Tree Protection News

tpcp

Newsletter of the Tree Protection Co-operative Programme and the DST/NRF Centre of Excellence in Tree Health Biotechnology.

VOL: 11 May 2006

MESSAGE FROM THE DIRECTOR

While this might be a rather negative way to open this first issue of Tree Protection News for 2006, I cannot help but be filled with the sadness of having just heard of the passing of our good friend and colleague Eric Kietzka. As a tree breeder for Mondi, Eric was an active participant of so many of our activities for more years that I can even remember. He also contributed actively to a great number of TPCP accomplishments, including progress towards understanding the resistance of trees to the pitch canker fungus, Diplodia die-back of pines and Cryphonectria canker. We will miss Eric greatly, his insight and guidance, and his wry sense of humor. I know that I speak not only for the TPCP team but also for our whole community, in saying that our special thoughts and prayers go to Janine and all of the Kietzka family at this difficult time.

The New Year has once again rushed upon us with speed and vigor. Many new students have joined the group while some have completed degrees and others are progressing towards that cherished goal. Many field trips have already been undertaken and various field training and extension courses have been held. Team members have attended various scientific congresses and meetings and many are planning for participation in meetings later this year. In the TPCP/CTHB offices, work towards arranging our annual meeting in May is already well advanced. As always, we are very much looking forward to having many of our forestry and tree community colleagues with us for this special event.

CONTENTS

Newsletter compiled by:
Jolanda Roux
Layout, Design & Printing by:
Dyason Design & Print
Contributions to this newsletter by:
Ronald Heath, Teresa Coutinho, Bernard Slippers, Jolanda Roux, Martin Coetzee, Wolfgang Maier, Brett Hurley, Jenny Hale.

Thinking of our annual research meeting, this year's event is once again set to be an interesting and informative event. We will have the privilege of the company of various collaborators from different parts of the world. These will include a number of Sirex experts from Australia and the United States of America, a group of internationally recognized forest entomologists and a few forest pathologists. Mike Edwards of FSA has agreed to open the meeting and give us an Industry perspective on matters relating to tree health. To add to this, Dr Arlene Bailey of Sappi will share some of her thoughts with us on research and innovation. As usual, we will have presentations by students and staff of the group and the meeting will provide the opportunity to hold important board and satellite meetings. We hope that you will be able to join us on the 9th and 10th May in Pretoria.

During the past few years, we have experienced a worrying increase in the number and impact of diseases and pest problems with which we have to deal. While this is what we should logically expect in the long term, and it is what we have predicted for many years, the reality of more serious tree health problems is of concern. The spread of the Sirex wood wasp, the curious adaptation of the goat moth to infest *Eucalyptus nitens*, and the appearance of *Thaumastocoris australicus* in the last few years add to our challenges. Diseases have also increased in importance, adding to research pressures. The Pitch Canker fungus continues to plague many nurseries and we are concerned about the appearance of *Quambalaria eucalypti* on stems of *Eucalyptus nitens* in areas where the fungus has not previously been known.

Certainly, the invasion of the Sirex Wood wasp has become one of the greatest threats to our forestry industry. Huge effort has thus been made by large numbers of people to understand and contain the problem. From my perspective, it has been most impressive to see the level of collaboration between researchers and field foresters to study this problem. The fact that the nematode biological control system, on which we had all pinned our hopes has not worked well, has been very disappointing. Yet I believe that we have made substantial progress towards understanding the problem and feverish efforts are being made to advance along this path. It is imperative that we succeed in managing Sirex and I am convinced that with a strong team effort we will accomplish this. Yet, it is also important for us to be realistic and recognize that a "silver bullet" in the tail of Sirex is most unlikely.

Integrating the activities of the CTHB and the TPCP during the past year has been an interesting and valuable challenge. There is no doubt that the CTHB has brought new synergy to TPCP research and it has also brought us closer to South Africa's science system. I was recently asked to present a lecture to the Directors of the six Centers of Excellence and asked to address the title "Keeping it all together". In thinking about this proposed title, I concluded that an equally important challenge has been to keep the programmes apart. Thus keeping the programmes sufficiently together to be synergistic, while keeping them sufficiently apart to address their respective focuses, has been a fundamental challenge for the leaders of both programmes.

The challenges of pests and diseases in South African forest plantations and natural woody ecosystems will inevitably grow. Yet I remain convinced that we will deal with these challenges effectively and this will be through the introduction of increasingly powerful new technologies. The TPCP and CTHB teams have established themselves to bring these opportunities to forestry while also contributing strongly to the education of young South Africans. I am privileged to be supported by a great team of researchers and educators and this has to ensure a positive future.

