Ganoderma in South Africa

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Ganoderma is a genus of wood-degrading fungi that grow on coniferous and hardwood trees. They are frequently observed on trees in natural forests, plantation forests and gardens as large, perennial, woody brackets, also called "conks" (Fig. 1). The genus includes more than 80 species, many of them occurring in the tropical regions of the world.

Several *Ganoderma* species are important to a number of diverse industries. Some species occur as saprophytes, utilising dead wood as nutrient source; these species are important to biopulping by virtue of their ability to produce enzymes that degrade lignin and cellulose. Some species are also valued for their medicinal properties and have been used in traditional Asian medicine for thousands of years. They are believed to have therapeutic effects on cancer, cholesterol, hypoglycaemia, fungal infections and many other diseases or disorders. A number of *Ganoderma* species survive as phytopathogens, causing wood rot and eventually the death of infected trees. Pathogenic species may cause extensive infection centres, leading to great financial losses to forestry industries due to the death of commercially grown trees. For example, in Malaysia mortality of *Acacia mangium* due to *G. phillippii* has been estimated at up to 40% in severely infected plots.

On account of their importance to different industries, the taxonomy, distribution and host range of *Ganoderma* species have received much attention by mycologists and plant pathologists world-wide. In South Africa, a number of *Ganoderma* species have been reported from various indigenous and introduced tree species, where they give rise to Ganoderma root rot disease. The *Ganoderma* species most frequently linked with this disease in South Africa are *G. lucidum* and *G. applinatum*. It is known, however, that these two species actually represent species complexes and may include several species not previously identified. Another gap in scientific knowledge of *Ganoderma* relates to the fact that very little attention has been afforded to elucidating the species occurring in the rest of Africa. As a result, the taxonomic status and the distribution of *Ganoderma* species on this continent are currently uncertain.

Because of the uncertainties described above, we have embarked on a research project to investigate the taxonomy of *Ganoderma* in South Africa. This has led to a number of interesting discoveries to date. For example, the results of an investigation undertaken by Ms Vuledzani Muthelo showed that a *Ganoderma* species similar to *G. lucidum* is causing root rot on Jacaranda trees in the Brooklyn suburb of Pretoria (Fig. 2). A number of these trees have died as a result of this disease, and many more have been infected by the fungus since this research project commenced. A large number of *Ganoderma* samples were also collected from various hosts and localities in South Africa by researchers in the DST/NRF Centre of Excellence in Tree Health Biotechnologgy (CTHB). Preliminary DNA sequence comparisons have revealed the presence of *Ganoderma* species not previously reported from South Africa.

Future work on *Ganoderma* will focus on the species diversity of this genus in selected indigenous forests. Earlier this year, Prof. Jolanda Roux was awarded a research grant from the South African Biodiversity Initiative (SABI) to investigate the systematics of a number of fungal genera, including *Ganoderma*, from natural forests in South Africa. While the flora and fauna in these forests are well documented, little is known about their fungal diversity. We believe that information gleaned from research projects funded by this grant will make a significant contribution to our understanding of the taxonomy and distribution of *Ganoderma* species in these forests.

Fig. 1. Typical fruit body (bracket) of a *Ganoderma* species growing on an infected tree.

Fig. 2. Jacaranda tree in Brooklyn, Pretoria, showing symtoms of Ganoderma root rot.