Plant Pathology Bulletin 18: 119-123, 2009

First report of *Botrytis cinerea* causing gray mold of Jamaica cherry in Taiwan

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Accepted for publication: June 18, 2009

ABSTRACT

Chen, C. H., and Hsieh, T. F. 2009. First report of *Botrytis cinerea* causing gray mold of Jamaica cherry in Taiwan. Plant Pathol. 18: 119-123.

Gray mold of Jamaica cherry caused by *Botrytis cinerea* was first found in Taiwan during March to June of 2005. The typical symptom of gray mold showed abundant gray mycelia and conidia was observed on the infected fruit of Jamaica cherry after raining season. The pathogen was isolated from infected fruit and cultured on PDA for further fungal morphological observation and confirming its pathogenicity according to Koch's postulates. Results of morphological data and pathogenicity test showed that the gray mold of Jamaica cherry was caused by *B. cinerea*.

Keywords: gray mold, Jamaica cherry

Jamaica cherry (*Muntingia calabura* L.), a member of the family Elaeocarpaceae, is an ornamental plant with edible fruit. It is indigenous to southern Mexico, Central America, tropical South America, the Greater Antilles, St. Vincent and Trinidad. The Jamaica cherry is widely cultivated in warm areas of the New World and in India, Southeast Asia, Malaya, Indonesia, and Philippines [(7)]. It is also commonly found of the wild in southern Taiwan [(2)]. The diseased fruit with gray mold symptoms were first observed at Taichung during March to June of 2005. The affected fruit initially appeared discolor with dry or wrinkle, and then dark or brown lesions. The surface of the fruit was eventually covered with abundant gray mycelia and conidia (Fig. 1A). Occasionally the gray and yellowish lesions appeared on leaves, and gray mycelia with powdery conidia were also observed on shoots.

The pathogen was isolated from the pericarp of fruit with gray mold symptom by single conidium isolated method. It formed gray to dark colonies with dark mycelium on potato dextrose agar (PDA, Difco Laboratory, Detroit, MI, USA) under near-UV light (Black Light Blue, F10T8BLB, Sankyo Denki, Japan) at 20℃ for 7 days, and then produced abundant conidia [(5)]. The brown conidiophores developed from the gray mycelia on plant tissue with symptom or the potato dextrose agar were 0.4-0.5 mm in length, and the hyaline conidia formed on the grey, branching tree-like conidiophore were 1-celled (Fig. 1B), 6.7-9.7 × 9.1-15.2 μm in size (Table. 1). The fungus formed several black sclerotia as survival structures (Fig. 1C) near the PDA plate edge of Petri dish. To compare the spore germination percentage and the mycelial growth rate of the pathogen to *B. cinerea*, a standard isolate (B-134) of *B. cinerea* provided by laboratory of flower and vegetable diseases, Division of Plant Pathology, Taiwan Agricultural Research Institute, Wufeng, Taichung, Taiwan, was used. The effect of temperature on spore germination was evaluated by water agar plate method inoculated with 0.5 ml of 10^5 conidia ml^{-1} at 8 to 32℃, interval 4℃, in darkness for 16 hrs and each was examined for the percentage of germination. Each isolate has five replicates

in each treatment. The experiment was repeated twice. The effect of temperature on mycelial growth was evaluated by PDA plate method inoculated with 0.5 mm mycelial plug derived from 7-day-old colony of PDA at the same condition described as above. Data showed that the suitable temperature for spore germination of these two isolates was ranged from 16 to 28℃ (Fig. 2), and for mycelial growth was 16℃ to 24℃ (Fig. 3). The reaction of both isolates to temperature was similar. To compare the colony morphological characteristics, the gray mold isolate from Jamaica cherry and B-134 isolate were evaluated by PDA plate method inoculated with 0.5 mm mycelial plug derived from 7-day-old colony of PDA, and incubated on PDA culture under near-UV light, darkness, and natural light (Sun-Light, FL-10D, China Electric Mfg. Co., Taiwan) at 20℃ for 21 days, respectively. Data showed that the colony morphological characteristics of both isolates were also similar (Fig. 4). According to the results of microscopy observed, the reaction to temperature, and the morphological characteristics, the pathogen isolated from Jamaica cherry was identified as *Botrytis cinerea* Pers. ex Fr. [1, 3, 6].