Ultimately, dealing with forest health problems will demand strong collaborative efforts between teams that are more strongly laboratory based and those that work primarily in the field. I have been delighted to see that this form of association has grown substantially in recent years. Thus students and other researchers linked to companies and working in plantations and nurseries have formed close alliances with FABI. Furthermore, field foresters have begun to collaborate with researchers on field-based projects that must, by their very nature be conducted entirely in the field. In all, I believe that forest tree health can be sustained in a positive way and we look forward to working with you in our efforts at "keeping trees healthy".

WELCOME TO THE TPCP AND CTHB!

The following people have recently joined the TPCP and CTHB research groups. We wish you all a happy and productive time in the group.

Makuena Lebusa Molapa will be studying *Coryphodema tristis* as part of her PhD programme at FABI. She completed her Bachelors and Honours degrees in Agriculture at the National University of Lesotho, and a Masters degree in Entomology at the Oklahoma State University in the USA. Her Masters research project was on intra-guild predation between coccinellid beetles and an aphidiid wasp. Her doctorate research project will focus on the biology, population dynamics, microbial association and management of *Coryphodema tristis* in South Africa.

Riikka Linnakoski is doing four months (2.2.-25.5.2006) of her PhD work at the TPCP as part of the collaborative project between the University of Joensuu (Finland) and FABI. The focus of her recearch is the bark-beetle associated fungi on pine and spruce in Finland and Russia. She is doing her PhD in the Faculty of Forestry (University of Joensuu), where her major is Management of Forest Ecosystems.

Natalie van Zuydam completed her Bachelors and honours degrees at the University of KwaZulu-Natal, majoring in Genetics. She used to live in Pietermaritzburg but has now moved to Pretoria to do her MSc. Her project involves developing a microarray chip in order to identify all known species of *Leptographium*.

Brair Harmer obtained both her BSc and BSc Hons degrees from the University of KwaZulu-Natal, Peitermaritzburg campus. She is currently doing her Masters degree at FABI, with Martin Coetzee as her supervisor and Brenda Wingfield as her co-supervisor. She will be working on the sequencing and annotation of the MAT-2 mating type gene of *Ceratocystis albifundus*.

Marthin Tarigan joined the TPCP for his masters degree in November 2005. He is from North Sumatra, Indonesia. For his masters, he will be working on *Ceratocystis* spp. that attack *Acacia mangium*, *A. crassicarpa* and *Eucalyptus pellita* in forest plantation, in Central Sumatra, Indonesia. Marthin works for a forestry company in Indonesia and had to leave his wife and children behind to pursue his masters here at FABI.

Ryan Nadel will be studying *Thaumastocoris australicus*. Ryan recently completed his MSc degree at the University of the Witwatersrand, where he looked at slash burning and its effects on nutrient dynamics and soil faunal composition in an *Eucalyptus grandis* plantation. His PhD project will aim to unravel the molecular ecology of *Thaumastocoris australicus* reflecting diversity, introduction, spread and adaptation in South African environments. A second focus of the project is to characterise the role of semiochemicals in host selection and pest control.

Marcele Basson has just completed her BSc degree and has joined the TPCP for her honours degree. She will be working on *Chrysoporthe* spp. (*Cryphonectria*) for her honours. Marcele grew up on plantations around Piet Retief and now lives in Kwambonambi where her father works for a forestry company and her mother is a teacher.

Nicolette Fouche is another honours student who joined the TPCP this year. She will be working on *Ceratocystis* spp. for her degree. Just like Marcele, she also grew up in Piet Retief, and has some forestry connections through her father, while her mother is also a teacher. They now live in Pretoria.

The SIREX epedemic in Kwazulu-Natal and it's control

The *Sirex* woodwasp was first reported in KwaZulu-Natal in 2003. By then the wasp populations already seemed well established. By 2005 these infestations had reached epidemic proportions, with 30% or more of the trees being killed in infested plantations. Despite extensive efforts on the part of foresters and researchers to curb the epidemic, success thus far has been limited. This disturbing situation is threatening all pine based forestry in South Africa. For this reason, both industry and research organizations including the Tree Protection Co-operative Programme (TPCP) and the Institute for Commercial Forestry Research (ICFR) are continuing coordinated and intensive efforts to address the problem.

The fast build-up of the *Sirex* populations in Kwazulu-Natal is not unlike those in some other regions of the world. While epidemics did not develop for 50 years after introduction of *S. noctilio* into some areas (e.g. New Zealand), some regions of Australia and South America appear to have been more conducive to a very rapid build-up of *Sirex* populations. This is because *Sirex* infestation is typically a stress related problem. In the absence of widespread stress in plantations or forests, *Sirex* populations normally do not explode. However, the drought over the past seasons in Kwazulu-Natal, the high density, un-thinned plantations and the uniform nature of these plantations are ideal situations for a *Sirex* population build-up. These same factors have been responsible for severe *Sirex* epidemics in pine plantations across the Southern Hemisphere.

