



# Tree Protection News



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

VOL: 17

December 2009

## FROM THE DIRECTOR'S DESK

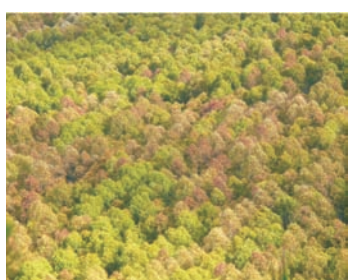
As I write this introduction to the last edition of "Tree Protection News", I am flying back from a short visit to Florida where I have visited with forest pathology/entomology colleagues and continued my survey of *Eucalyptus* diseases in the USA. This component of my sabbatical research project is intended to provide our group with a more extensive understanding of the diseases and insect pests on *Eucalyptus* outside their native range. In fact, the USA is one of the more important 'missing links' in our understanding of how the pathogens of Eucalypts have moved around the world. This is mainly due to the fact that these trees have not really been particularly important in terms of forestry in the USA. Yet, we have much to learn from understanding which insect pests and diseases made their way to this country, and to build collaborative research with colleagues here. Amongst other opportunities, this links our work more closely to some really strong research groups, brings opportunities to draw students and funding to South Africa and provides us with important research material and biological control agents.



Adults with Eggs



*Thaumastocoris peregrinus* Adult



Damage to GC Clone

## CONTENTS

• Directors message	1
• Kenyan delegation visits FABI	3
• Sirex News	3
• IUFRO Management meets in RSA	4
• Dates for annual meeting 2010	5
• Contacting the researchers	5
• Increased entomology capacity	5
• Congress news: Entomology	6
• Congress News: Mycology	7
• FABI exhibition	8
• Diagnostic clinic summary	9
• Welcome to the programmes	10
• FISNA	10
• Field extension	11
• Treehealthnet	12
• Genome sequencing and tree health	13
• Graduations	14
• Who's Who?	15
• Awards and promotions	16

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Having the privilege to undertake sabbatical research in the USA has highlighted in my mind, many issues that tend to be forgotten when one is “at home” and dealing with day to day issues. This is akin to taking a break from the norm and perusing one's situation from afar. I am thus constantly reminded of the incredible strength of the TPCP together with the linked DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB) and the very high regard that groups around the world have for this programme. The fact that pests and pathogens are moving around the world with increasing frequency is also increasingly clear. This highlights the challenges that we have to keep new pathogens and pests out of South Africa, but also that it is increasingly important to continue to build collaborations with colleagues around the world. There is no question that increasingly robust team effort will be needed to deal with plantation health problems in the future.

Our fight against the impact of the Sirex wood wasp has provided a superb example of the power of collaboration in dealing with matters pertaining to tree health. There is little question that our linkages with colleagues around the world have contributed to the great progress that has been made on this front and I believe that this will continue to be the case. These collaborations will bring us more and better biological control agents, but also ideas and techniques that will be vital to us in the future.


On a similar line, TPCP Board members will be aware that we are working with colleagues in various countries of South America to share efforts and costs to develop effective biological control for the bronze bug *Thaumastocoris peregrinus*. During October and linked to the fact that I needed to be in Buenos Aires for the IUFRO Board meeting, I thus met with forest protection specialists from Chile, Argentina, Brazil and Uruguay to discuss opportunities on this front. Here we made superb progress and agreed to collaborate closely to fight a common enemy of increasing importance to all of us. Part of this collaboration will include a jointly funded programme to have one possible biological control agent bred in Sydney and shipped to various of our laboratories. This will mean that we can multiply our efforts to gain access to robust populations of the biological control agent and hopefully also more cheaply than if we were to

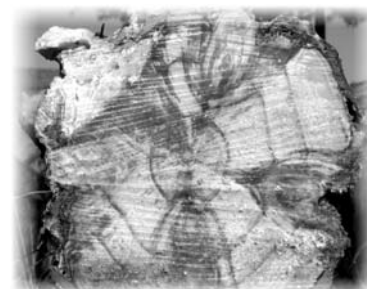
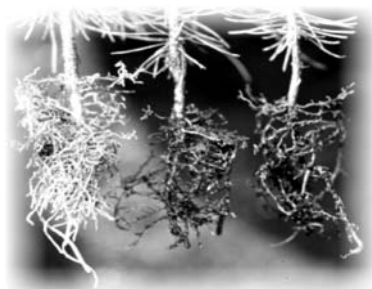
undertake this work on our own.

We have recently heard that efforts to fight pitch canker will be amplified in the coming year through an action of FSA to have Dr. Andrew Morris lead a task team on this topic. Pitch canker caused by *Fusarium circinatum* will continue to be an important disease and a concerted effort to deal with it will be increasingly important. While the strongest tool that we have to deal with the disease lies in host resistance, at the nursery and establishment level, management tools will need to be improved.

During my visit to Florida this last week, I was able to have many useful discussions with colleagues regarding pitch canker, which has been a serious disease in the area for many decades. They have made great progress towards promoting planting of disease-tolerant trees. Yet, the interaction with the environment and the pathogen is understood to be extremely important and, for example, over fertilisation can seriously increase the susceptibility of otherwise tolerant plants. This was clearly emphasised where I had the opportunity to visit stands of *Pinus eliottii* alongside chicken and turkey farms where ammonia emitted from the farms has resulted in trees being very seriously damaged by the pathogen. There are certainly many lessons for us in this and other similar outbreaks of the disease.

We are rapidly moving towards the end of another incredible TPCP year. This is also the end of two decades of a most remarkable programme that has emerged from an understanding that collaboration allows opportunities that would otherwise not be possible. Thus, a team effort including forestry company members of the TPCP, funding from linked programmes such as THRIP and a solid base of support from the University of Pretoria has given South Africa one of the best tree protection programmes in the world. The TPCP and CTHB team wish all our collaborators and stakeholders every good wish for the festive season and for a great 2010. For the TPCP, this will be our 21<sup>st</sup> Birthday year and we look forward to welcoming you all to our annual TPCP/CTHB Tree Health Symposium and Birthday celebration on Tuesday 11<sup>th</sup> and Wednesday 12<sup>th</sup> May.

With best regards  
Mike Wingfield 



Disease symptoms caused by *F. circinatum*

# High Profile Delegation From Kenya Visits FABI



Mike Wingfield, Bernard Slippers and Jolanda Roux (TPCP/CTHB) with visitors from Kenya: Dr. Florence Wambugu and Mr. Daniel Kamanga (Africa Harvest), Dr. Bernard Kigomo (KEFRI), Mr. Benson Kanyi (TBP), Mr. Eric Akotsi, Mr. Nelson Manyeki, Mrs. Faith Odongo (Ministry of Energy).