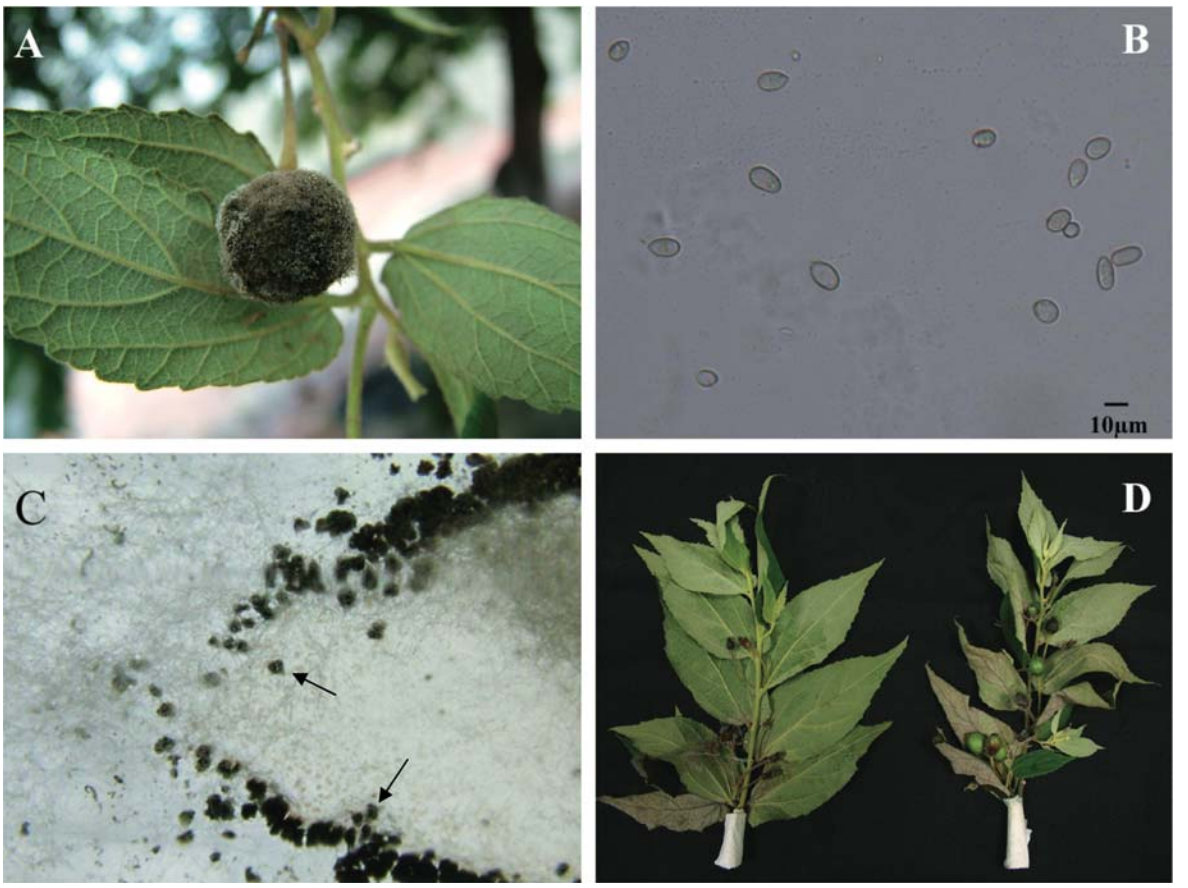

Fig. 1. The gray mold of Jamaica cherry. A. The gray mold symptom on a Jamaica cherry fruit. B. The conidia of gray mold pathogen grown on PDA culture. C. The black sclerotia (arrows) formed on the side of the PDA culture. D. The symptoms on leaves and fruits artificially inoculated with *Botrytis cinerea* isolated from the diseased Jamaica cherry.