Another contributing factor to the *Sirex* epidemic in KwaZulu-Natal is the absence of natural enemies or biological control agents of *Sirex* in the area. A significant effort has been made over the past two seasons to introduce the main biological control agent in many areas of the Southern Hemisphere, namely the nematode *Deladenus siricidicola*. Unfortunately, despite great efforts to ensure the maximum chance of success, the nematode has failed to establish a uniformly high level of parasitism. Assessment of a sample of the 4400 trees inoculated in 2005 (a huge effort which also required the dissection of 15 000 wasps) has revealed an average of only 7 - 10% parasitism. While this is an improvement over the 2004 results, it remains far below the expected parasitism of up to 95% or more. This situation is similar to South America where parasitism has varied between 2 - 90 % in different areas.

A positive aspect from the nematode inoculations during 2004 and 2005 is that it has allowed extensive research and observation regarding this biological control system. Potential factors contributing to the low parasitism have been identified and can roughly be categorized into either operational or biological problems. Operational problems would include rearing, handling, distributing and inoculating the nematode. Biological problems include the influence of the environmental differences between KwaZulu-Natal and the winter rainfall areas from which the nematode originated, differences in populations of *Sirex* and the pine species affected, and loss of virulence in the nematode. Many of these factors have already been addressed. A very large trial is jointly being undertaken by industry and TPCP researchers, with the aim of addressing the outstanding or uncertain questions. Apart from identifying barriers to higher parasitism, the trial also considers different sources of the nematode and could identify potentially better stocks with which to inoculate next year.

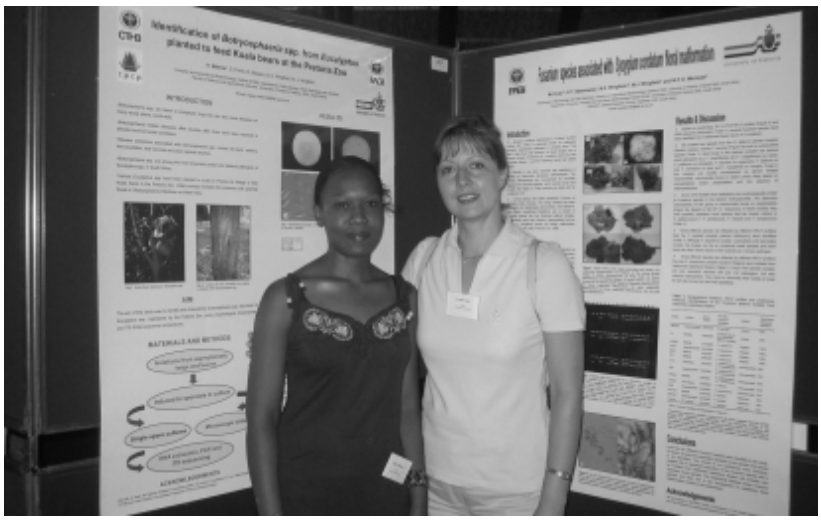
The high *Sirex* populations in KwaZulu-Natal significantly increase the chances of the spread of the wasp. For this reason, quarantine of movement of untreated, raw timber or products is of utmost importance. Any movement of such wood from infested areas is very likely to result in unpredictable *Sirex* distribution. Due to this risk, the need for awareness amongst the forestry community for early detection of *Sirex* in new areas is also great. Monitoring efforts are ongoing in many areas, but need serious consideration on a wide scale. Eradication of small, early established populations is still the best tool to slow population build-ups. Given current problems and the long-term nature of biological control, this is one of the best options should *Sirex* spread to Mpumalanga soon.

There is reason to be optimistic about future control of *Sirex* in eastern pine plantations in South Africa. The current efforts to build an effective monitoring system, determine the necessary silvicultural adaptations, and research on biological control has resulted in great progress towards developing a regionally specific control program for the industry. From other successful programs in the Southern Hemisphere, it is clear that the South African problem is not a simple one, and belief in short term solutions and "silver bullets" should be avoided. What is required and is being implemented is a comprehensive programme, integrating various silvicultural and biological measures. It will also require vigorous and persistent applications of silvicultural and biological control procedures, as well as monitoring, as long as pine is grown in this country.

TPCP PATHOLOGISTS ATTEND NATIONAL CONGRESS

The 44th Congress of the Southern African Society for Plant Pathology was held at Magalies Park Country Club from the 22nd to the 25th January 2006. The congress was attended by about 100 local plant pathologists, fewer than in previous years. There were three keynote speakers from overseas, viz. Dr. Tom Gulya, Sunflower Research Unit, USA-ARS, USA, Dr. Gary Kong, Dept of Primary Industries and Fisheries, Australia and Dr. Jan Rademaker, NIZO Food Research, the Netherlands. The presentations were strongly focused on technical issues related to plant pathology, notably management of diseases by using either fungicides or breeding for resistance. Seventeen TPCP team members attended the meeting and presented papers or posters (some abstracts are presented below).

