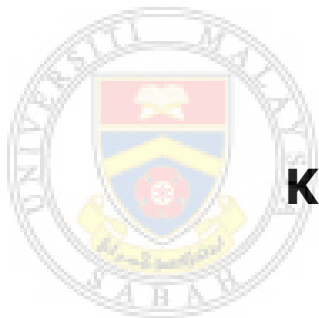


**PATHOGENICITY STUDY OF *Ceratocystis acaciivora* AND *Ceratocystis manginecans* ASSOCIATED WITH WILTING AND DIEBACK DISEASES ON *Acacia mangium* AT ACACIA FOREST INDUSTRY (AFI), SABAH**



**KHESNII SHIV RAM**

**UMMS**  
UNIVERSITI MALAYSIA SABAH

**FACULTY OF SCIENCE AND NATURAL  
RESOURCES  
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**THIS THESIS SUBMITTED IN FULFILLMENT FOR  
THE MASTER OF SCIENCE**

**FACULTY OF SCIENCE AND NATURAL  
RESOURCES  
UNIVERSITY MALAYSIA SABAH  
2019**

## 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.*