FIELD RESEARCH AND EXTENSION AT FABI IN 2006

Prof Jolanda Roux has the responsibility within the CTHB and the Tree Protection Cooperative Programme (TPCP) for coordinating all field trips undertaken by staff and students and for ensuring that reports on these trips and research findings are communicated to all concerned. The extension leg involves the presentation of talks at research meetings and field days, as well as ensuring articles in newsletters, newspapers and radio interviews to talk to the public about tree health.

Field trip vehicle jointly sponsored by CTHB and TPCP.
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Several field trips were undertaken in 2006 related to diseases of native tree species in Southern Africa. These field trips included local ones, mostly to Kruger National Park (KNP), but also to several other areas in Mpumalanga, as well as to KwaZulu-Natal. Two field trips to neighbouring SADC countries were also undertaken. Many of the field trips conducted in FABI during 2006 combined TPCP and CTHB work, emphasising the synergy between these two programmes. These field trips aim to investigate and identify possible tree diseases, leading to new research projects, and provide the fungal isolates which form the basis of all CTHB research projects. They are also important in student training, providing students with a broader view and skills in communicating with the public, as well as providing practical insight into the disease problems that are being studied.

Field trips to Kruger National Park

In the latter part of 2004 the DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB) at the University of Pretoria, together with Kruger National Park (KNP), initiated a study to survey for tree diseases and fungi in KNP. One of the main projects within this research agreement is to investigate fungi that infect tree wounds caused by elephants in KNP. The other was to identify any possible serious tree diseases present in the reserve. Four survey trips were undertaken in 2006 by Prof Jolanda Roux and students of the CTHB with the help and assistance of Thembi Khoza,

(Science Liaison Officer, KNP), and game scouts of KNP. Working in KNP requires the assistance of armed game scouts to protect researchers from possible wild-life encounters. These game scouts are also valuable for the identification of native trees species and the tracking of elephants. Fresh wounds, created within 2-3 weeks prior to the surveys are located and segments of cambium and wood collected for fungal isolation. Wounds are commonly covered with mycelium and fruiting bodies belonging to *Ceratocystis* and *Ophiostoma*, as these fungi are primary wound colonists and pathogens.

The CTHB is currently in the process of describing new fungal species isolated from the survey trips to KNP. This research will be followed by more detailed impact studies to determine the role of these fungi in the decline of wounded trees. Ronald Heath is busy with population diversity studies on *C. albifundus* which was collected from native trees in KNP. This he will compare to populations from non-native *A. mearnsii* in RSA, Tanzania, and Uganda. Importantly, results of this study will greatly enhance our knowledge of fungi occurring on native southern African tree species, allowing us to rapidly identify exotic fungi that may be introduced into the country in future. Depending on whether these wound-infecting fungi are native or exotic, strategies for management of elephant wounds and other recommendations will be made.

In 2004 a major disease outbreak in KNP affecting buffalo thorn trees (*Zizyphus mucronata*) was detected by staff of KNP, and material was sent to FABI for identification. The causal agent was determined by Dr Wolfgang Maier as *Coniodictyum chevalieri*, a relative of the basidiomycetous smut fungi. This is the first report of an epidemic caused by this fungus that is restricted to buffalo thorn trees in Africa and which was believed to be very rare. To monitor the severity of the disease field trips were undertaken in May 2004, March and June 2005 and March 2006. During the epidemic in 2004 the disease was also monitored by field rangers and it was established that the epidemic only affected the southern part of the park. A research paper dealing with the epidemic of *Coniodictyum* in KNP and the phylogeny of this fungus has been published.

Various contributions to the annual Science Network Meeting of KNP were made during the research period. This included four presentations on tree diseases and our current research. A presentation on tree diseases was also made to the game scouts and field management. These presentations all serve to inform people about the presence and impact of tree diseases and forms an important part of the field extension and training programme of the CTHB.

The current project with KNP is coming to an end in 2006. However, findings from the first two-year research contract have laid the foundation for future work in collaboration with Sanparks and KNP specifically. This is currently being discussed with KNP.