Magalies Park Country Club is situated on the banks of the Hartebeespoort Dam. An idyllic location one would think but the stench from the Cyanobacteria bloom on the dam was over-powering at times. Ingesting food became a challenge! One wondered how the affluent residents of the numerous suburbs situated around the dam, lived with the smell. It also rained for the 3 days of the conference which resulted in 100% attendance by the participants of all presentations. Smell or no smell the social events were, as per usual, memorable. The Mildenhall stakes (beer drinking competition) took place at 02:00!! The results by all accounts were hilarious!



Happy and Draginja at their posters

Ophiostoma and *Ceratocystis* species associated with wounds on native South African tree species

G. Kamgan Nkuekam[1], J. Roux[1], K. Jacobs[2,] and M.J. Wingfield[1]

Ceratocystis and *Ophiostoma* species are carried by insects and they infect wounds visited or made by these vectors. These fungi include well-known plant pathogens, such as the Dutch Elm disease fungi *O. ulmi* and *O. novo-ulmi* and *Ceratocystis fagacearum*, the causal agent of Oak Wilt. In this study, *Ceratocystis* and *Ophiostoma* spp. were collected from wounds on native tree species in South Africa. Both morphological characteristics and DNA sequence comparisons were used to identify the fungi. Cultures were grown on malt extract agar supplemented with the antibiotic streptomycin. Slides bearing fruiting structures were examined using light microscopy. DNA sequence comparisons for parts of the ITS, ß-tubulin and elongation factor1-ß gene regions were used to confirm morphological observations. *Ceratocystis* and *Ophiostoma* spp. were common on wounds and in some cases they were associated with discolouration of the xylem surrounding the wounds. *Pesotum quercus*, *Pesotum fragrans, Ceratocystis albifundus* as well as an undescribed *Ophiostoma* sp. and two *Ceratocystis* spp. were collected. This study expands reports of *Ophiostoma* and *Ceratocystis* spp. from South Africa and supports the view that the diversity of these fungi is incompletely understood in the country. Surveys will now be expanded to include additional geographic areas and new species will be described.

Sexual compatibility in *Amylostereum areolatum*

M.A. van der Nest[1], M. Wilkens[1], B. Slippers[1], J. Stenlid[2], B.D. Wingfield[1] and M.J. Wingfield[1].

The homobasidiomycete *Amylostereum areolatum*, together with its vector *Sirex noctilio*, seriously threatens pine forestry in the Southern Hemisphere. In these areas, the fungus is spread via asexual arthrospores carried by the woodwasp. This is in contrast to its native environments where *A. areolatum* also reproduces sexually, having a tetrapolar heterothallic mating system. In the model homobasidiomycetes *Coprinus cinereus* and *Schizophyllum commune* with this type of mating system, compatibility is determined by two unlinked mating type loci (loci A and B), each with a number of sub-loci. Since nothing is known about these loci in *A. areolatum*, information from the model homobasidiomycetes was used to characterize the mating type loci of *A. areolatum*. For this purpose, degenerate PCR primers based on the mitochondrial intermediate peptidase (MIP) and the pheromone receptor (PR) genes of *S. commune* were used. Resulting PCR products were cloned and sequenced. Subsequently, allele-specific primers for MIP were designed. Amplification using these primers showed that MIP and mating type locus A are tightly linked, because the amplified products co-segregated with one of the mating type locus A alleles (based on hyphal morphology during mating interactions). Sequences from products obtained using the PR gene primers were extended using PCR-based genome walking. These sequenced PR genes most likely represent a sub-locus of mating type locus B, since mating type B phenotypes co-segregate with diagnostic restriction sites in the sequences. In future studies mating type locus A and other B sub-loci of *A. areolatum* will continue to be characterised using the approach described above. This information will improve our understanding of the processes that shape and govern the population biology and evolution of this important fungus.

Phylogeny of the Pine Pitch Canker Fungus, *Fusarium circinatum:* An emerging global view

J. Wright[1*], R.J. Ganley[2], E.T. Steenkamp[1], E. Iturritxa[3], R. Ahumada[4], B.D. Wingfield[5], W.F.O. Marasas[6] and M.J. Wingfield[1].

