PATHOGENICITY STUDY OF *Ceratocystis acaciivora* AND *Ceratocystis manginecans* ASSOCIATED WITH WILTING AND DIEBACK DISEASES ON *Acacia mangium* AT ACACIA FOREST INDUSTRY (AFI), SABAH

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ABSTRACT

A radical rise posting in the incidence of wilting and dieback diseases induced by plant pathogenic fungi *Ceratocystis* sp. in commercially planted *Acacia mangium* are major problem faced by industrial plantations such as Acacia Forest Industry (AFI) Plantation. Two types of *Ceratocystis* isolates;*Ceratocystis manginecans* (AFI/CM/001) and *Ceratocystis acaciivora* (AFI/CA/001) are recognized and collected from AFI Plantation in Pitas, Sabah. The general aim is to scientifically determine the immensity of *Ceratocystis* isolates to induce disease on plantation grown *A. mangium* using pathogenicity and interaction study. On this objective, field inoculation is done in the plantation nursery and interaction behavior is to be observed in-vitro. In field inoculation, 100 *A. mangium* seedlings were inoculated with *C. manginecans* and *C. acaciivora* to observe the ability of both fungi to induce diseases for 6 weeks. The efficacy study shows both fungi have capability to enhance lesion on *A. mangium* seedlings. *C. manginecans* isolate produced longer lesions (mean=47.103) compared to *C. acaciivora* isolate (mean=42.940), the difference is not significant (p=0.148, F=2.099). Yet, *C. acaciivora* showed a more linear growth in lesion increment compared to *C. manginecans* by weekly observation. Dual culture method was used to assess the ability of 6 test isolates which were identified during the isolation of infected *A. mangium* sample to control *C. manginecans* and *C. acaciivora*, which causes the wilting and dieback diseases. The highest percentage inhibition of radical growth (PIRG) values was observed with isolate KHES/AFI-UMS/D001; *Trichoderma* sp (60.00%; C. *manginecans* and 53.33%; *C. acaciivora*) and the lowest recorded (15.55%; C. *manginecans* and 21.67%; *C. acaciivora*) were observed with isolate KHES/AFI-UMS/E001; *Verticillium* sp. This study showed that isolate *Trichoderma* sp. has a good antagonistic effect on *C.manginecans and C. acaciivora* mycelial growth. Diseases developments from *C.manginecans and C. acaciivora* inoculated samples which suggesting that this fungus is the primary cause of the wilting of trees under natural conditions.

ABSTRAK

KAJIAN INTERAKSI & PATHOGENICITI Ceratocystis sp. BERHUBUNG DENGAN PENYAKIT LAYU & 'DIEBACK' PADA Acacia mangium DALAM PERLADANGAN INDUSTRI DI PITAS, SABAH

Peningkatan radikal dalam kejadian penyakit layu dan 'dieback' berleluasa yang disebabkan oleh kulat patogenik Ceratocystis sp. dalam Acacia mangium yang ditanam secara komersil adalah masalah utama yang dihadapi oleh perladangan industri seperti Acacia Forest Industries (AFI). Dua jenis isolat Ceratocystis; Ceratocystis manginecans (AFI / CM / 001) dan Ceratocystis acaciivora (AFI / CA / 001) dikenali dan dikutip dari ladang AFI di Pitas, Sabah. Objektif umum adalah secara saintifik menentukan potensi isolat Ceratocystis untuk menimbulkan penyakit pada pokok A. mangium yang menggunakan kajian patogenik dan interaksi. Untuk mengecapi objektif ini, inokulasi dilakukan di tapak semaian ladang dan tingkah laku interaksi diperhatikan 'in-vitro'. Semasa inokulasi, 100 anak pokok A. mangium telah diinokulasi dengan C. manginecans dan C. acaciivora untuk melihat keupayaan kedua-dua kulat untuk menggalakkan penyakit selama 6 minggu. Kajian menunjukkan kedua-dua kulat mempunyai keupayaan untuk meningkatkan 'lesion' pada anak pokok A. mangium. C. manginecans telah menghasilkan 'lesion' yang lebih panjang (min = 47.103) berbanding dengan isolat C. acaciivora (min = 42.940), perbezaannya tidak signifikan (p=0.148, F=2.099). Walau bagaimanapun, C. acaciivora menunjukkan pertumbuhan yang lebih nyata dalam peningkatan 'lesion' berbanding dengan C. manginecans oleh pemerhatian mingguan. Kaedah 'dual culture' digunakan untuk menilai keupayaan 6 'test isolate' yang telah diisolat daripada sampel A. mangium yang telah jangkitan untuk mengawal C. manginecans dan C. acaciivora, yang menyebabkan tanda-tanda penyakit berleluasa. Kadar 'percentage inhibition of radical growth' (PIRG) tertinggi diperhatikan dengan isolat KHES / AFI-UMS / D001; Trichoderma sp. (60.00%; C. manginecans dan 53.33%; C. acaciivora) dan rekod terendah (15.55%; C. manginecans dan 21.67 %; C. acaciivora) diperhatikan dengan isolat KHES / AFI-UMS / E001; Verticillium sp. Kajian ini menunjukkan bahawa isolat Trichoderma sp. mempunyai kesan antagonistik yang baik terhadap pertumbuhan mycelial C. manginecans dan C. acaciivora. Perkembangan penyakit daripada isolat C.