Table 1. Comparison of the size of conidium and length of conidiophore between *Botrytis cinerea* (isolate B-134) and gray mold isolate from Jamaica cherry

Isolate	Size of conidium (μm × μm) (range)	Length of conidiophore (μm) (range)
B-134	7.9 × 10.8 (6.5-10.1 × 8.3-14.6)	517.9 (409.3-791.2)
Gray mold isolate	7.9 × 11.7 (6.7-9.7 × 9.1-15.2)	489.9 (294.4-740.6)

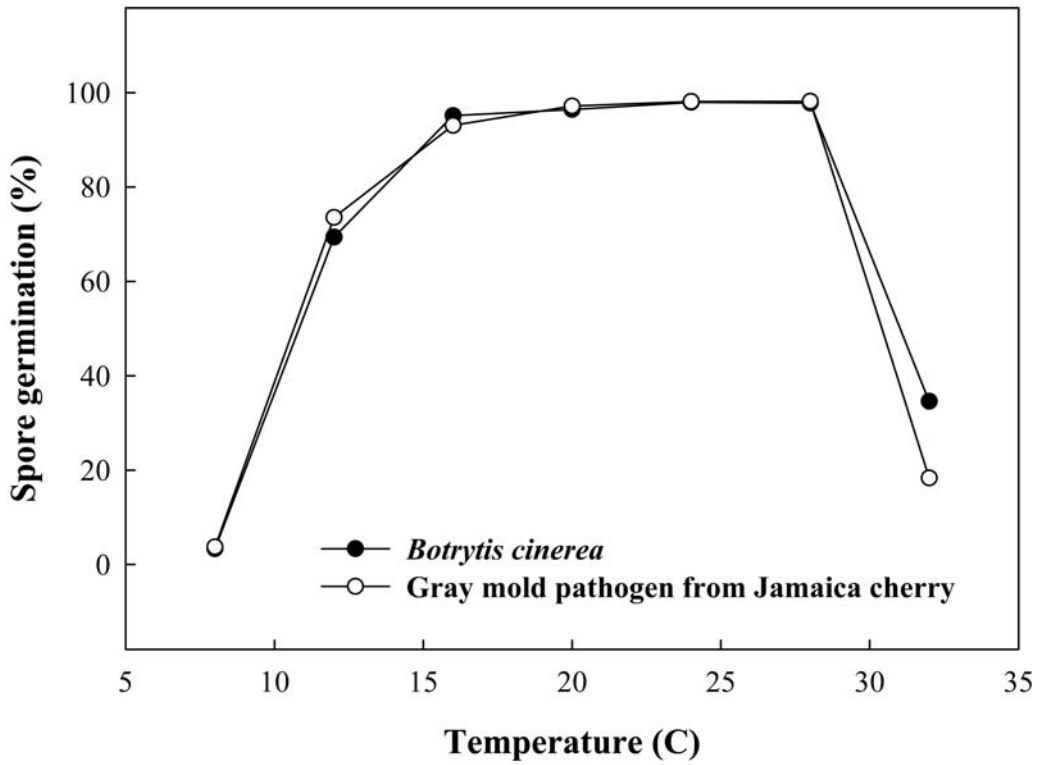

Fig. 2. Effect of different temperatures on spore germination of *Botrytis cinerea* (isolate B-134) and gray mold pathogen isolated from Jamaica cherry.