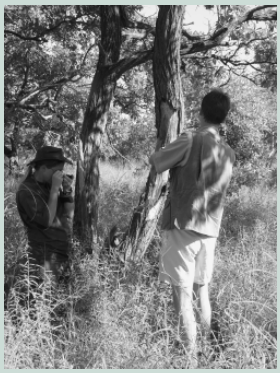
Pitch canker, caused by the ascomycete *Fusarium circinatum*, is one of the most serious diseases of *Pinus spp*. The disease manifests itself as large resinous cankers accompanied with pitch-soaked wood, crown dieback and stunted growth of mature trees. In nursery stock, this fungus can cause serious root and root collar disease, resulting in large-scale seedling mortality. Globally, pitch canker or the pitch canker fungus is known in the USA, Mexico, Chile, Haiti, South Africa, Spain, and Japan, with unconfirmed reports from Italy, Iraq, South Korea and China. In the majority of these locations *F. circinatum* represents a significant threat to native forests or commercial pine-based forestry. Therefore, our major objective is to gain a better understanding of the global evolution and population biology of *F. circinatum*. In this study we conducted a phylogenetic analysis that included representatives from *F. circinatum* populations from California, Florida, Mexico, Chile and South Africa. DNA was extracted from these isolates and several housekeeping genes were PCR-amplified and sequenced. These sequences were then aligned and subjected to various phylogenetic analyses. Analyses of the sequences revealed several nucleotide polymorphisms between the five populations, with fewer differences within populations. These data also allowed us to identify sequence signatures which differentiate among the various populations. Preliminary data suggest that the Chilean populations are more closely related to the isolates from Mexico than those representing the other populations examined. Ultimately the results of this study will provide valuable insight into the origin of the pitch canker fungus and its global spread.

TPCP & CTHB FIELD WORK

None of the projects in the TPCP or CTHB would be possible without material that was at some stage collected in the field, either by the students, or by staff and colleagues. Field trips are also an important component of the education of students in the TPCP and CTHB. They provide students with an opportunity to expand their horizons and to better understand the importance of their work, as well as the forestry industry on which their work ultimately impacts. Field work allows team members from various research subgroups to interact more closely than they might normally do. This is great for retaining a strong team spirit and students also get to know foresters, farmers and nature conservationists.

This year, which is very much in its early stages, there have already been 16 field trips connected to TPCP and CTHB work. These trips provide opportunities for advising TPCP members, opportunity to undertake pest and disease surveys, inoculation experiments, attend field days and present data at meetings held with industry. Interaction with foresters and farmers is crucial, as these people not only rely on our research for answers to disease and pest problems, but without their assistance in the field, our work would be much more difficult. We encourage foresters, farmers and conservation people to report disease and pest outbreaks and to contact us regarding these problems. This forms an important component of the overall TPCP and CTHB pest and disease monitoring function.

Feild trips provide students with an opportunity to learn about tree breeding and see first hand the difference between provenances. Marelize van Wyk, Marcele Basson and Marthin Tarigan at a Sappi provenance trial



Ronald Heath and Jolanda Roux searching for fungi infecting wounds made by elephants in Kruger Nation Park. The work definitely has it's advantages

Izette Greyling and Bianca Hinze hard at work reading an inoculation trial in the field

Surveying for *Thaumatocoris australicus.* A forester's bakkie bonnet provides a very good surface on which to catch these bugs

Field work often requires many hours of isolations, often in the field, as James Mehl is busy with during a survey of *Pterocarpus angolensis* diseases

New Diagnostic Clinic Structure

As part of the services that the TPCP provides to industry, the research team runs a diagnostic clinic for the analyses of forestry samples for pathogens and pests. For the past 12 years, this clinic has been managed and run by Prof Teresa Coutinho. It has also had the reputation of being one of the best of such functions in the world. Teresa made use of students in the group to assist her in the isolation and identification of pathogens from diseased material. In this manner students also received training and experience in the analyses of plant samples and the identification of pathogens.

The clinic not only serves to provide foresters with answers regarding the death of trees and guidelines to reduce these problems, but it also forms an important component of the disease monitoring function of the TPCP and now CTHB. This is extremely important as effective monitoring is a key component of disease management. Not only is monitoring important for the early detection of new pests and diseases, and thus early implementation of management and research systems, but it also provides valuable information on the susceptibility of different clones etc. to pests and diseases. Monitoring, however, requires the entire industry's participation, relying not only on TPCP research staff, but also the diagnostic clinic, farmers, foresters and students. As diseases and pests affect the entire industry, it must be everyone's responsibility to help protect the industry as a whole and thereby the interests of individual companies, or farms.

The TPCP research team continuously strives to improve our services to industry, just as we strive to improve our research quality. In this spirit, the Diagnostic Clinic structure was changed in February 2006. The clinic is now managed and run by Izette Greyling, under the guidance of Prof Jolanda Roux. This addresses the issue that Teresa has assumed substantial new responsibility for pitch canker screening and the new structure would more closely link field services (Jolanda's responsibility) with laboratory diagnostics. Assigning full responsibility of all diagnostics work to a single person, will ensure easier quality control and hopefully more effective service to industry. Izette is currently completing her M.Sc. degree in the TPCP and previously worked in the diagnostic clinic under the guidance of Prof Coutinho. Through her research project, she has already become a familiar face to foresters in the Zululand area, where she has been collecting samples of *Coniothyrium* and conducting trials for her research project.

