DIVERSITY OF FUNGI ASSOCIATED WITH VASCULAR STREAK DIEBACK (VSD) DISEASE ON CACAO PLANTATION IN SPECIAL REGION OF YOGYAKARTA PROVINCE

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ABSTRACT

Cacao (*Theobroma cacao* L.) is one of the most important estate crops in Indonesia. Recently, Indonesia is the third largest cacao producer in the world after Ivory Coast and Ghana. Vascular Streak Dieback (VSD) is one of the major diseases of the cacao crop in Indonesia which caused by a fungus *Oncobasidium theobromae*. On another hand, in the field the causal agents of this disease were recognized as other fungi in some areas and on cacao genotypes. The objective of this study is to identify morphological and molecular the fungal pathogens associated with VSD disease in cacao plantation in Yogyakarta Special Province. The activities in this study were included survey, sampling, isolation, *in-vitro* patogenicity test, morphological and molecular identification. This study was conducted in Laboratory of Plant Disease, Faculty of Agriculture, UGM, Yogyakarta. Survey and sampling in field were conducted at 16 locations cacao plantations in Yogyakarta Special Province which included Regencies of Gunungkidul, Kulon Progo, Sleman, and Bantul. There were 88 fungal isolates collected which were obtained from cacao stems and petioles with VSD infected from the field. The result of the pathogenicity test *in vitro* was derived in 4 groups. In group 1, there were 12 fungal isolates, there were 20 fungal isolates in group 2, there were 14 fungal isolates in group 3, and there were 42 fungal isolates grouped in group 4. There were 32 fungal isolates selected. Based on colony morphology, fungal isolates were devided into three clusters. Cgn2b1 and Cgn2b2 isolates in cluster I were showed similar character with 100% similarity. Kb1d1, Kb2b2, Kb2b5, kb2b6, Cgn2d3, and Dl1b2 isolates in cluster II were also showed similar character with 100% similarity based on colony morphology. There were 24 isolates identified based on microscopic observation of conidial morphology either macrospora or microspora. They were assumed into genus *Fusarium, Colletotrichum, Pestalotiopsis,* and *Lasiodiplodia*. The PCR test showed that DNA from all isolates selected could be amplified at range 550-700 bp with using universal primer pair ITS1-ITS4. The pathogen, which associated with VSD dieback on cacao in Yogyakarta are *Lasiodiplodia theobromae, Fusarium decemcellulare, F. solani, F. proliferatum, Colletotrichum siamense, Diaporthe ueckerae, D perseae, Pestalotiopsis microspora, and Corynespora cassiicola*.

Keywords: cacao, VSD, fungi associated with VSD.

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INTISARI

Kakao (Theobroma cacao L.) adalah salah satu tanaman perkebunan penting di Indonesia. Indonesia adalah produsen kakao terbesar ketiga di dunia setelah Pantai Gading dan Ghana. Vaskular Streak Dieback (VSD) adalah salah satu penyakit utama tanaman kakao di Indonesia yang disebabkan oleh jamur Oncobasidium theobromae. Selain itu, terdapat jamur patogen lain yang dapat menyebabkan penyakit VSD pada beberapa jenis kakao di beberapa daerah. Tujuan dari penelitian ini adalah untuk mengidentifikasi morfologi dan molekuler patogen yang berasosiasi dengan penyakit VSD di perkebunan kakao di Provinsi Daerah Istimewa Yogyakarta. Kegiatan dalam penelitian ini meliputi survei, sampling, isolasi, uji patogenisitas secara in-vitro, identifikasi morfologi dan molekul . Penelitian ini dilakukan di laboratorium penyakit tanaman, Fakultas Pertanian, UGM, Yogyakarta. Survei dan pengambilan sampel di lapangan dilakukan di 16 lokasi perkebunan kakao di Propinsi Daerah Istimewa Yogyakarta yang termasuk Kabupaten Gunungkidul, Kulon Progo, Sleman, dan Bantul. Ada 88 isolat jamur koleksi yang diperoleh dari batang dan daun yang bergejala VSD di lapangan. Hasil uji patogenisitas secara in vitro terdapat 4 kelompok isolat jamur. Dalam kelompok 1, terdapat 12 isolat jamur, kelompok 2 terdapat 20 isolat jamur, kelompok 3 terdapat 14 isolat jamur, dan kelompok terdapat 42 isolat jamur. Ada 32 isolat jamur yang dipilih berdasarkan hasil uji patogenisitas. Berdasarkan morfologi koloni, isolat jamur yang terbagi menjadi tiga cluster. Isolat Cgn2b1 dan Cgn2b2 pada Cluster I menunjukkan karakter yang mirip (100%). Isolat Kb1d1, Kb2b2, Kb2b5, kb2b6, Cgn2d3, dan Dl1b2 pada cluster II juga menunjukkan kemiripan 100% berdasarkan karakter koloninya. Ada 24 isolat diidentifikasi berdasarkan pengamatan mikroskopis morfologi konidia yang termasuk kedalam genus Fusarium, Colletotrichum, Pestalotiopsis, dan Lasiodiplodia. Hasil PCR menunjukkan bahwa DNA dari semua isolat yang dipilih bisa teramplifikasi pada 550-700 bp dengan menggunakan primer universal ITS1-ITS4. Patogen yang berasosiasi dengan penyakit VSD pada perkebunan kakao di Yogyakarta adalah Lasiodiplodia theobromae, Fusarium decemcellulare, F. solani, F. proliferatum, Colletotrichum siamense, Diaporthe ueckerae, D perseae, Pestalotiopsis microspora, dan Corynespora cassiicola.

Kata kunci: kakao,VSD, jamur yang berasosiasi dengan VSD