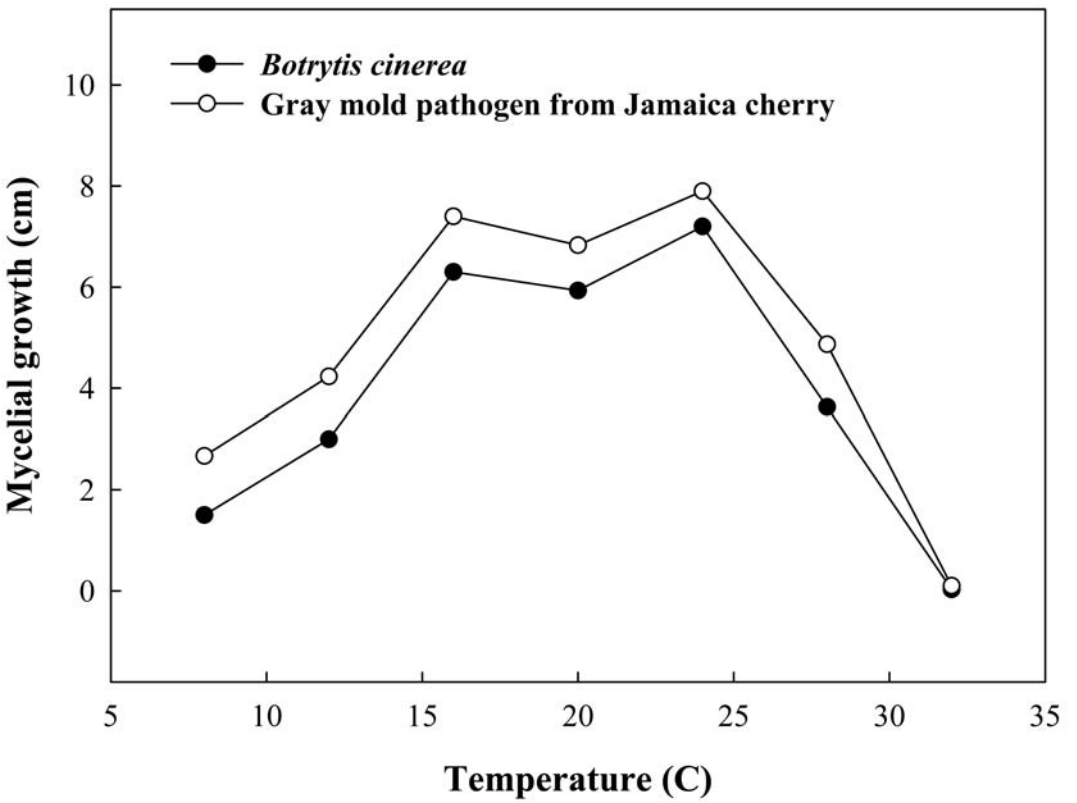

Fig. 3. Effect of different temperatures on mycelia growth of *Botrytis cinerea* (isolate B-134) and gray mold pathogen isolated from Jamaica cherry.

