Mycobiology 29(4): 227-229 (2001)

Occurrence of Gray Mold Caused by *Botrytis cinerea* on *Cryptotaenia japonica* in Korea

Seog-Won Chang*, Sung-Kee Kim, Eun-Sup Yi and Jin-Won Kim[1]

Northern Agricultural Research Station, Gyeonggido Agriculture Research and Extension Services, Yonchon 486-833, Korea
[1]Department of Environmental Horticulture, The University of Seoul, Seoul 130-743, Korea

A gray mold disease occurred on *Cryptotaenia japonica* in Korea. All the isolates of *Botrytis* sp. from the lesions of the diseased plants were identified to be *B. cinerea* based on the morphological characteristics. Conidia formed on conidiogenous cells were not in chains, hyaline to pale brown, unicellular, ellipsoidal to obovate with a single hilum at the base, entirely verruculose, and 6.3-11.3~6.3-10.0 μm in size. Pathogenicity of the fungus was proved by artificial inoculation on *C. japonica*. This is the first record of gray mold on *C. japonica* caused by *B. cinerea* in Korea.

KEYWORDS: ***Botrytis cinerea*, *Cryptotaenia japonica*, Gray mold**

Cryptotaenia japonica Hassk. is a vegetable plant belonging to the family Umbelliferaeceae. The plants are used as salads in Korea. In Korea, diseases causing damages to *C. japonica* were reported to be witches'-broom caused by Phytoplasma, rust caused by *Puccinia pimpinellae-brachycarpa* and *P. tokyensis*, and *Sclerotinia* rot caused by *Sclerotinia sclerotiorum* (The Korean Society of Plant Pathology, 1998). In March 2001, a fungal disease with gray mold on leaves and petioles of *C. japonica* was observed in Namyangju, Yangpyung, and Yonchon areas of Korea. A fungus isolated repeatedly from the diseased plants was identified as *Botrytis* sp. However, gray mold caused by *Botrytis* sp. on *C. japonica* was not yet reported in Korea. The gray mold caused by *Botrytis* sp. on *C. japonica* may be a potential threat to the plants under environmental conditions favorable for the disease. It was because *C. japonica* is usually cultivated in vinylhouse condition. Therefore, the purpose of this study was to identify the causal organism and to examine its pathogenicity on *C. japonica*.

Symptoms of gray mold on *C. japonica* usually developed on leaf margins (Fig. 1A). Water-soaked and irregularly shaped lesions initially appeared on infected tissues. The lesions were gradually enlarged and coalesced. The lesions turned brown and dried outward from the center, resulting in rot or blight of the leaves, or other infected organs. Plants with numerous lesions rapidly withered that led to death. Gray to grayish brown, velvety molds with numerous dry spores often appeared on the lesions under moist conditions.

Color of colonies on potato dextrose agar (PDA) was gray or grayish brown (Fig. 1B). When three isolates of this fungus were cultured on PDA in the darkness, they grew well with optimum temperatures at 20~25°C (Fig. 2). This result agreed with the observations of Okada and Kusakari (2000) who showed that *B. cinerea* isolates isolated from *C. japonica* grew with an optimum temperature at 23°C. Sclerotia were black in color. Production, size and shape of sclerotia on natural substrate and in culture were extremely variable. In culture, some strains formed no sclerotia while others strains abundantly formed (Fig. 1B). The conidiophores were mononematous with 2~4 branches in upper parts, with somewhat swollen conidiogenous cells located on the distal ends of the branches, often proliferating from the polyblastic and brown cells. The conidia were formed on conidiogenous cells, not in chains, hyaline to pale brown, unicellular, ellipsoid to obovate with a single hilum at the bases, entirely verruclose and 6.3~11.3×6.3~10.0 μm in size (Fig. 1C). The morphological characteristics of *B. cinerea* examined were very similar to those reported by previous workers (Ellis, 1971; Okada and Kusakari, 2000). *B. cinerea* is distinguished from other species by the conidial size. Conidia of *B. cinerea* usually have a length:width ratio of 1.0~1.5:1. In other species, conidia have approximately 2.0~3.0:1 ratio. Conidia of *B. cinerea* are somewhat smaller than those of other species (Table 1). Those observations confirmed that the causal organism of gray mold on *C. japonica* was *B. cinerea*.