In future, we would be obliged if our members would use the following channels to send samples for analyses.

- Izette Greyling (izette.greyling@fabi.up.ac.za); 012 420 3938/9/3933 as clinic manager should be your first stop in sending samples to FABI. She will provide you with a reference number for your sample and keep you updated with progress. She will also send out a letter with the results of the analyses.
- Jolanda Roux (jolanda.roux@fabi.up.ac.za); 082 9093202 guides Izette in the clinic and manages field extension for the TPCP. If Izette is thus not available, you can talk to Jolanda. Jolanda will also most likely be the one to do field visits in cases where it is not possible to send samples.
- Entomological samples are logged by Izette who then liaises with Brett Hurley and Bernard Slippers for identification and report writing. Brett Hurley (brett.hurley@fabi.up.ac.za); 082 9093211

We will respond to the receipt of samples (preferably by e-mail), but please always check that samples have been received. These are sometimes lost during dispatch.

If you are unsure of the problem being encountered or need advice on collection of samples, please phone Izette or Jolanda and discuss the problem before collecting and sending the samples.

New Entomology capacity for TPCP/CTHB

Bernard Slippers recently joined the TPCP/CTHB programme as a senior lecturer at the University of Pretoria, officially starting in October 2005. Bernard is not unknown to TPCP members, because he completed his postgraduate studies in the TPCP. His M.Sc. research dealt with the fungal symbiont of *Sirex.* In order to broaden his experience, he chose to undertake a Ph.D. project on a very different topic, namely *Botryosphaeria* canker and die-back pathogens of trees.

After his Ph.D. at the end of 2003, Bernard, his wife Jana and daughter Yvonne left for a postdoctoral project at the Swedish University of Agricultural Sciences. The project, jointly funded by the SKYE Foundation, the National Research Foundation (SA), a bilateral agreement between the governments of Sweden and South Africa, and Forestry South Africa dealt with various aspects of the biology of the *Sirex*-fungal symbiosis. In the process he had the opportunity to work with a number of recognized scientists on this topic, as well as various other forest entomology and pathology projects.

Bernard's studies and involvement with a diversity of projects in the group have brought him into contact with both the forest entomology and forest pathology fields. While he views specialized work in these two fields as essential, the interaction of these organisms and their simultaneous study is a specific passion. Bernard continues to be involved in *Botryosphaeria* related projects within the programme. However, in recent times he has increasingly been involved in forest entomology related projects. Currently he is also supervising projects dealing with *Gonipterus*, the Cossid moth and *Thaumastocoris*. His most prominent current focus is, however, as part of the team studying the Sirex woodwasp, its fungus and biological control agents, in an attempt to better understand and control this major pest.

A new UP research fellow joins TPCP and CTHB

Martin Coetzee (Ph.D.) has recently been awarded a five year contract position in the Research Fellow Programme at the University of Pretoria. This programme is a new initiative of the university that is aimed at providing young scientists with the infrastructure and environment for building their careers within the academia. During his contract period, Martin will be involved in the training of researchers and students by continuation of the phylogenetic workshops that are already in place within the TPCP. He will also act as supervisor for M.Sc. and Ph.D. students. As part of his appointment, Martin has initiated and accepted responsibility for managing two research projects within the TPCP.

The first project involves characterising mitochondrial genomes of a number of plant pathogenic fungi important to tree health in South Africa. Knowledge pertaining to the architecture of the genomes will aid in answering questions regarding the evolution of these organelles and their possible role in pathogenicity. This project will employ many of the tools associated with the field of bioinformatics; it will therefore provide an excellent platform for acquiring and developing new skills within the research corps of the TPCP.

The second project focuses on the taxonomy of *Ganoderma* in South Africa and other countries in Africa. This fungus causes the disease known as Basal Stem Rot (BSR) on trees and other plants world-wide. The identity of the species involved in causing the disease in South Africa has not yet been clarified. The aim of this project is therefore to identify the *Ganoderma* species and develop diagnostic tools that will aid in rapid identification of these pathogens.

A new SAPPI fellow joins the TPCP

Wolfgang Maier was born in Pforzheim, Germany, where he also completed his matric in 1989. After having worked as an orderly during his civil service in a hospital he started to study biology at the University of Tübingen and soil science at the University of Stuttgart-Hohenheim in 1991. Having chosen botany and mycology as his main biological subjects he became especially interested in fungal and plant systematics and the interaction of fungi with plants. For his diploma thesis he undertook a vegetation study in the Southern Brazilian Highland with its impressive *Araucaria* forests, a joint project of the universities of Porto Alegre and Tübingen. He obtained his diploma in 1998. His Ph.D. studies then led him back to Germany, but into a different field. He started working on molecular systematics of rust fungi and completed his doctoral studies on that topic in 2002. This was the first published study aimed at understanding the evolution of rust fungi and their generic circumscriptions on a broader scale, and has been cited extensively since its publication in 2003.