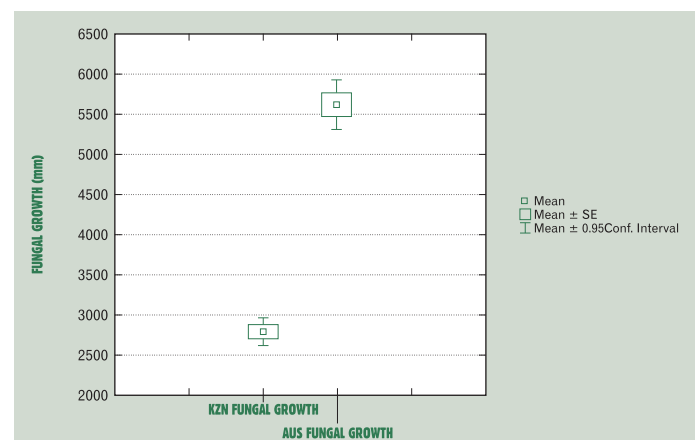
Earlier this year a delegation from the Ministry of Energy (Department of Renewable Energy) in Kenya visited South Africa on a fact finding mission. They were accompanied by researchers from the Kenya Forestry Research Institute (KEFRI), the Tree Biotechnology Project and Africa Harvest. The aim of this delegation was to obtain information on plantation forestry in South Africa, with an aim of using fast growing trees as sources of bio-energy. They visited several commercial forestry companies in South Africa and included a visit to the TPCP and CTB because of the reputation of these groups in dealing with tree health issues. 🌲

## SIREX Woodwasp

### PUSHING TOWARDS MORE EFFECTIVE BIOLOGICAL CONTROL

The Sirex woodwasp, *Sirex noctilio*, still remains a major pest threat to the forestry industry in South Africa. This is despite the recent decrease in infestation levels of this pest and the increase in parasitism levels of the biological control agent, the nematode *Deladenus* (= *Beddingia*) *siricidicola*. One of the main concerns is that the increased parasitism levels of the nematode are mostly due to its natural spread within the Sirex population. Parasitism levels obtained by artificial inoculation of the nematode are still very poor. This means that the industry is not able to rapidly establish the nematode in new areas infested by Sirex, or during outbreaks of Sirex (which may be brought on by environmental factors such as drought or fire). With this in mind, the TPCP is working hard to assist the industry in improving the current efficacy of the biological control programme against Sirex.

One area that the TPCP is investigating is the compatibility of the nematode with the fungus it feeds on. The nematodes feed on the fungus *Amylostereum areolatum* which *Sirex* introduces into the tree (and which results in the tree's death). The nematodes are dependant on the fungus for their survival and their ability to parasitize Sirex larvae. However, the fungus which the nematodes encounter in the trees is a different strain to the fungus which the nematodes are successfully reared on, which may influence the survival of the nematodes in the field. Recent research has shown that there is a significant difference in the growth of these two fungal strains (see figure).



Whether the slower growth of the 'field strain' of the fungus will reduce its success in the field is still being investigated.

The introduction of more effective strains of the nematode could greatly increase inoculation success and thus the efficacy of the biological control programme. However, recent field trials testing nematodes from across the Southern Hemisphere have shown no significant differences in parasitism levels. These results have been supported by molecular studies that reveal that the nematode populations used in the Southern Hemisphere for biological control are essentially clonal (the same).

Continue



Fortunately, collaborators of the TPCP have kindly provided various strains of the nematodes from Canada. These nematode strains can now be tested in the coming seasons for their efficacy to parasitize *Sirex* in South African conditions.

The TPCP is also aiming to increase the efficacy of the current biological control programme through the introduction of parasitic wasps. Parasitic wasps can be used to complement the nematode in controlling *Sirex* populations. One such parasitic wasp, *Ibalia leucospoides*, is already established in the Western Cape and there have been recent efforts by the industry to establish these wasps in KwaZulu-Natal. The TPCP aims to secure a rearing culture of *I. leucospoides* to ensure a continuous supply of this wasp to the industry. This includes the introduction of *I. leucospoides* from other countries to increase the genetic diversity of the population which could possibly influence the ability of *I. leucospoides* to adapt to the diverse environments in South Africa. Efforts are also underway to introduce other parasitic wasps not yet present in South Africa.

To this purpose, a rearing facility has been established

which allows the importation of biological control agents from other countries.

Through these and other efforts, the TPCP aims to assist the forestry industry of South Africa to increase the efficacy of the current biological control programme against the *Sirex* wood wasp. ▲



The Parasitic Wasp, *Ibalia leucospoides*

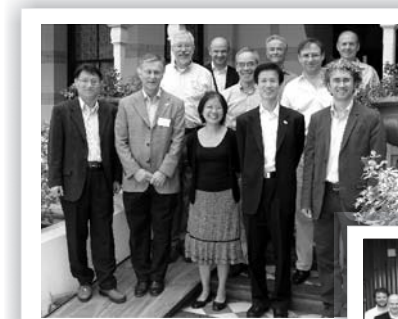
## International Union of Forestry Research Organisations (IUFRO) Management Meets in South Africa

During April 2009, FABI had the privilege of hosting the Management Committee of the International Union of Forestry Research Organisations (IUFRO). IUFRO is one of the world's oldest scientific organizations, well into its second Century, now representing more than 15 000 forest researchers worldwide. With its strong forestry focus, FABI staff and students were delighted to be able to meet and entertain the leaders of IUFRO and to gain from some of their vast international experience.

The management committee of IUFRO which visited FABI included Dr. Don Koo Lee, President of IUFRO based in Korea, Prof. Risto Seppala, IUFRO past president from Finland, the two vice presidents (Prof. John Innes and Prof. Niels Ehlers Koch from Canada and Denmark respectively), Dr. Su See Lee (Malaysia) general member of the IUFRO Board, Dr. John Parotta, Chair of the IUFRO 2010 World Congress organizing committee, Dr. Peter Mayer, Executive Director and Mr. Alexander Buck, Deputy Director from IUFRO Head Office in Vienna, Dr. Richard Guldin (USA) representing the IUFRO Review Panel and Dr. Park of the Korea Forest Research Institute who is Chair of the 2010 Congress organizing Committee. Prof. Mike Wingfield, Director of FABI who also serves on the IUFRO Board and Management Committee, was the local host.



