Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Internal Black Rot on *Carica papaya* Fruit Caused by *Fusarium sulawesiense* in China

Run Hua Yi,[†] Ting Lian, Jun Jie Su, and Jing Chen

College of Coastal Agriculture Sciences, Guangdong Ocean University, Zhanjiang, Guangdong, 524088, China

Funding: Supported by Guangdong Ocean University quality project and “innovation and strong school project” of teaching projects (XJW[2017] 94-9). Plant Dis. 106:319, 2022; published online as <https://doi.org/10.1094/PDIS-04-21-0721-PDN>. Accepted for publication 18 May 2021.

Papaya (*Carica papaya* L.) is a tropical fruit consumed worldwide due to its nutritional, medicinal, and pharmacological properties. In China, papaya was widely planted in Guangdong, Guangxi, Hainan, Yunnan, Fujian, and Taiwan provinces. From September to December in 2015 to 2020, fruit with internal black rot disease was observed in papaya plantation in Xuwen, Guangdong province (N20°20'9"; E110°14'45"), and approximately 5% of fruits on about 85% of trees were infected every year. The infected fruits showed the symptom of “false ripening”, and the pericarp color changed from green to yellow earlier than that of normal fruits. In the cavity of diseased fruits, the sarcocarp was black rotted, and conspicuous mycelia were observed. Mycelia and infected tissues from symptomatic fruits were picked up, placed on potato dextrose agar with 50 mg/liter of ampicillin, and incubated at 25 ± 2°C in the dark. The fungus was purified by the spore dilution plate method. Fast-growing colonies with dense, floccose, cottony mycelium were initially white, gradually becoming buff brown. Macroconidia were falcate, three to five septa, with foot-shaped cell and were 10.35 to 41.50 (average 25.41 ± 6.82) × 1.90 to 5.95 (average 3.67 ± 0.85) μm (*n* > 140) in size after 7 days of incubation on carnation leaf agar. There were scarce microconidia. Chlamydospores were intercalary, solitary or in chains, globose or irregular, hyaline to light brown. The morphological characteristics of the fungus were similar to those of *Fusarium sulawesiense*

(Maryani et al. 2019). The internal transcribed spacer region (KU881904 and KY436233), translation elongation factor 1-alpha (KU894408 and KY436232), and RNA polymerase second largest subunit (KU894409 and KY436231) were sequenced from two isolates to confirm species identification. BLAST analysis in the *FUSARIUM*-ID and the NCBI databases revealed above 99 to 100% identity match with the *F. sulawesiense* strains NRRL34056, NRRL34059, NRRL34004, and NRRL43730 (Xia et al. 2019). Maximum likelihood analysis and Bayesian inference based on the concatenated sequences using RAXML version 1.0.0 and MrBayes version 3.2.1 software revealed that the isolates resolved in the same clade with the *F. sulawesiense* strains. Thus, the fungus was identified as *F. sulawesiense* based on morphological characteristics and molecular criteria. To confirm pathogenicity, five healthy fruits were injected with 200 μl of spore suspension (approximately 10⁴ spores/ml) in the field and laboratory, and isovolumetric sterile water served as a control. Each fruit was sealed with a plastic bag and kept at natural temperature (about 25 to 30°C). All the inoculated fruits developed typical symptoms after 30 days in the field and 15 days in the laboratory, whereas no symptoms were observed on the control fruits. *F. sulawesiense* was reisolated from inoculated fruits but not from noninoculated fruits. *F. sulawesiense* has displayed a broad host, including *Oryza sativa*, *Musa nana*, *Citrus reticulata*, *Colocasia esculenta*, and so on, in China (Wang et al. 2019). To our knowledge, this is the first report of *F. sulawesiense* causing internal black rot on papaya fruit. This work is important for papaya growers to prevent this disease in time.

References:

- Maryani, N., et al. 2019. Persoonia 43:48.
Wang, M. M., et al. 2019. Persoonia 43:70.
Xia, J. W., et al. 2019. Persoonia 43:186.

The author(s) declare no conflict of interest.

e-Xtra

Keywords: fruit internal black rot, papaya, *Carica papaya*, *Fusarium sulawesiense*, papaw, pawpaw

[†]Indicates the corresponding author.
R. H. Yi; scibyhr@163.com