Interaction between *Colletotrichum dematium* and cowpea

by

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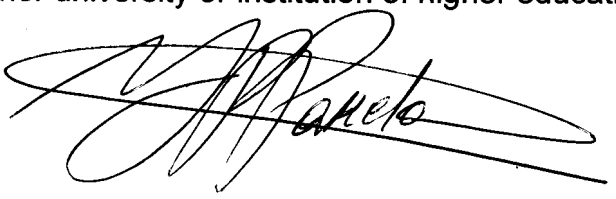
I declare that the dissertation herewith submitted for the degree of Ph.D. (Botany) at the University of Pretoria, has not previously been submitted by me for a degree at any other university or institution of higher education.



ABSTRACT

INTERACTION BETWEEN *COLLETOTRICHUM DEMATIUM* AND COWPEA

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Anthracnose of cowpea (*Vigna unguiculata* (L.) Walp) caused by *Colletotrichum dematium* (Pers. ex Fr) Grove has serious socio-economic implications. Subsistence farmers rely heavily on cowpea for protein and fodder; therefore, *C. dematium* poses a threat to production of this crop. The purpose of this study was to investigate the interaction between cowpea and *C. dematium*. Investigations involved characterising *C. dematium* field isolates using morphological and molecular techniques, infection studies, biochemical and histochemical analysis and determining factors that influence the severity of the fungus on the host. Random amplified microsatellite profiles of *C. dematium* grouped the isolates into eleven groups linked to morphological characteristics, pathogenicity and geographic origin. Infection studies indicated that *C. dematium* is a subcuticular intramural coloniser, that switches to destructive necrotrophy. Pulvinate acervuli were produced at 72 hours post inoculation over water-soaked lesions and complete necrosis of the host tissue occurred at 120 hours. The infection process was favoured by prolonged periods of high humidity and high temperatures, especially in cowpea plants between the ages six to nine-weeks-old. Investigations on the location and patterns of polyphenols in the cowpea seedcoats indicated that brown coloured cowpea cultivars contained more soluble phenolic compounds than cream coloured cultivars and they were more resistant to *C. dematium*.

Keywords: anthracnose, *Colletotrichum dematium*, cowpea, necrotrophy, random amplified microsatellites, resistant, soluble phenolic compounds.

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