The first part of the IUFRO Management Committee's visit included two days of formal meetings at FABI. As a side event, FABI students and staff enjoyed a seminar dedicated to better understanding IUFRO and its many projects and programmes throughout the world. After completing their business at FABI, the IUFRO Management Committee proceeded to Cape Town where they met with the staff of the University of Stellenbosch's Department of Forestry, a lively event that was dedicated to sharing ideas and knowledge. This was followed by two days of visits to various sites on the Cape Peninsula where the group had the opportunity to learn of activities in the area related to forestry and forestry research. ▲



**Top Row l-r:**  
Dr. Richard Guldin, Mr. Alexander Buck, Dr. John Parotta, Prof. John Innes and Prof. Mike Wingfield

**Bottom Row l-r:**  
Dr. Park, Prof. Niels-Ehlers Koch, Dr. Su See Lee, Prof. Don Lee and Dr. Peter Mayer



Visiting the University of Stellenbosch's Department of Forestry

# Annual TPCP/CTHB Meeting 2010

## Please Diarize!

The annual meeting of the TPCP and CT HB will take place on Tuesday the 11<sup>th</sup> and Wednesday the 12<sup>th</sup> of May 2010 in Pretoria.

If you are interested in attending this meeting, please do not hesitate to contact your board member, or the TPCP/CTHB for more information.

The meeting provides a valuable opportunity for updates on the latest research findings of the research groups, and of those of international groups, as well as important contact time with the researchers to discuss particular problems you are experiencing in your forests/ plantations. ▲

## Increased Entomology Capacity at FABI

Dr. Jeff Garnas has joined the FABI team and will be dedicated to developing research on insect pests of pine and *Eucalyptus* in South Africa. Jeff comes to us from the United States, where he completed his PhD in Ecology and Evolution at Dartmouth College with a specific focus on forest insects. After spending 3 months at FABI in 2008, Jeff has returned as a Sr. Lecturer in the Department of Zoology and Entomology and as a Research Entomologist at FABI.

Jeff is trained as an entomologist and as a population and community ecologist, and brings strengths in the areas of field sampling and experimental design, statistical analysis, and large scale spatial analyses. Please look for Jeff as he finds his way around the country, and embarks on projects aimed at understanding the driving forces behind important pest and pathogen outbreaks in South Africa while developing and evaluating strategies to mitigate their impacts. ▲



## Contacting the TPCP and CT HB

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082 909 3211  
012 420 3938/9

**To share information widely and rapidly please use the email list server called treehealthnet: [treehealthnet@kendy.up.ac.za](mailto:treehealthnet@kendy.up.ac.za)**

# Entomology Congress

The Sixteenth Entomological Congress organised by the Entomological Society of Southern Africa was held at the University of Stellenbosch from the 5-7 July 2009. Six FABI members, Bernard Slippers, Brett Hurley, Gudrun Dittrich-Schröder, Marc Bouwer, Osmond Mlonyeni and Ryan Nadel attended this congress.

The congress commenced with a 'Meet and Greet' function on Sunday evening which was an ideal opportunity to network with fellow entomologists. The keynote address entitled *Microbial control of insects and mites: does it have a future?* by Dr. Lawrence Lacey from the USDA-ARS, USA marked the start of the congress presentations. Dr. Lacey concluded that the implementation of several microbial control agents, such as entomopathogenic viruses, bacteria, fungi, and nematodes, have excellent potential for use in IPM programs.

Attendants were able to select talks from three parallel sessions. The topics of these talks included Behavioural Entomology, Biodiversity, Biocontrol, Conservation, Forest Entomology, Integrated Pest Management, Medical and Veterinary Entomology, Morphology and Physiology. This congress showed a marked increase in student participation with a strong focus on biodiversity and conservation entomology.

Six presentations and one poster were presented from the FABI group, namely:

- Antennal Response of *Gonipterus scutellatus* to Semiochemicals from Eucalyptus Species (Bouwer, M., Slippers, B., Nadel, R., Wingfield, M. J., Naudé, Y. & Rohwer, E.)
- Barcoding of Forestry Pests as a Tool to Understand their Introduction Histories (Slippers, B., Hurley, B., Nadel, R. & Wingfield, M. J.)
- Factors Influencing the Success of *Deladenus siricidicola* to Control the Sirex Woodwasp in South Africa (Hurley, B., Slippers, B. & Wingfield, M. J.)
- Rapid Development of Microsatellite Markers for the *Sirex noctilio* Biological Control Agent, *Deladenus siricidicola*, using FIASCO Enrichment and 454 Genome Sequencing (Mlonyeni, O., Slippers, B., Hurley, B., Ahmuda, R., Klasmer, P., Wingfield, B., & Wingfield, M.)
- Mitochondrial DNA Diversity of Native Populations of *Cleruchooides noackae*, a Potential Biological Control Agent for *Thaumastocoris peregrinus* (Nadel, R. L., Slippers, B., Scholes, M. C., Lawson, S. A., Noack, A. E. & Wingfield, M. J.)
- The Population Dynamics of *Thaumastocoris peregrinus* in South Africa (Nadel, R. L., Slippers, B., Scholes, M. C. & Wingfield, M. J.)

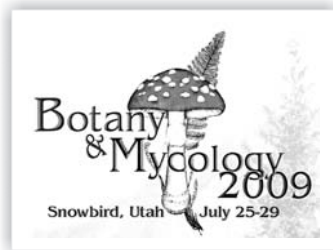
(Poster) The Invasive Gall-forming Wasp *Leptocybe invasa* (Hymenoptera: Eulophidae) in South Africa (Dittrich-Schröder, G., Wingfield, M. J., Hurley, B., Naser, S., Mendel, Z. & Slippers, B.) ▲



From left to right: Osmond Mlonyeni, Gudrun Dittrich-Schröder, Brett Hurley, Ryan Nadel and Marc Bouwer

# Annual Meeting of the Mycological Society of America

Utah, 24<sup>th</sup> - 30<sup>th</sup> July 2009



After a scenic 12 hour road trip on the interstate 80 from Davis in California, across the Nevada desert and through the Salt Pans of Utah, the FABI delegation arrived at Snowbird Ski resort, just outside Salt Lake City, for the meeting of the American Mycological Society (MSA). The given

the title of the conference "Botany and Mycology" connected five leading scientific societies that included members of the Mycological Society of America, the American Bryological and Lichenological Society, the American Fern Society, the American Society of Plant Taxonomists and the Botanical Society of America.