Other field trips (2006)

Apart from the research project in KNP, the CTHB undertook several other field trips in 2006. Many of these were in collaboration with TPCP field trips. Prof. Roux also organized and led two field trips to neighbouring countries. These two field trips were done in collaboration with the University of Namibia and the Copperbelt University in Zambia. Pests and pathogens do not recognize international boundaries, making it crucial

Left to right: Francois van der Walt, Jean-Damascene (University of Namibia) and Percy Chimwamurumbe (University of Namibia) in their "field lab" doing isolations from *Acacia* spp.

Francois van der Walt (back) and Jean-Damascene from the University of Namibia collecting *Acacia* samples

for collaboration between countries in order to effectively manage tree diseases. It has thus been a strong drive of the TPCP and CTHB to build collaborations with researchers at Universities in other African countries. During the field trip to Namibia, discussions were held with Dr Percy Chimwamurumbe of the Biology Department at the University of Windhoek and a field survey was undertaken with Dr Chimwamurumbe and one of his staff members. The three main survey aims of this trip were to investigate the die-back of native *Acacia* trees in the Windhoek area, reported by Dr Chimwamurumbe, to investigate the reported die-back of *A. mellifera* in certain areas of Namibia and to survey Myrtales for the presence of *Chrysoporthe* spp. At the same time disease symptoms on other tree species were also investigated. Some interesting symptoms were noted on non-native *Eucalyptus* spp. planted in the Caprivi area. Preliminary results from this trip reveal that several new fungal species have been collected. Two first reports for Namibia, of known pathogens, have also resulted from the trip, which was undertaken by Prof Roux, Dr Martin Coetzee and Mr Francois van der Walt.

The second field trip to another African country took place in September and October 2006 and included Prof. Roux, Dr. Jane Wright, Dr. Francois Roets and Ms Marcele Vermeulen (honours student). On this trip discussions were held with Dr. Muimba A. Kangolongo from the School of Natural Resources at the Copperbelt University in Kitwe, Zambia. Great progress was made in establishing future collaborative research projects and student exchange opportunities with this University. Part of the visit also served for Prof. Roux to investigate the results of a collaborative project looking at fungal infection of medicinal bark harvesting wounds on native trees. This project was initiated in 2004 and partially funded by DFID (Department for International Development), UK. The DIFD funding is only for a two year period. During the survey visit Prof. Roux also assisted Dr. Kangolongo in the identification of several diseases on non-native *Pinus* and *Eucalyptus* spp. Furthermore, surveys of native Myrtales in Zambia (mostly *Syzygium* spp.) were undertaken in several locations, and Dr Roets surveyed *Protea* spp. as part of his post-doctoral research in the CTHB.

Profs Brenda and Mike Wingfield accompanied Prof Giles Hardy and Dr. Treena Burgess on a one week field trip to the Kimberley region in North West Australia. This is part of an ongoing collaboration with Murdoch University. The focus of this field trip that took place in early July was to sample the Boabab trees, which grow in this region of Australia and also other indigenous tree species growing in the vicinity of Baobabs. One of the long-term aims of this study is to understand the pests and disease of Baobabs and the interaction of the endophytic fungi, which inhabit these trees across their native ranges in Africa and Australia.

From left to right: Brenda Wingfield, Giles Hardy and Treena Burgess

Boabab trees

Local field trips in South Africa, involving CTHB research totalled ten trips. These focussed on the current research projects in the group. James Mehl continued his surveys of fungi contributing to a possible disease of *Pterocarpus angolensis* (kiaat) in the country with field trips to Mawewe, Bushbuckridge, KNP and the Sudwala area. Bianca Hinze collected samples from *Sclerocarya birrea* (Marula) for her MSc project in Mpumalanga and the Zululand area, while Chrizelle Beukes collected rhizobia from the roots of kiaat. Several collections were also done for Marija Kvas' MSc project on flower malformation of *Syzygium* spp. A number of Ad hoc visits were also made to investigate reports of diseases of yellowwoods and a number of native tree species.

Francois van der Walt and Jolanda Roux looking at samples from *Acacia* species in our "field lab"