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Morphological, molecular and
pathogenic characterization of
Colletotrichum spp., causing rubber
(*Hevea brasiliensis*) leaf disease in Sri
Lanka

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Abstract

Colletotrichum is a fungal genus consisting of a number of pathogenic species that cause anthracnose in crops worldwide. Among them, *Hevea brasiliensis* (rubber) is an important cash crop cultivated in Sri Lanka which is affected by *Colletotrichum* leaf disease. In addition, many fruits and other economically important crops in Sri Lanka are affected by *Colletotrichum* anthracnose. However in rubber, only a few species have been identified as causal organisms hitherto. The present study was carried out to investigate and characterize the *Colletotrichum* species causing rubber leaf disease in Sri Lanka, using morphological, genetic and pathogenic characters.

Infected rubber leaf samples were collected from major rubber cultivating districts in Sri Lanka including Kalutara, Rathnapura, Colombo, Kurunegala, Galle, Kegalle and Monaragala. Initially, the pathogen was isolated from each infected plant material and single conidia derived cultures were prepared for further experiments.

Initial identification of *Colletotrichum* isolates was carried out using the sequences of internal transcribed spacer regions. This was followed by molecular characterization using multilocus based phylogenetic analysis and species specific primers. Each of the identified species was then subjected to morphological characterization using twenty one morphological characters. Finally, the pathogenicity, antifungal sensitivity and cross infection capability of the identified *Colletotrichum* species were determined.

Based on multilocus analysis, seven *Colletotrichum* species were identified as causal organisms of rubber leaf disease in Sri Lanka including *C. acutatum*, *C. simmondsii*, *C. laticophilum*, *C. citri*, *C. nymphaeae*, *C. gloeosporioides*, and *C. siamense*. Among them *C. simmondsii*, *C. laticophilum*, *C. citri*, *C. nymphaeae* and *C. siamense* are being reported for the first time in Sri Lanka as rubber pathogens and *C. siamense* was identified as the major causative organism of rubber leaf disease. Species specific primers were not found to be useful in species identification. However they were able to distinguish the *C. acutatum* and *C. gloeosporioides* species complexes.

The antifungal sensitivity of each species was different and *Colletotrichum* species isolated from rubber plants were able to cross infect most fruit crops studied in the surrounding area of the rubber plantations. Finally, it was observed that the fungicide Carbendazim can still be used to control this disease and the concentrations used for application need to be reviewed with respect to the species.