Three representatives from FABI were privileged to be able to attend this meeting. Accompanying Prof Brenda Wingfield was Post-Doc student Irene Barnes and PhD student Quentin Santana. Quentin presented his first paper ever at an international meeting on the pitch canker pathogen of pines and Irene presented work related to the anthropogenic movement of the invasive pine pathogen, *Dothistroma septosporum*. Other contributions to the congress included posters on the Botryosphaeriaceae and *Teratosphaeria* spp.

The conference commenced with a pre-conference MSA foray into the Uintah mountain range of northern Utah. Two busloads of eager mycologists could be seen foraging through the natural forests in search for some interesting looking mushrooms and even possible new fungal species. The day's collections were delightfully displayed in the poster hall for all to see. The timely event of some rainfall two weeks prior to the meeting left spectacular fields full of native wild flowers. Observing these beautiful blooms was a highlight for those botanists and mycologist alike, who managed to get up early enough to attend the morning walks, organised, and lead by, experts in Botanical nomenclature and taxonomy.

The congress had an exciting program filled with a week's worth of workshops, lectures, poster sessions and special symposia including a "Women in Science Panel Discussion" over lunch. It was often difficult to decide which event to attend. While some of the FABI members attended the pre-conference forays, others attended various workshops that were relevant to the research and the teaching done at FABI. These included workshops such as "Using and writing case studies for botany and mycology education", "Preparing Digital Images for Publication" and "DNA-Align, A New Cross-Platform Multiple Sequence Alignment Tool". Although the talks covered a great diversity of topics, many were relevant to a wide scientific audience. These topics ranged from assembling the plant and fungal trees of life, dynamics of evolution in plant and fungi, climate change and biological invasions.

As for some "other fun", a tram ride up to the top of ski slopes afforded the group some relaxation and the opportunity to play, bare foot, in the snow.

The Zipper ride down the mountain, however, was definitely

for the adrenaline junkies. The conference, as a whole, was exciting and a great experience. It was good way to catch up with some old friends and colleagues but also a great way to establish new relationships and collaborations with other scientists.

Irene Barnes would like to thank FABI and Whitehead Scientific for the travel grants that sponsored her attendance at this conference. Quentin Santana had his way paid through UP student travel bursary. Brenda Wingfield is currently on sabbatical in the USA and this has been sponsored jointly by the NRF, Oppenheimer Foundation, the DST/NRF Centre of Excellence in Tree Health Biotechnology and the University of Pretoria.

## TPCP/CTHB Presentations



Quentin, Irene, Conrad Schoch and Brenda



Irene meeting Eva Stukenbrock from Switzerland

- Barnes, I., T. Kirisits, M.J. Wingfield and B.D. Wingfield (2009) Diagnostic markers reveal two species of *Dothistroma* in Hungary.
- Barnes, I., T. Kirisits, M.J. Wingfield and B.D. Wingfield (2009) The anthropogenic movement of the invasive pine pathogen, *Dothistroma septosporum*, is reflected in its genetic diversity.
- Bihon W., B. Slippers, T. Burgess, M.J. Wingfield and B.D. Wingfield (2009) The infection and diversity of *Diplodia pinea* in asymptomatic *Pinus patula*.
- Perez C.A., M.J. Wingfield, B. Slippers, N.A. Altier and R.A. Blanchette (2009) Native Myrtaceae and introduced Eucalyptus sharing Botryosphaeriaceae species in Uruguay.
- Perez G., B. Slippers, B.D. Wingfield, G.C. Hunter and M.J. Wingfield (2009) Micro and macrospatial distribution of the genetic diversity of *Teratosphaeria* (*Mycosphaerella*) *nubilosa* on *Eucalyptus nitens* in South Africa.
- Santana, Q.C., M.P.A. Coetzee, Martin, E.T. Steenkamp, M.J. Wingfield And B.D. Wingfield (2009) Microsatellite discovery in *Fusarium circinatum* using ISSR-PCR and deep sequencing.
- Slippers B., J. Roux, G. Marais, B.D. Wingfield, D. Pavlic, F. Van der Walt, H.M. Maleme, B. Hinze, and M.J. Wingfield (2009) Diverse and overlapping communities of the Botryosphaeriaceae on native and non-native trees in Southern Africa.
- Van der Nest, M., B. Slippers, K. van Zyl, J. Stenlid, M.J. Wingfield And B.D. Wingfield (2009) Gene expression during vegetative incompatibility in *Amylostereum areolatum*.

# CTHB Exhibits at SARChI (South African Research Chairs Initiative) Meeting



Priyen Pillay, Osmond Mlonyeni,  
Gudrun Ditttrich Schröder,  
Marcele Vermeulen and  
Prof Teresa Coutinho

awardees of the South African Research Chairs Initiative (SARChI) and made an announcement about New Research Chairs. The function was attended by the DVC of Higher Education Institutions (HEI's), the recipients of the newly awarded Research Chairs, Vice Chancellors and Directors of Research of HEI's, and representatives of the Private and Business sector, other National Government Departments, the National Research Foundation (NRF) as well as FABI representatives.

The aim of SARChI is to 'expand the scientific research base of South Africa in a way that is relevant to national development goals in an internationally competitive global knowledge economy'. This is envisaged to be achieved by attracting internationally acclaimed researchers and scientists who will conduct research, in publicly funded Higher Education Institutions, that address the challenges associated with the developmental needs of the country and mentorship of post-graduate students.

The new Research Chairs are an addition to the 72 previously awarded since its inception in 2007. The researchers come from the Universities of Pretoria, Cape Town, Fort Hare, Johannesburg, KwaZulu- Natal, Rhodes, Western Cape and Walter Sisulu University for Technology and Science. Seven of the ten new Research Chairs were awarded to researchers working in the field of social and human sciences. This clearly acknowledged the importance of a paradigm shift on the role that social sciences can and must play with

On 6 August 2009, the Minister of Science and Technology, Dr Naledi Pandor, officiated at a function at the Botanical Gardens in Pretoria at which she congratulated the ten new

respect to scientific and technological innovation.

Apart from conducting research, the effective communication of such research is important and very necessary. Mr Bheki Hadebe of the Department of Science and Technology (DST), invited FABI that houses one of the seven DST/NRF Centres of Excellence, and the NRF to exhibit at the event. At the FABI exhibition stall, we shared with attendees the diverse research topics undertaken in FABI. For this we used the 10 year FABI anniversary DVD, and a slide show illustrating pathogens (fungal and bacterial), insect pests of trees and agricultural crops, the damage caused by these and the analysis of "woody" trees. FABIans were also on hand to share their expertise and to answer any questions sparked by the exhibition. Informative material, such as the latest Biennial Report and research brochures, was also available for attendees. The FABI exhibition showcased the dynamic nature of the Institute so successfully, that the team

was asked whether FABI had a new department - THE MARKETING DEPARTMENT!



