



# First report of *Colletotrichum coccodes* causing fruit anthracnose and leaf spot on sweet pepper in Taiwan

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Sweet pepper (*Capsicum annuum*) is a high-value vegetable crop in Taiwan. In August 2016, a new disease was found infecting about 10% of sweet pepper (cv. Andalus) plants in a highland farm in Nantou County (24°6'10.26"N, 121°12'16.65"E, about 2,070 m above sea level). The disease lesions were brown, circular or irregular and with scattered black dots on leaves (Fig. 1), and sunken brown to dark black lesions with orange conidial masses and black acervuli on fruit (Fig. 2).

A *Colletotrichum* species with long cylindrical conidia and black setae was consistently isolated from the diseased samples. Morphological and cultural characteristics of two isolates from fruits and one from a leaf, cultured on potato dextrose agar plates at 28°C with 12 hr of light, were determined. All isolates produced white aerial mycelium and orange conidial masses. About one week after incubation, numerous black, spherical microsclerotia (180-380, av. 264 µm) associated with setae (Fig. 3) were observed to have formed evenly over the colony and the reverse turned dark grey to black (Fig. 4). Conidia were 16-25 (av. 21.4) x 2-5 (av. 3.3) µm, hyaline, aseptate, and cylindrical with tapered ends (Fig. 5). The fungus was identified as *Colletotrichum coccodes* based on the description being consistent with Mordue (1967). To confirm the identity, the internal transcribed spacer (ITS) regions of ribosomal DNA, amplified by PCR with universal primers ITS4/ITS5 (White *et al.*, 1990), for the three isolates were sequenced. The sequences from all three isolates were identical (GenBank Accession No. MF942405), and a BLASTn search showed the sequence was 100% identical to many records of *C. coccodes*, including the ex-neotype CBS269.75 (NR119858).

To confirm the pathogenicity, six 85-day-old greenhouse-grown sweet pepper plants (cv. Andalus) bearing 5-8 mature fruits were spray-inoculated to run-off with 150 ml of spore suspension ( $1 \times 10^5$  spores/ml). After 24 hr incubation in a growth chamber in darkness at 25°C and 98-99% relative humidity, the plants were returned to the greenhouse (25-35°C). Leaf spots appeared on the leaves seven days after inoculation (DAI), and 72%

(43-100) of the fruits developed disease lesions by 28 DAI. All uninoculated plants remained symptomless. Symptoms on inoculated plants were the same as those observed in the field. Koch's postulates were fulfilled by re-isolating *C. coccodes* from both infected leaves and fruits.

To our knowledge, this is the first report of *C. coccodes* and anthracnose disease of pepper caused by this pathogen in Taiwan. The pathogen can infect not only peppers, but also numerous other hosts including important economic crops such as tomato, potato and onions (Farr & Rossman, 2020). It is important to assess the distribution, rate of spread, and extent of damage caused by *C. coccodes* on pepper and other hosts in Taiwan to determine its current and potential economic significance.

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Figure 1



Figure 2



Figure 3

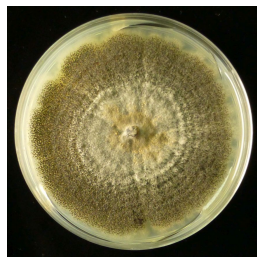


Figure 4

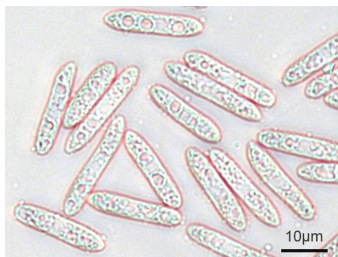


Figure 5

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