Dr. Maier joined FABI in March 2004, funded by the German Research Foundation (DFG) and the NRF, with the aim of gaining a closer understanding of the real global phylogeny of rust fungi by integrating more southern hemisphere rust genera into his studies. This work is ongoing and also integrating research that had been done by Prof Brenda Wingfield on the rust fungi in the past. As a sub-project of this larger goal, he is studying the phylogeny of the two biggest genera of rust fungi, namely *Puccinia* and *Uromyces* that also include one of the world's most important tree pathogens. This work is done in cooperation with Dr Marlien Van der Merwe at CSIRO, Canberra, Australia.

As a Sappi Researcher, Dr. Maier will contribute to the research activities of the Tree Protection Co-operative Programme (TPCP), of which Sappi is a founder member. One of the most important threats to South African forestry is *Eucalyptus* rust caused by *Puccinia psidii*, which is known to some as the Guava Rust fungus. A key focus of Dr Maier's research will thus be to consider whether the guava- or *Eucalyptus*-rust *P. psidii* in reality represents just one species with a very broad host range or whether it might be a species complex comprising several species with narrower host specificities. Such knowledge will be vital for successful control of the pathogen, which is causing considerable problems in *Eucalyptus* plantations, and especially in *Eucalyptus* nurseries in South America. There is great concern that *P. psidii* could spread to South Africa or even to Australia with its huge natural eucalypt-forests that represent the centre of diversity of eucalypts. Together with Lefoka Calvyn Molepo he is also investigating pathogenic rust fungi on *Acacia* species including those that infect *A. mearnsii* and its relatives. Last but not least Dr Maier is involved in capacity building at FABI, especially in the field of molecular phylogenetic reconstruction.

While Dr. Maier's research is relevant and important to forestry and forest protection in South Africa, one of his most valuable contributions will be to share some of his considerable knowledge of pathogen identification systems, with TPCP students and staff. South African has relatively poor expertise in the field of pathogen and pest recognition and identification and Dr. Maier will thus contribute to expanding human capacity development in this arena. Through its Research Fellowship supporting Dr. Maier Sappi will continue to add to the education of young South Africans, while also promoting the field of forest protection.

Visit to FABI by Norwegian and English entomologists

In November 2005, FABI and the TPCP was visited by two colaborators specialising in entomology. They were Torstein Kvamme from the Norwegian Forest Research Institute and Mark Russel, freelance author and entomological artist from the United Kingdom. The aim of their visit was to meet with staff and students at FABI and discuss current projects and provide their expertise, advice and help.

During their visit we were fortunate to be able to attend a seminar presented by Mark and Torstein, and to have Torstein accompany some students on a field trip. On the field trip he had the opportunity to test a new pheromone canopy trap and investigate the possible occurrence of Ambrosia beetles of the genus *Trypodendron* in South Africa. This genus is easily transported with timber. Debarking is not sufficient to prevent introduction of the genus to new areas, since the larvae mostly live in the wood and not in the bark. The species of the genus are economically important in North America, Europe as well as Asia. To date no member of the genus has been found in South Africa. However, the presence of *Sirex* and European bark beetles in South Africa indicates that these ambrosia beetles might also be present or stand the chance of being introduced.

During a visit to Sabie the new model canopy trap was put out in a pine stand and baited with bark beetle pheromones. A twenty-six year old *Pinus elliottii* stand, on the Tweefontein plantation, situated close to Sabie in the Mpumulanga Province was selected for the study. This site was selected based on its age and close proximity to a recently felled stand, a log depot and the Tweefontein Sawmill. The pheromone mix applied was the standard commercial pheromone for the European spruce bark beetle (*Ips typographus*). In addition pheromones for attraction of the ambrosia beetles of the genus *Trypodendron* were put in the trap. *Trypodendron* species living in broad-leaved trees are attracted to a combination of lineatin and ethanol. If alpha-pinene is added, the conifer living species are attracted.

No ambrosia beetles of the genus *Trypodendron* were collected in the trap. It might be that specimens of *Trypodendron* were not trapped simply because they are absent. No empirical data on the genus in South Africa exist so far. Thus, it is not known what might be the flight period, or if the species are able to produce several generations a year. Twelve specimens of *Orthotomicus erosus* were caught in the trap. It is well known that *O. erosus* responds to the pheromones of *I. typographus*. One specimen of *Hylastes angustatus* was also trapped. No specific information on response of *H. angustatus* to pheromones or host tree components was found in the Pherobase (http://www.pherobase.net/index.htm) or other searches. However, *Hylastes ater* and other species of the genus are known to respond to volatiles from pines, or in combination to ethanol. In addition to the bark beetles, several other families were represented in the trap. Elateridae (Click beetles) was the family with the highest number of specimens trapped. It seems the canopy pheromone trap used might be a good way to screen the flying beetle fauna if adapted to African conditions, in particular to heavy rain.