The FABI exhibit.

As this event marked the continuation of establishing building blocks for research excellence that is responsive to South African needs, it can be said that the active alignment of expectation and reality is well and truly underway!

*Our thanks go to Osmond, Gudrun, Marcelle and Priyen for preparing a wonderful exhibit at very short notice and, together with Prof Teresa Coutinho, for representing FABI at this important function.*



Prof Teresa Coutinho and Jenny Hale (FABI),  
Mr Bheki Hadebe (DST), Dr Linda Mthwisha  
(Manager of SARChI programme, NRF)  
and Vusi Duma (DST)

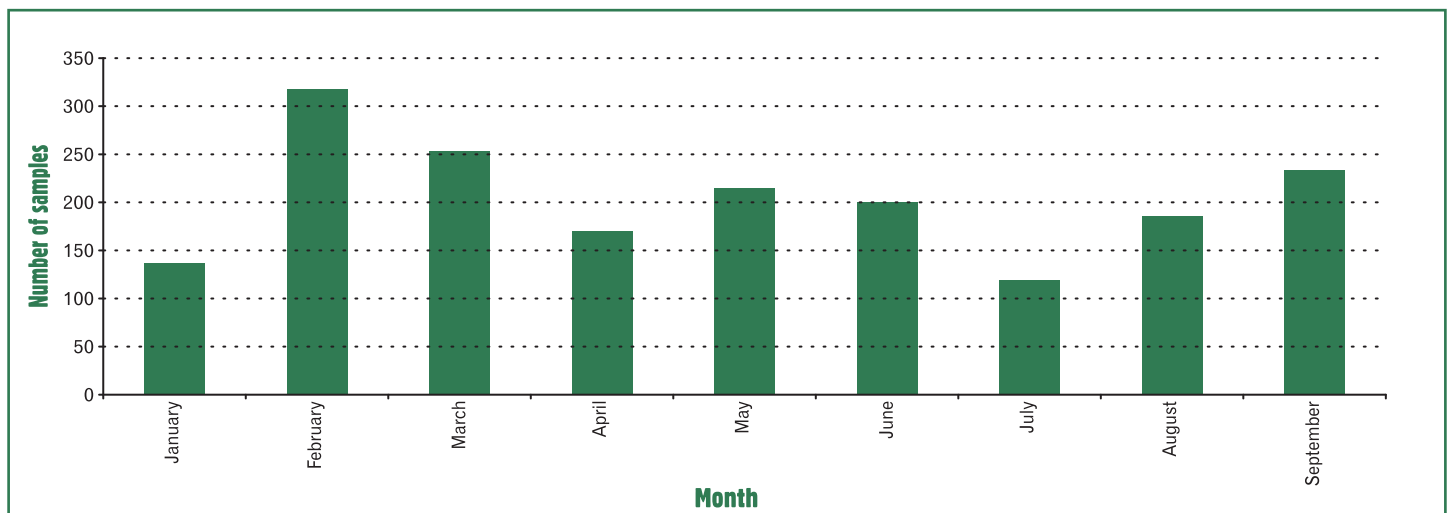


# Diagnostic Clinic Summary 2009

The clinic received 400 more samples compared to the same period in 2008, receiving approximately 1821 samples from January to September 2009. Although the main source of samples is still packages sent to the clinic, the number of samples collected in field has increased significantly with the augmented extension capacity at the TPCP/CTHB.

The majority (77%) of samples received at the clinic was Pine samples. Approximately 6 % of the total samples processed were Eucalyptus samples with most of these samples collected in field. *Acacia mearnsii* samples only comprised about 0.4% of the total number of samples received. Soil and seed samples combined made up about 14% of the total samples received. Samples classified as "other" included water samples as well as samples from native and non commercial tree species and made up the remaining 2.6% of samples received.

Of the Pine samples received at the clinic, 62% of the samples were marked for general disease analyses. These samples included both healthy/asymptomatic as well as diseased samples. 38% of samples received were from nurseries and specific for *Fusarium* screening. These samples were asymptomatic and appeared healthy. Of all the Pine samples received, from both nurseries and field samples, *Fusarium circinatum* was detected on 42% of the samples.



Number of samples received January - September 2009

As noted previously, we have noted an increase in the incidence of opportunistic pathogens such as *Diplodia pinea* causing diseases on trees. Many of the incidents could be traced back to adverse weather conditions such as drought, frost or heat. However, root problems such as J-rooting and plug bound roots were also found to be main causes of stress to trees making them more susceptible to infection by various pests and pathogens. 🌲



J-rooting of *Eucalyptus* root



Sub-optimal root shoot ratio of *P. patula* seedling


# Welcome to the TPCP & CTNB



Emilie Boissin joined the TPCP as a Post doctoral fellow in 2009. She has an interest in Molecular ecology and evolution of tree pests and pathogens, with a particular focus on the *Sirex-Amylostereum* symbiosis. Emilie is from France and completed her PhD at Marseille and a post doc at the Université de La Réunion (France).

Dawit Tesfaye Degefu is currently enrolled in the department of Genetics for a PhD on the genetic diversity and management of the cossid moth *Coryphodema tristis* (Lepidoptera: Cossidae) in South Africa. He is from Ethiopia and holds a degree in Plant Science and a MSc in Insect Science.



Mmatshapho Phasha is from the Limpopo Province, near Polokwane and holds a B.Sc degree in Plant Pathology from the University of Pretoria. She is currently busy with her BSc (Hons) in Microbiology with a project on the identification of vegetative incompatibility gene homologs in *Fusarium circinatum*. 



## Forest Invasive Species Network for Africa Meets in Ghana




In February the executive committee of the Forest invasive species network for Africa held its 2<sup>nd</sup> executive

meeting. The venue for this meeting was the Kwame Nkrumae University of Science and Technology in Kumasi Ghana and the meeting was organized by Dr. Paul Bosu and staff of the Ghana Forestry Research Institute (FORIG), with assistance from the FISNA secretariat in Malawi and funding from the Forestry Service of the United States Department of Agriculture. During the meeting updates were provided on pest, pathogen and invasive plant species in each region in Africa and new management strategies shared. Considerable news coverage was also generated to emphasize the impact of invasive species to the general public and create an awareness of the consequences of the uncontrolled movement of plants and plant products into and within Africa. This falls within the mandate of the network, which is to coordinate the collation and dissemination of information relating to forest invasive species in sub-Saharan Africa for sustainable forest management and conservation of biodiversity. In line with this the network also has an email list server, which is open for anyone interested in forestry and forest protection.

