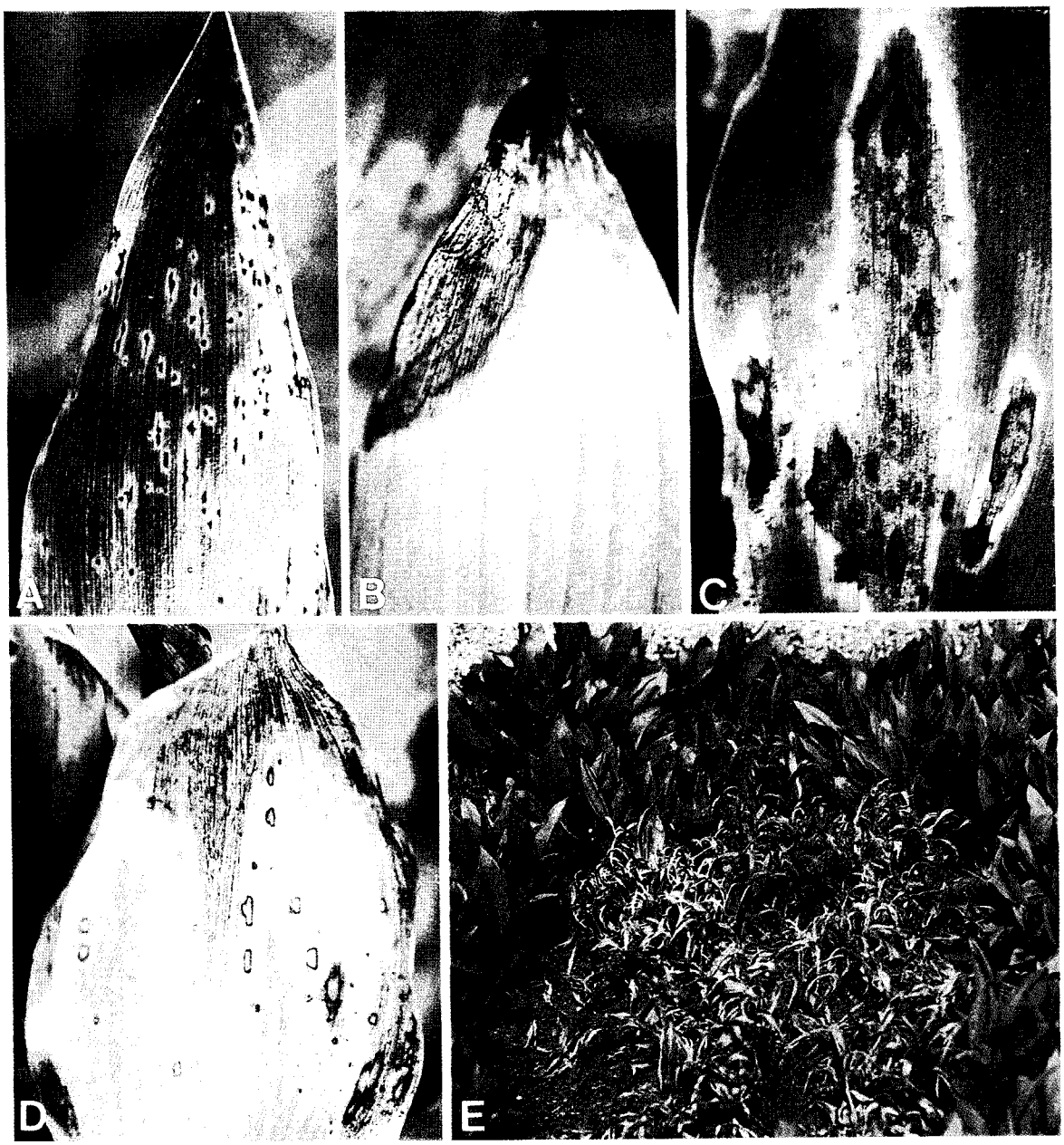

Fig. 1. Symptoms of anthracnose on leaves of May lily in the field. A, circular to irregular, small spots on the leaf at the early stage; B and C, irregularly enlarged lesions with dark brown to black discoloration at the margin or center of the leaf at the late stage; D, a severely infected leaf; E, severely diseased plants showing blight.

rium convallariae Allesh. as anthracnose fungi of lily-of-the-valley (*Convallaria majalis* L.). It has been reported that *C. dematium* is different from *C. liliacearum* in morphological and pathological characteristics (Sutton, 1992), and *G. convallariae* is an indistinct name in a taxonomical rank (Arx, 1957; Farr *et al.*, 1989). The present study

Table 1. Morphological characteristics of *Colletotrichum liliacearum* isolated from leaves of May lily