The visit by these international collaborators was a valuable opportunity for students to communicate and interact with these experts in their respective fields and to gain experience. Visits such as these are invaluable to the TPCP research group and we hope to have Torstein Kvamme and Mark back for another visit soon.

Marthin Tarigan (MSc student), Torstein and Chris Wentzel setting up the trap

THE RESEARCH TEAMS OF THE TREE PROTECTION CO-OPERATIVE PROGRAMME AND DST/NRF CENTRE OF EXCELLENCE IN TREE HEALTH BIOTECHNOLOGY

The research teams of the two programmes are varied, but overlap in many cases. It includes full time research and lecturing staff of the University of Pretoria [Prof. M.J. Wingfield (Director and Mondi Professor), Prof. B.D. Wingfield, Prof. T.A. Coutinho, Prof. J. Roux, Dr. B. Slippers, Dr. M.P.A. Coetzee, Dr. G. Marais, Dr. E. Steenkamp, Mr. B. Hurley] and technical staff (H. Hatting, R. Visser, P. Khumalo, V. Nkosi, K. Mongwaketsi, M. Mahlangu, L. Twala, M. van Zyl, H. Doman, E. Müller, V. Clarence, J. Hale, H. Roos, A. Shumba, M. Fouche, M. Mbonani, T. Mojela). Colleagues and students attached to other organizations such as the ICFR and post graduate students also form part of these teams. Staff from various departments of the University provide advice and support where required.

CONTACT NUMBERS AND WEB ADDRESS
Tel.: 012 420 3938/9
Fax.: 012 420 3960
http://www.fabinet.up.ac.za

IN ORDER FOR US TO COORDINATE OUR SERVICES TO YOU PLEASE HELP US BY USING THE FOLLOWING CONTACT ADDRESS:
STREET ADDRESS FOR DELIVERIES
FABI
Lunnon Rd
University of Pretoria
Hillcrest Pretoria
Gauteng

POSTAL ADDRESS
Tree Protection Co-operative Programme (TPCP)
Att: Prof. Mike Wingfield
FABI
University of Pretoria
Pretoria
0002

MPEPU RURAL YOUTH ENCOURAGEMENT (MRYE) OUTREACH INITIATIVE

Two of the five "hurdles" which the DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB) has to pass as part of its Service Level Agreement, are "knowledge brokerage" and "service rendering".

Although FABI is involved mainly with postgraduate training and research, the importance of supporting and being involved in outreach programmes at all levels of the educational chain is fully appreciated. FABI is therefore actively involved in communicating the importance of science to learners at school level as well. It has been involved with initiatives such as the UP with Science programme, the National Science Week, visits to local schools, visits of school children to FABI and other SAASTA initiatives.

The CTHB has decided to support a special outreach project in 2006. The MRYE outreach initiative was started by a group of very inspired and enthusiastic 3rd and 4th year engineering students at the University of Pretoria, all of whom came from disadvantaged rural school backgrounds and were aware of the problems of poverty, poor education and deprivation facing these learners in the rural areas. The group's mission is to preach the message that education would provide the key to enable hard-working learners to rise above their situation and open up opportunities for them to continue with tertiary education and so embark on successful careers.

Initially, without sponsorship, the MRYE group paid a one day visit to rural schools in Kwazulu-Natal. They provided learners with details of subjects that they needed to take at school in order to follow various careers, discussed courses available at different tertiary institutions and made learners aware of the funding opportunities available to them. Their aim was to motivate these learners and excite them to do well at school so as to open up the opportunity for further study at tertiary institutions.

The group developed their own logo with the slogan "Insight inspires success". They believe that an educated nation = a well informed nation and that the MRYE creates an atmosphere of excellence.

Profs Mike and Brenda Wingfield, of the CTHB, decided to support the MRYE group this year and to sponsor three of the visits that they had planned. The first visit took place to Nquthu in Kwazulu-Natal from 18–21 January 2006. Eleven enthusiastic and excited students under the leadership of Samukelo Vilakazi, visited seven schools in the Nquthu area and were able to assist and inform learners and teachers. On the whole they were well received and considered that their visit had been a great success. A full report on the visit is available from the CTHB.

The group learnt a great deal from this visit to Kwazulu-Natal and are ready to implement changes to their presentations, programme and arrangements so as to ensure that their visit to the Eastern Cape from 8-12 April is an even greater success. They plan a third visit to Limpopo Province in June 2006.

The team is hopeful that they will obtain further sponsorship for the second and third visit and also aims to enlist the support of the Department of Education. We wish the group every success in their drive to help the rural youth of South Africa.

The photo shows the Kwazulu-Natal team in their bright and attractive t-shirts displaying the MRYE and CTHB logos, about to embark on their January visit.