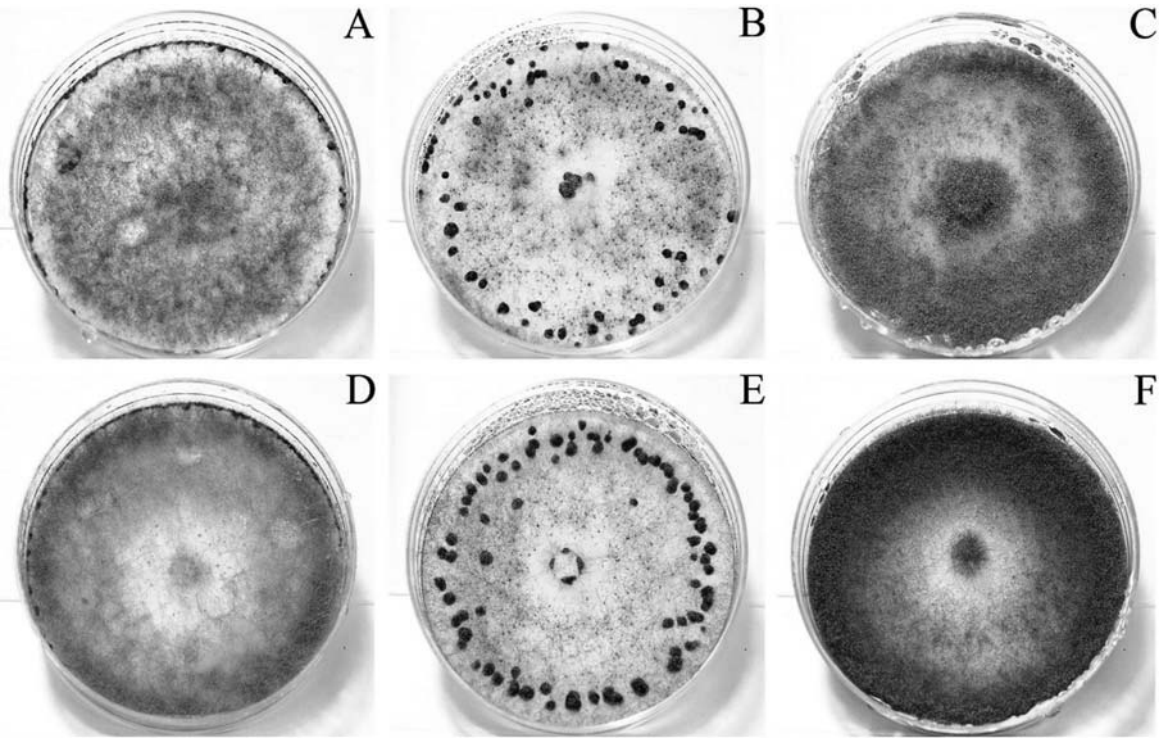

Fig. 4. A. Comparison of colony morphology of *Botrytis cinerea* (isolate B-134) and gray mold isolate from Jamaica cherry grown in different light conditions. B-134 in natural light (A), in darkness (B), and in near-UV light (C). Gray mold isolate in natural light (D), in darkness (E), and in near-UV light (F).

To confirm the pathogenicity, the detached shoots of Jamaica cherry were inoculated with isolate *B. cinerea* (from diseased Jamaica cherry) by spraying leaves and fruits with the conidial suspension (1×10^6 conidia per ml). Leaves and fruits sprayed with sterile distilled water were used as the control. The inoculated shoots were kept in moistened boxes in the dark for two days and then moved to natural light, 12 hrs a day, at 20℃ for another three days. Symptoms developed on inoculated leaves and fruits were similar to those observed on the diseased plant in the field (Fig.1D). The pathogen of gray mold was re-isolated from the infected tissue and showed the typical colony of *B. cinerea*. The control shoots remained healthy.

Botrytis cinerea was well known as an important pathogen of the vegetables, ornamental plants and some fruit trees around the world, and caused secondary soft rots of fruits during storage and marketing [1,4]. To our best knowledge, this is the first report of gray mold of Jamaica cherry caused by *B. cinerea*.

LITERATURE CITED

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摘 要

陳俊宏[1]、謝廷芳[2, 3]. 2009. 西印度櫻桃灰黴病的首度報導. 植病會刊 18: 119-123. ([1] 行政院農業委員會農業試驗所植物病理組；[2] 農業試驗所花卉研究中心；[3] 聯絡作者，電子郵件：tfhsieh@tari.gov.tw；傳真：+886-5-5820-835)

由 *Botrytis cinerea* 引起的西印度櫻桃灰黴病，於 2005 年 3 至 6 月間在台灣首次被發現。在梅雨季節的雨後，受感染的西印度櫻桃果實部位出現典型灰黴病病徵，病徵上覆蓋一層灰色黴狀物及孢子。由病組織上分離病原菌並培養於馬鈴薯葡萄糖洋菜培養基上，以觀察其型態特徵；另依柯霍氏法則 (Koch's postulates) 確定其病原性。由病原菌型態、病原性及對溫度的反應等結果證實西印度櫻桃灰黴病確由 *B. cinerea* 所引起。

關鍵詞：灰黴病、西印度櫻桃