For more information on the network and to contact the local representative in your area:  
<http://www.fao.org/forestry/fisna/en/>

To join the FISNA list server for rapid information sharing please contact the administrator, Jolanda Roux, at [jolanda.roux@fabi.up.ac.za](mailto:jolanda.roux@fabi.up.ac.za)

### Objectives of the network

- To facilitate exchange of information and provide a link for communication about forest invasive species
- To alert and provide policy advice on transboundary movement, phytosanitary measures and other relevant information
- To raise regional awareness on forest invasive species issues
- To encourage the publication and sharing of research results, management and monitoring strategies
- To facilitate taxonomic support 



# Field Extension Activities

An important function of the TPCP and CTHB programmes at FABI is to provide field and monitoring support to the commercial industry, conservation organizations and private land owners. In the period January to November 2009, extension staff and students of these programmes undertook more than 25 research, monitoring and consulting trips to plantations and natural forests in South Africa. These trips involved numerous presentations at field days.

Eucalyptus snout beetle, *Gonipterus scutellatus*. This insect has been causing major defoliation in areas in Mpumalanga, Zululand as well the KZN Midlands. Although this insect has been successfully managed using a biological control agent, *Anaphes nitens*, populations of *G. scutellatus* has shown a dramatic increase in the past few years. Any information by foresters on the incidence and impact of this insect pest would be greatly appreciated. A Ph.D student has started working on the insect to better understand the reasons for the increased outbreaks, as well as to investigate improvement of biological control of this pest.



Industry field day



*Gonipterus scutellatus* adult

Students working on a field experiment



Larvae



Investigating the cause of death of camel thorn trees

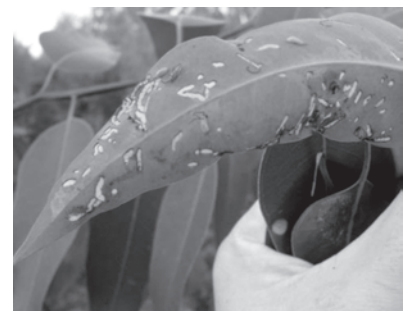


Defoliation

The extension capacity of the TPCP programme was significantly enhanced by the appointment of Izette Greyling in 2008 to act as entomology extension officer. Her position is funded through FSA and with her background in pathology also, Izette has been a valuable addition to the extension programme. For example, through her vigilance, *Leptocybe invasa* was first observed in commercial Eucalypt plantations in the Zululand area. She covered more than 50 000km and has spent more than 120 days in the field.

Monitoring activities by Izette and reports from foresters have showed an increase in the damage caused by the

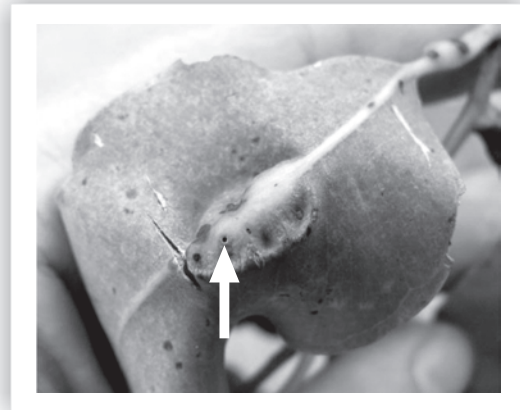
Damage by Larvae



Continue 

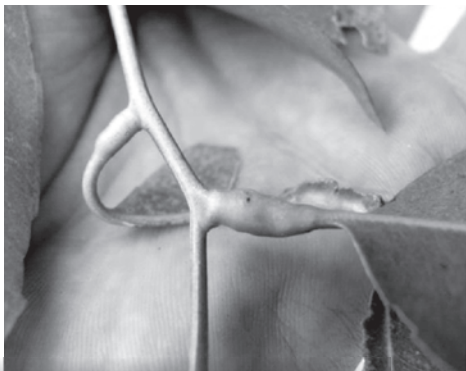


The gall wasp, *Leptocybe invasa*, which was first reported in RSA in 2007, was detected for the first time in commercial *Eucalyptus* plantings in 2009. This was done during routine monitoring activities by the field extension officer and was shortly thereafter confirmed in nearby plantings by foresters in the Zululand area. Gall-like symptoms were first observed on a GC clone in field near Nseleni but the material was too young to confirm whether it was *Leptocybe* or not. Following an alert on Treehealthnet, foresters in the area reported similar gall-like symptoms on the leaves of a commercial stand of GC clones. *Leptocybe invasa* was confirmed by Gudrun Dittrich-Schroder using DNA sequencing techniques. We would like to urge all foresters in *Eucalyptus* growing regions to look out for the symptoms and if you suspect *Leptocybe* please contact us for a site visit.



Galls caused by *Leptocybe invasa* with an emergence hole indicated by the arrow.

Contact Izette Greyling ([izette.greyling@fab.up.ac.za](mailto:izette.greyling@fab.up.ac.za)) or Jolanda Roux ([jolanda.roux@fab.up.ac.za](mailto:jolanda.roux@fab.up.ac.za)) if you have any questions regarding possible diseases or if you would like to send samples to the clinic. This would enable us to offer advice on what samples to send as well as the best way to package and send the samples. We would also be able to discuss the problem in more detail and determine if a site visit is required.



Galls on *Eucalyptus* leaves

## Information Sharing Through Treehealthnet

[treehealthnet@kendy.up.ac.za](mailto:treehealthnet@kendy.up.ac.za)

We would like to encourage any and all members of the forestry industry to join our online tree health forum, Treehealthnet. This is a spam secured email list server that was created to provide a platform for information dissemination and discussion on all matters related to tree health. It is used to advertise upcoming TPCP/CTHB field trips, give updates on the main pests and pathogens as well as provide any other information deemed of interest to the group. It is open to all subscribers to post questions, report sightings of pests and diseases as well as share relevant information.

To subscribe please send an email to the list server manager:

[Wilhelm.debeer@fab.up.ac.za](mailto:Wilhelm.debeer@fab.up.ac.za)

or

[Izette.greyling@fab.up.ac.za](mailto:Izette.greyling@fab.up.ac.za).