To prove the pathogenicity of the fungus, single conid-

Table 1. Conidial size of isolated *Botrytis cinerea* in comparison with those of published descriptions of *Botrytis* spp.

Isolate	Conidial size (μm)
B-21017	6.3~11.3×6.3~10.0
Botrytis cinerea[a]	6~18×4~11 (mostly 8~14×6~9)
B. elliptica[a]	16~35×10~24 (mostly 20~30×13~18)
B. fabae[a]	14~29×11~20 (mostly 16~25×13~16)
B. squamosa[a]	10~26×10~18 (mostly 15~21×13~16)
B. tulipae[a]	12~22×8~15 (mostly 16~20×10~13)

[a]Ellis (1971).

*Corresponding author <E-mail: JI209@chollian.net>

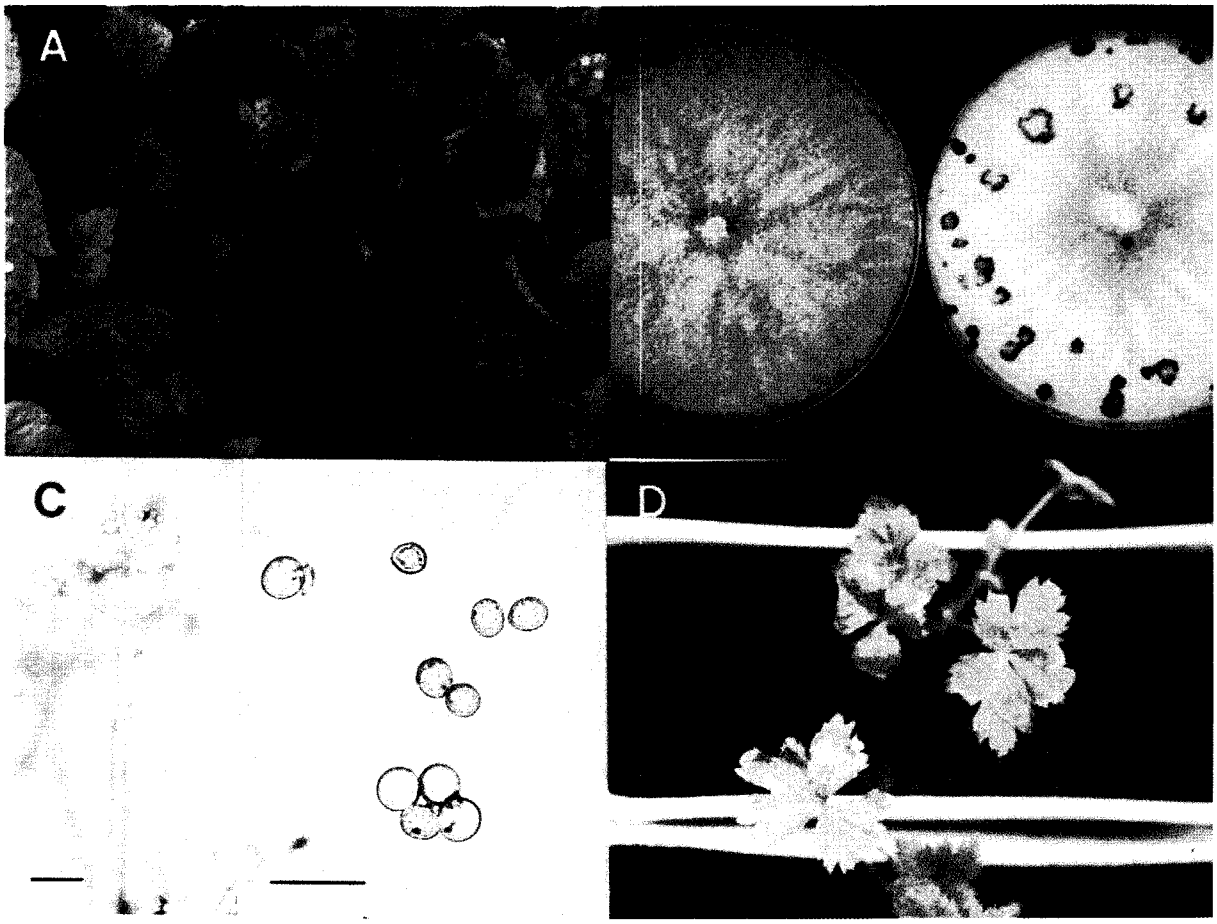

Fig. 1. Gray mold symptoms on leaf naturally infected by *Botrytis cinerea* in commericial field (A); Mycelial colony, sclerotia of *B. cinerea* grown on PDA after 14 days (B); Conidiophore (left) and conidia (right) of *B. cinerea* (C), and symptoms (indicated by arrows) induced by artificial inoculation with *B. cinerea* (D). The bar represents 20 μm.

ium was transferred from the leaf tissue sample to PDA medium. Two weeks later, conidia were harvested by adding about 20 m*l* of distilled water to the plate and then scraping the culture with a rubber spatula. The conidia per milliliter were counted with a hemacytometer. The concentration of suspension was adjusted to 10^5 conidia per mililiter. The conidial suspension was sprayed onto a healthy plant with wounding or unwounding. Inoculated plants were maintained in a moist chamber at 100% relative humidity and 25±1°C for 24 hr in the darkness. They were then transferred to a growth chamber. A comparable plant was treated with sterilized water and maintained under the same conditions.

All of the three isolates tested were virulent on *C.*

