

CHARACTERISATION, PATHOGENICITY AND CROSS PATHOGENICITY STUDIES OF *GANODERMA*, CAUSAL PATHOGEN OF BASAL STEM ROT OF OIL PALM

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Introduction

Very little information is known about the biology and host range of *Ganoderma* the causal pathogen of basal stem rot, the most serious disease of oil palm in most oil palm growing regions. This project investigated the biological species of *Ganoderma* from oil palms and coconut stumps by cross-matching of monokaryons for compatibility, examined the genetic relationships of *Ganoderma* from oil palms with those from several other hosts by numerical analysis based on data derived from isozyme electrophoresis, and carried out *in vivo* pathogenicity studies of *Ganoderma* from oil palms on coconut seedlings and *Ganoderma* from coconut stumps on oil palm seedlings, and *vice versa*.

Materials and Methods

Data on biological speciation were obtained from single spore cultures ("monokaryons") of *Ganoderma* from infected oil palms, from which one set of tester consisting of 4 monokaryons strains were obtained. These were cross-matched with monokaryons of *Ganoderma* from coconut and the results were scored; compatibility of strains would indicate the same biological species. For isozyme electrophoresis, isolates made from *Ganoderma* sporophores collected from oil palms and coconut collected from a single common site, as well as of the two hosts from outside the site, were scored for banding patterns. Electrophoretic bands were transformed as input data for a UPGMA-programme based on Roger's Distance measure (D_r) by Rohlf (1990) version 1.8, which eventually generated a dendrogram, depicting their genetic distances. For pathogenicity studies, oil palm and coconut seedlings were infected with *Ganoderma* following the method of Khairuddin et al. (1991) with modifications.

Results and Discussion

Monokaryon compatibility studies showed that the mating pattern for *Ganoderma boninense* was tetrapolar, thus four monokaryon testers had to be resourced. Cross-matching with *Ganoderma* monokaryons from coconut shows mating compatibility and therefore belonged to the same biological species (Abdullah et al. 1998). Electrophoretic studies showed that their banding patterns were not homogenous for some bands, and a numerical analysis showed *Ganoderma* from oil palms and coconuts to consist of two aggregate sub-groups. Pathogenicity studies showed that isolates from oil palm could infect both oil palm and coconut seedlings and *vice versa* for isolates from coconuts (Abdullah and Hasniati, 1998). The sporophores emerged on coconut only after the coconut seedlings were killed, and not while they were living, as on the oil palms.

Conclusions

Ganoderma boninense from oil palms and coconut stumps showed up as 2 aggregate groups in the numerical analysis. However, monokaryon compatibility showed that they belong to the same biological species, thus isozymic variations could be due to responses to the different substrate types. *Ganoderma* from the two host types were able to infect both oil palm and coconut seedlings. However, unlike for the oil palm seedling, the fungus killed the coconut seedlings first before the sporophores emerged from the basal stem.

References

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