# Genome Sequencing and Tree Health

The pitch canker pathogen joins *Pantoea ananatis* and becomes the second tree pathogen for which the genome has been sequenced in Africa and the first eukaryotic genome on the continent.

In a previous issue of this newsletter we reported on the sequencing of the first genome for a plant pathogen in Africa. Through funding obtained from the University of Pretoria and the NRF, the genome of a virulent strain of *Pantoea ananatis* from eucalypts was sequenced in May 2007. This project is lead by Profs. Teresa Coutinho and Fanus Venter and a number of PhD and MSc students are using the genomic data to better understand the pathogenicity, ecology and host specificity of this foliar pathogen of Eucalypts in South Africa. The bacterium is especially problematic in nurseries when the humidity is high and temperatures conducive to disease development. Some nurseries have reported losses of more than 50% of susceptible clones and a better understanding of this pathogen will help solve an important problem.

Prof Brenda Wingfield and a number of students have recently produced the full genome sequence of the tree killing fungus, *Fusarium circinatum*. Similar to the bacterial sequence, that of *F. circinatum* was done by Inqaba biotec, a South African genomics service company based in Sunnyside, Pretoria ([www.inqababiotec.co.za](http://www.inqababiotec.co.za)). Inqaba biotec is using a state of the art Roche/454 GS FLX sequencer for genome sequencing ([www.454.com](http://www.454.com)) Brenda is now spending six months at the University of California in Davis studying and developing a deeper understanding of what the genome can tell us about the fungus and perhaps also ways to control the devastating disease that it causes.

From the initial assembly, the genome of *F. circinatum* is around 44 000 000 base pairs in size which is ten times larger than the average bacterial genome. A total of 500 000 000 bases of DNA were sequenced, thus each base was sequenced on average 10 times. The next step in the process is to characterise the genome and finding the genes. This is referred to as "annotation" and it is where a large scale international collaboration will come into play. The sequence will first be put through an annotation pipeline known as MAKER. Brenda and her team, in collaboration with colleagues at UC Davis will refine their skills regarding the annotation of the genome during her sabbatical visit to that University. These skills will be of great value not only to students of the University of Pretoria, but to South Africa at large.



Symptoms of infection by *P. ananatis* on young Eucalypt clones. This can range from death of highly susceptible plants, to leaf spot.

The sequencing of the *F. circinatum* genome strengthens previous progress made by researchers at the TPCP to better understand this devastating pathogen. During the past few years, scientists in the TPCP produced the first genetic map (a framework of the genome) of *F. circinatum* and this has provided the template for the full genome sequence to be completed. From the map, evidence has emerged that Quantitative Trait Linked Loci (QTL) will shortly be identified for pathogenicity in this fungus. The potential availability of these QTLs and the fact that the genome of a closely related *Fusarium* species has been sequenced, provides an important and exciting opportunity to identify the pathogenicity genes in *Fusarium circinatum*. Understanding how this fungus is able to cause disease in pine trees should allow for the development of innovative methods to control the pathogen. It will also provide more sophisticated tools for tree breeders who are attempting to find resistance to this devastating pathogen.

It is anticipated that the *Fusarium circinatum* genome will be one of many genomes annotated by the University of Pretoria in the future. The skills gained from these two projects will be used to pursue a higher level of academic and research training at the University and to establish an annotation platform at the University of Pretoria.

# Graduations

A graduation is always a wonderful time for a celebration and the Spring Graduation at the University of Pretoria on the 2<sup>nd</sup> September 2009 was no exception.

This celebration was somewhat different to the usual graduations as it was held on the LC De Villiers sports grounds.

What was no different was the number of students receiving their MSc and PhD degrees. For the Faculty of Natural Science and Agriculture this was 22 PhD and 50 Masters degrees.

## Masters



Grobbelaar Johanna Wilhelmina (with distinction)

**Title:** Taxonomy, phylogeny and species diversity in the *Ophiostoma quercus* complex

**Supervisors:** Prof BD Wingfield, Prof P Bloomer, Prof MJ Wingfield

**External Examiners:** Dr H Solheim (Norwegian Forest Research Institute, Noorweë), Dr A Uzunovic (FPI Innovations - Forintek Division, Kanada)

Van Zuydam Natalie Rachel (with distinction)

**Title:** Identification of *Leptographium* species by oligonucleotide mismatch discrimination on a DNA microarray

**Supervisors:** Prof BD Wingfield, Prof MJ Wingfield, Dr K Jacobs

**External examiners:** Prof L Bernier (Université Laval, Canada) Prof RC Witthuhn (Stellenbosch University)



Wilken Pieter Marthinus (with distinction)

**Title:** Identification and application of mating type gene sequences in *Ophiostoma*

**Supervisors:** Prof BD Wingfield, Prof MJ Wingfield, Mnr ZW de Beer

**External examiners:** Prof RC Witthuhn (Universiteit Stellenbosch) Dr P Krokene (Norwegian Forest and Landscape Institute, Noorweë)

Muthelo Vuledzani Gloria

**Title:** Molecular characterisation of *Ganoderma* species

**Supervisors:** Dr MPA Coetzee, Prof BD Wingfield, Prof MJ Wingfield, Dr M Bogale

**External examiners:** Dr AJ Cilliers (Plaaskem (Pty) Ltd)



## PHD



Barnes Irene (Genetics)

**Thesis:** Taxonomy, phylogeny and population biology of the red band needle blight pathogen and related species

**Supervisors:** Prof BD Wingfield, Prof Dr MJ Wingfield

**External examiners:** Dr RE Bradshaw (Massey University, New Zealand) Dr RC Hamelin (Canadian Forest Service, Canada)

Heath Ronald Natale (Genetics)

**Thesis:** *Ceratocystis* species in southern and eastern Africa with particular reference to *Ceratocystis albifundus*

**Supervisor:** Prof J Roux, Prof BD Wingfield, Prof MJ Wingfield

**External examiners:** Prof J Juzwik (University of Minnesota, USA) Prof P Niemelä (University of Joensuu, Finland)



Pavlic Draginja (Plant Pathology)

**Thesis:** Taxonomy and population diversity of *Botryosphaeriaceae* associated with woody hosts in Southern Africa and Western Australia

**Supervisors:** Prof B Slippers, Prof TA Coutinho, Prof MJ Wingfield

**External examiners:** Prof P Capretti (Diba Dipartimento Biocologie Agrarie, Italy) Dr AJL Phillips (Universidade de Lisboa, Portugal)

