

MORPHOLOGICAL CHARACTERIZATION AND IDENTIFICATION OF *Colletotrichum* spp. CAUSING ANTRACHNOSE ON CITRUS PLANT (*Citrus* spp.) IN BATU, EAST JAVA

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Abstract

Orange plant (*Citrus* spp.) is one of the most important fruit crops in the world, including in Indonesia. Orange production in Indonesia ranks 4th after bananas, mangoes, and pineapples. However, in 2021 orange production decreased by 7.4% from the previous year. The decrease was caused by various factors, one of which was the pathogen *Colletotrichum* spp. This study aims to: 1) characterize the morphology of *Colletotrichum* spp. the cause of anthracnose disease in oranges; 2) testing the pathogenicity of *Colletotrichum* spp. isolates; and 3) knowing the *Colletotrichum* species found in citrus anthracnose based on molecular identification using Actin, β -tubulin, and GAPDH primers. This research consists of three main works, namely, 1) morphological characterization; 2) pathogenicity test; and 3) multigene molecular identification of *Colletotrichum* spp. using Actin, β -tubulin, and GAPDH primers. The isolation results obtained 22 isolates from leaves and citrus fruits with anthracnose symptoms. All isolates showed variations in morphological characters. The selected isolates from the UPGMA results were based on a 67% similarity coefficient for molecular identification, namely isolates CR2, CR3, CR5, CA6, CR11, CL19, and CA43. Pathogenicity test results showed that all isolates were virulent to *Citrus reticulata* cv keprok Batu 55 and *Citrus limon* cv lemon California, so they could be said to be pathogenic. The CR5 isolate had the highest virulence. The symptoms on the California lemon were milder than the keprok Batu 55. The results of molecular identification showed that CR2 isolate from keprok Batu 55 leaves was identical to *C. endophyticum*, and CA43 from lime leaves was identical to *C. queenslandicum*. Meanwhile, isolates CR3, CR5, CA6, CR11, and CL19 from keprok, lime, and lemon from fruits and leaves were identical to *C. gloeosporioides*. Although there were three different isolates, they were still in the same species complex, namely the *C. gloeosporioides* complex.

Keywords: anthracnose, citrus, multigene, *C. endophyticum*, *C. queenslandicum*.

KARAKTERISASI MORFOLOGI DAN IDENTIFIKASI *Colletotrichum* spp. PENYEBAB ANTRAKNOSA PADA TANAMAN JERUK (*Citrus* spp.) DI BATU, JAWA TIMUR

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Intisari

Tanaman jeruk (*Citrus* spp.) merupakan salah satu tanaman buah penting di dunia, termasuk di Indonesia. Produksi jeruk di Indonesia menempati posisi ke-4 setelah pisang, mangga, dan nanas. Namun, pada 2021 produksi jeruk menurun 7,4% dari tahun sebelumnya. Penurunan tersebut disebabkan oleh berbagai faktor, salah satunya patogen *Colletotrichum* spp. Penelitian ini bertujuan untuk: 1) melakukan karakterisasi morfologi *Colletotrichum* spp. penyebab penyakit antraknosa pada jeruk; 2) menguji patogenisitas isolat *Colletotrichum* spp.; dan 3) mengetahui spesies *Colletotrichum* yang ditemukan pada penyakit antraknosa jeruk berdasarkan identifikasi molekuler menggunakan primer Actin, β -tubulin, dan GAPDH. Penelitian ini terdiri dari tiga pekerjaan utama yaitu, 1) karakterisasi morfologi; 2) uji patogenisitas; dan 3) identifikasi molekuler multigen isolat *Colletotrichum* spp. menggunakan primer Actin, β -tubulin, dan GAPDH. Hasil isolasi didapatkan 22 isolat dari daun dan buah jeruk bergejala antraknosa. Semua isolat menunjukkan variasi karakter morfologi. Isolat terpilih hasil UPGMA berdasarkan koefisien kemiripan 67% untuk identifikasi molekuler, yaitu isolat CR2, CR3, CR5, CA6, CR11, CL19, dan CA43. Hasil uji patogenisitas menunjukkan semua isolat virulen terhadap keprok Batu 55 dan lemon California, sehingga bisa dikatakan patogenik. Isolat CR5 memiliki virulensi paling tinggi. Gejala pada lemon California lebih ringan dibanding keprok Batu 55. Hasil identifikasi molekuler menunjukkan isolat CR2 dari daun keprok Batu 55 identik dengan *C. endophyticum*, dan CA43 dari daun nipis identik dengan *C. queenslandicum*. Sedangkan isolat CR3, CR5, CA6, CR11, dan CL19 dari buah dan daun keprok, nipis, dan lemon identik dengan *C. gloeosporioides*. Walaupun terdapat tiga isolat berbeda namun masih dalam kompleks spesies yang sama yaitu spesies kompleks *C. gloeosporioides*.

Kata kunci: antraknosa, jeruk, multigen, *C. endophyticum*, *C. queenslandicum*.