

**Corynespora Leaf Fall Disease of *Hevea brasiliensis*:
Variability in Pathogen Population, Host Response and
their Interactions**

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B.Sc (Sri Lanka), M Phil (Sri Lanka)

**A thesis submitted to the
Faculty of Science
of the University of Colombo for the
Degree of Doctor of Philosophy**

2011



Abstract

Corynespora cassiicola (Berk and Curt.) Wei., causes target spots mainly on leaves, stems, roots and flowers of more than 500 host plants covering tropical, sub-tropical and temperate countries and *Corynespora* leaf fall disease has become a serious threat to natural rubber plantation industry. *C. cassiicola* on *Hevea brasiliensis* show a diversity of symptoms and is a unique feature of this pathogen.

The present population of the *C. cassiicola* in Sri Lanka indicated a clear variation in cultural, reproductive, physiological, bio-chemical and pathogenicity characteristics. Positive correlations between conidia & toxin production, conidia production & pathogenicity and toxin production & pathogenicity were revealed. *C. cassiicola* existing on resistant or moderately resistant rubber clones were more virulent. Three pathogenic groups were identified and the variability in pathogenicity has to be considered in selecting isolates for clonal screening. The present isolates showed a wide variation in their sensitivity to the fungicides. The variability to fungicide sensitivity has to be considered when selecting isolates for fungicide screening programmes.

Identification of resistant clones is a major strategy in the management of this disease. There were significant variations in the mean lesion scores of clones when evaluated by laboratory based *in vitro* assays. The results suggests that laboratory based screening techniques should be used only for preliminary data. Field experiments were the most reliable but take a long period. A special type of bud wood nursery experiment was developed for screening of clones. Screening of clones under natural conditions showed that 85% of RRISL recommendation list are resistant. The young leaf stages were the most susceptible to CLFD. With maturity the lesion sizes reduced and it was not possible to artificially inoculate mature leaves. Infection of CLFD occurs mainly at the time of refoliation, hence fungicide sprays could be confined to refoliation period to suppress initial infection reducing the number of spray – rounds.

Factors affecting the disease development, production, germination and viability of conidia were studied. The data will assist to form cost-effective method of control. The microscopic method used to detect cell death was successful. No clear difference was observed in rapid cell death upon infection between CLFD resistant and susceptible clones. The total phenolic substances, total protein level and the enzyme PAL, time and their secretion did not vary significantly between CLFD resistant and susceptible clones suggesting that they do not play a significant role in governing resistance of *H. brasiliensis* clones to *C. cassiicola*. *C. cassiicola* produced only PL *in vitro*, it did not produce PG. Pectin lyase plays an important role in pathogenesis. All isolates secreted cellobiase and β -glucosidase.

Reduced doses of fungicides together with light overhead shadings were effective in controlling the CLFD in nurseries. The most effective treatment was the overhead shading with the application of the fungicide mancozeb or carbendazim. Attempts to induce systemic acquired resistance by foliar and biological applications were not successful. Multiclonal clearings established showed a significantly lower level of CLFD incidence. Application of modified doses of fertilizers to reduce CLFD incidence & severity was not successful.