Source of isolates	Shape and size (μm) of structures		
	Conidium	Appressorium	Seta
The present study	Falcate, fusiform, tapered gradually to each end, 14~24 × 3~4	Dark brown to black, mostly lobed, rarely circular to clavate, 6~19 × 5~10	Dark brown to black, 1~4 septate, 42~174 × 4~6
Sutton (1992)	Falcate, fusiform, tapered gradually to each end, 13~23 × 3.5~5.0	Not described	Present and abundant

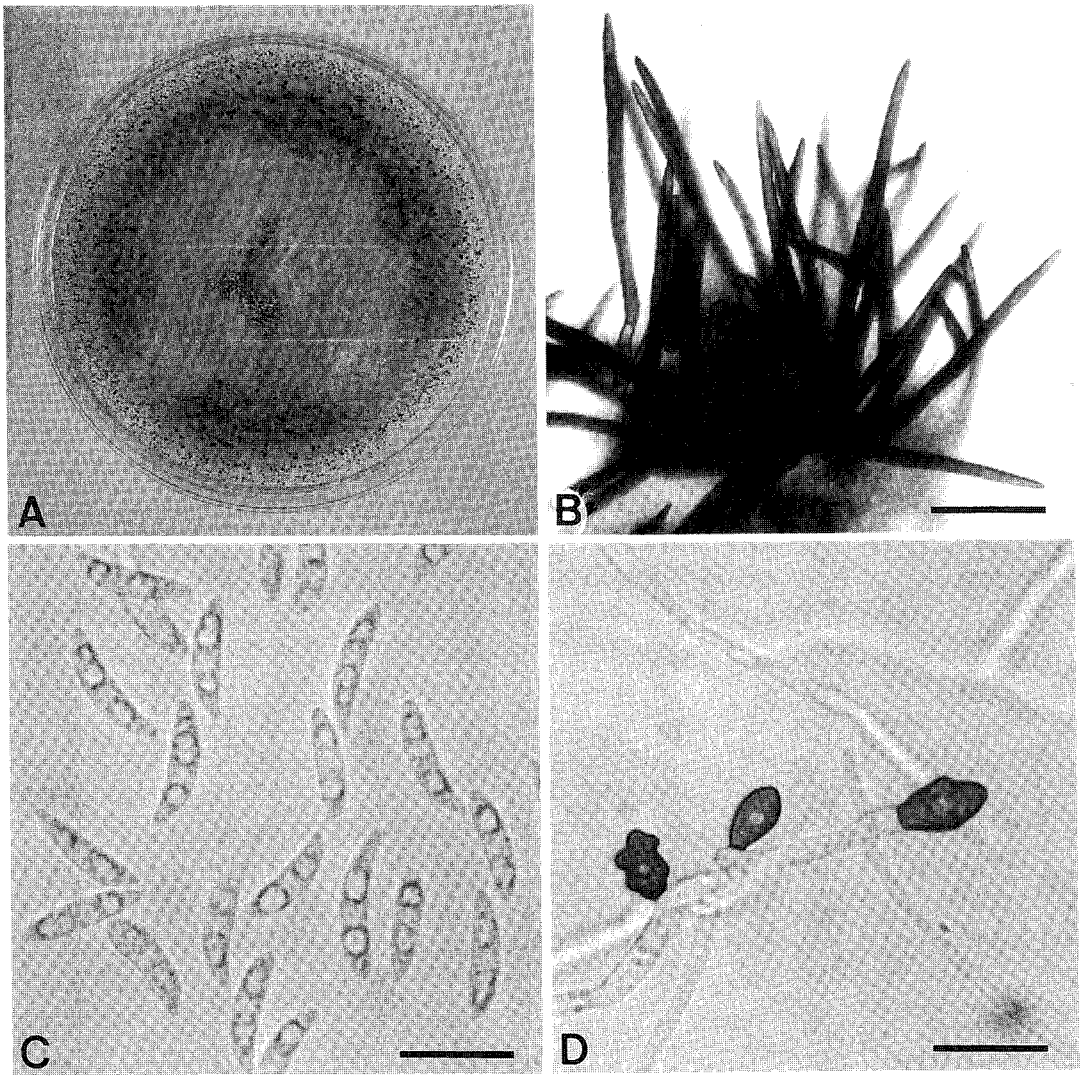

Fig. 2. Morphological and cultural features of *Colletotrichum liliacearum* isolated from leaves of May lily. A, a 20-day-old colony on PDA at 26°C under alternating cycles of 12 hr NUV light and 12 hr darkness; B, setae produced in PDA culture (scale bar = 30 μm); C, conidia (scale bar = 15 μm); D, appressoria (scale bar = 15 μm).

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