BIODIVERSITY OF MACROFUNGI OF MANGO (*MANGIFERA SP.*) AND THEIR PATHOGENIC IMPORTANCE

F. Abdullah

Faculty of Science and Environmental Studies
Universiti Putra Malaysia, 43400 UPM, Serdang, Selangor, Malaysia

Keywords: macrofungi, mango, pathogenicity, ganoderma, monokaryon.

Introduction

Freshly cut stumps of mangoes (*Mangifera indica*) were consistently observed to harbour non-laccate *Ganoderma* sporophores. In our case study, about 10% of the trees in an orchard had to be felled because of an unidentified disease, which resulted in rapid defoliation of the tree. Non-laccate *Ganoderma* sporophores were observed on the stumps within 2 months. This study investigated the biological species of *Ganoderma* from mangoes by cross-matching of monokaryons, examines the genetic relationships of *Ganoderma* from mango stumps obtained from 3 regions of the country and carries out an *in vivo* pathogenicity test on mango seedlings.

Materials and Methods

Morphological studies of the sporophores and spores were made of specimens derived by artificial sporophore induction (Abdullah, 1996) on rubber wood blocks, using mycelia isolated from the fruiting body collected from the study sites. Data on biological speciation were obtained from single spore cultures ('monokaryons') of *Ganoderma* from which one set of tester consisting of 4 single spore isolates of *Ganoderma* were then cross-matched with monokaryons of *G. australe* and *G. applanatum* from United Kingdom and New Zealand to test for biological speciation. For isozyme electrophoresis, isolates made from *Ganoderma* sporophores collected from various mango stumps in Sri Manjung (Perak), Sri Serdang (Selangor) and Petaling Jaya (Selangor) were scored for banding patterns. The patterns were then transformed as input data for a UPGMA cluster analysis based on Roger's Distance measure (Rohlf, 1990), version 1.8, which eventually generates a dendrogram. For pathogenicity studies, isolates of *Ganoderma* from the 3 study sites were used to artificially infect bud-grafted mango seedlings, following the method of Khairuddin et al. (1991) with modifications.

Results and Discussion

Morphological studies showed that the fruiting bodies from the 3 study sites were not significantly different in shape, colour and thickness of pileus and spore sizes. Cross matching of monokaryons showed the species on mango was *G. australe* and not *G. applanatum*. Isozyme studies showed that their banding patterns were similar for all mango isolates and to *Ganoderma* isolated from rubber and cocoa hosts but different from *Ganoderma* on oil palms and coconuts. Pathogenicity studies showed that *Ganoderma* isolates collected from mango stumps showed a relatively low level of disease susceptibility, where approximately 10% were infected in all 3 separate trials. However, of the small number that was infected, all showed 100% mortality. The first visible symptoms of infection was the appearance of white rhizomorph at the basal stem end, which eventually formed *Ganoderma* primodia, followed by collapse of the foliage. By the time the *Ganoderma* sporophores were well formed 90% of the leaves had dried up without turning yellow and had fallen, and the main tap root swelled and rotted.

Conclusions

The non-laccate *Ganoderma* on mango from the 3 study sites were confirmed as *G. australe*. They caused a relatively low rate of infection at 10% when artificially infected, and is perhaps lower in a natural situation. However, of those that were infected, 100% of the mango seedlings died by the time the sporophores emerged, thus the presence of this fungus in fruit orchards may prove a serious threat to the fruit trees.

References

Abdullah, F. 1996. Basidiomata induction and characterisation of *Ganoderma* from oil palm (*Elaeis guineensis*) on three agrowaste substrates. *Pertanika J. Trop. Agric. Sci.* 19(2/3):117-122.

Khairuddin, H., Lim, T.K. and Abdul Rahman, A.R. 1991. Pathogenicity of *Ganoderma boninense* Pat. on oil palm seedlings. Proc. PORIM Int. Palm Oil Conf: Progress, Prospects and Challenges Towards the 21st Century, 9-14 Sept. 1991, Kuala Lumpur.

Rohlf, F.J. 1990. *NTSYS-pc, Numerical Taxonomy and multivariate system, version 1.8.* Exeter Publishing Ltd.: Setauket, New York, USA.

Supported by IRPA Grant 09-02-04-0008