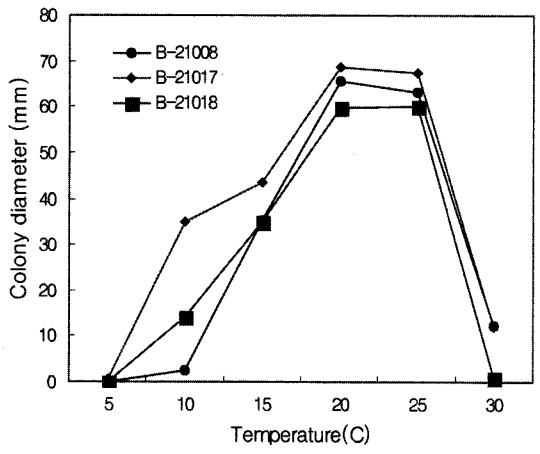

Fig. 2. Effect of temperature on the growth of *Botrytis cinerea* isolated from *Cryptotaenia japonica* in the field. Mycelial growth was measured on PDA 3 days after inoculation.

Table 2. Pathogenicity of isolated *Botrytis cinerea* on *Cryptotaenia japonica* by artificial inoculation

Isolate	Geographic origin	Pathogenicity[a]	
		Non-wounded	Wounded
B-21008	Yonchon	-	+[b]
B-21017	Namyangju	-	++
B-21018	Yangpyung	-	++

[a]Pathogenicity was measured 7 days after inoculation.
[b]+++; more than 11 mm in lesion length, ++; 6~10 mm in lesion length, +; 1~5 mm in lesion length, -; no symptoms.

japonica (Table 2). Characteristic lesions were noticed on the leaves inoculated with conidial suspensions 5 days after treatment. The organs having lesions were rotten or blighten when the lesions enlarged and coalesced 7~10 days after inoculation (Fig. 1D). Some leaves of plants with lesions were entirely dead 2 weeks after the inoculation. Artificially inoculated leaves produced gray mold lesions that were similar to those observed in the field. The fungus was reisolated from lesions on the artificially inoculated plants. On the other hand, there were no visible spots on the leaves sprayed with sterile water up to 7 days after treatment. There was no significant difference in pathogenicity among the isolates. Virulence of the isolate B-21008 was somewhat lower than that of isolates B-21017 or B-21018 (Table 2). This pathogen was reported in Japan where *C. japonica* plants was cultivated (Okada and Kusakari, 2000), but not in Korea. This is the first report of *Botrytis cinerea* causing gray mold on *C. japonica* in Korea.

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