

Dissertation Title	<i>Colletotrichum</i> Species Causing Anthracnose Disease in Laos and Thailand
Author	Sitthisack Phoulivong
Degree	Doctor of Philosophy (Biosciences)
Advisor	Assoc. Prof. Dr. Kevin D. Hyde
Co-Advisor	Asst. Prof. Dr. Ekachai Chukeatirote

ABSTRACT

Fruits and leaf samples exhibiting anthracnose disease were collected from different regions of Laos (i.e., Luang Prabang and Vientiane) and Thailand (i.e., Chiang Mai and Nakon Si Thammarat). In total, 236 strains were isolated and, based on morphological characteristics, they could be initially identified as *Colletotrichum gloeosporioides*. Molecular approaches were then used to confirm these fungal identities. The ITS results showed that the fungal isolates were *C. gloeosporioides*. However, it is widely accepted that *C. gloeosporioides* is genetically diverse consisting of several species, the so-called “*C. gloeosporioides* species complex”. Subsequent analyses using multi-genes (partial actin (ACT), β -tubulin (TUB2), glutamine synthetase gene (GS), glyceraldehyde-3-phosphate dehydrogenase (GPDH) genes and the complete rDNA-ITS (ITS) region) were performed and our data revealed that the *C. gloeosporioides* strains were complex species. Interestingly, most of these fungal isolates (> 99%) did not group into the *C. gloeosporioides* clade represented by the *C. gloeosporioides* epitype. We also showed that the use of these five gene regions could be used to resolve the species identity of *C. asianum*, *C. fructicola*, *C. horii*, *C. kahawae* and *C. gloeosporioides* in the “*gloeosporioides*” complex as distinct phylogenetic lineages with high statistical support.

Cultural, conidial and appressorial characters can be used to differentiate taxa into species complexes, but cannot separate species within a complex. Four new species of *Colletotrichum* were discovered in this study based on distinct morphology as well as sequencing results. These new species include *C. brevisporum*, *C. codylinicola*, *C. tropicicola*, and *C. thailandicum*. In this study, all *Colletotrichum* strains were complex comprising nine species namely, *C. asianum*, *C. brevisporum*, *C. cordylinicola*, *C. fruticola*, *C. gloeosporioides*, *C. siamense*, *C. tropicicola*, *C. thailandicum* and *C. simmondsii*. Pathogenicity testing was also used to determine whether the fungal isolates were host specific. Eleven strains of *Colletotrichum* representing five species were able to infect a broad range of hosts used. It can be concluded from the pathogenicity results that the fungal isolates of the *C. gloeosporioides* complex could cause a potential outbreak of anthracnose disease.

Keywords: Anthracnose/*Colletotrichum*/Identification/Multi-gene loci/
Pathogenicity/Taxonomy