# Who's Who?

## Dr Eunsung Oh



Post Doctoral Associate  
South Korean

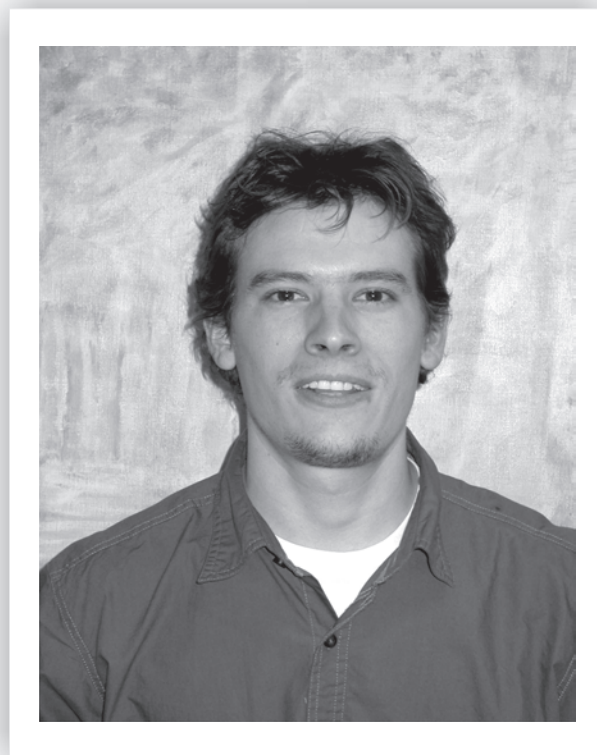
### Research/Expertise:

The main aim of my project is to survey biodiversity of Phytophthora species in natural forest ecosystem in South Africa. Phytophthora species are known as destructive pathogens worldwide causing root-rot, foliar blight, and cankers on economically valuable forest trees. Because virtually nothing is known of what species of Phytophthora exist nor what their roles are in South African forests, my work aims to better understand the biology, ecology, and population structure of Phytophthora species in Southern Africa. In addition, this project will provide a valuable baseline study which will be essential information to determine whether Phytophthora species are introduced pathogens or indigenous to South African forests. Such information is invaluable in terms of disease management in epidemic situations. In general, I am interested in microbe-plant interactions in aspects of pathology, histocytology, and molecular biology.

### Hobbies/Interests:

I love reading novels and watching movies. I also enjoy the outdoors and photography.

## Marc Bower



MSc student  
South African

### Research/Expertise:

I am a chemist by training and joined FABI in 2008 for my MSc. My research project focuses on the identification of certain volatile organic molecules known as semiochemicals. Semiochemicals are molecules that function as messenger molecules between different species of insects and trees. These molecules have the potential to be used in kairomone and pheromone traps which can be used by the forestry industry for monitoring pests. Currently I am busy identifying kairomones for the Eucalyptus snout beetle (*Gonipterus scutellatus*). The identification of these molecules is a complex process which involves a separation step (chromatography). We use the nerve responses from the insect's antenna to indicate which chromatographic peaks contain active semiochemicals, and identify these peaks based on their mass spectra.

### Hobbies/Interests:

I play tennis and squash and occasionally jog to keep fit. I also love music and I play guitar.

# Awards and Promotions for TPCP and CTHB

## Students and Staff



The Faculty of Natural and Agricultural Sciences at the University of Pretoria (UP) is proud to announce that the exceptional achievements of Prof. Mike Wingfield, Director of FABI (Forestry & Agricultural Biotechnology Institute), and Faculty Deputy Dean, Prof. Brenda Wingfield, have again been recognized and rewarded.

**AU Award to Brenda Wingfield:** The African Union honoured Prof. Brenda Wingfield with an AU Women Scientist Regional Award which recognizes her great scientific achievements and contribution, through science, to the socio-economic development of Africa. The official awards ceremony was held on African Union Day, 9 September 2009, at the African Union Commission Headquarters Conference Centre in Addis Ababa, Ethiopia. The honorable South African Ambassador to Ethiopia received the award on her behalf. The AU's Women Scientists' Awards Programme stems from the Commission of African Union's attempts to promote science in Africa and is being implemented by Regional Economic Communities within the five regions of Africa.

"One does not do research to receive awards, but recognition is deeply appreciated, and this recognition is certainly not only to myself but to the many students and colleagues that have

supported me. I hope that this award will encourage women to consider careers in Science, especially in those domains that are considered nationally as scarce skills," says Prof. Brenda Wingfield

According to Brenda, being part of an outstanding research-orientated institution such as UP, has enabled her to reach her goals. She makes a point further that being part of the world-class Forestry and Agricultural Biotechnology Institute (FABI), has provided her with a community of colleagues and superb students that has synergised her research and mentorship in many ways. The world class facilities, opportunities to contribute to global projects, as well as the quality of work done at UP and FABI have been fundamental to her success.

**GDARD Award to Mike Wingfield:** Prof. Mike Wingfield was the recipient of the "Biotec Fundi Capacity Builder Award 2009" at a function held at the Innovation Hub, Pretoria, on Monday 31 August. This was one of six Biotech Fundi Awards presented at a Gala event as part of a comprehensive incentive scheme set up by the Gauteng Department of Agriculture and Rural Development (GDARD) to support, promote and develop those individuals and companies who make a significant impact on the Biotech sector in Gauteng.

The specific award presented to Prof Mike Wingfield is reserved for a person who has gone the extra mile with regard to empowering students and colleagues by imparting his insight and skills in order to add to trainees' market readiness in the biotech sector.



**FABI awards:** During the annual year-end function of the Forestry and Agricultural Biotechnology Institute, several people associated with the TPCP and CTHB programmes were awarded for their contributions to the programme and research excellence. **Ryan Nadel** was selected as the FABIAN of the year. This award is the highest award that a student in FABI can receive and acknowledges scientific excellence, participation in the running of the group, mentorship and general contributions to the group. Ryan also received the award for the best feature article on the FABI website. **Gerda Fourie** received the award for the publication with the highest international impact factor during 2009 and **Joha Grobelaar** received the award for the M.Sc dissertation with the highest percentage (84%). Awards for mentorship went to **Markus Wilken** and **Tuan Duong**, while **Alvaro Duran** received the prize for the best student website. **Kershney Naidoo** won the award for "getting the message to the public" for her contributions to communicating science to a wider audience.

**Ryan Nadel**

**Promotions:** During the recent rounds of evaluations for promotion of staff, three staff members of the TPCP and CTHB were promoted. Early in 2009 Dr. Bernard Slippers was promoted to Associate Professor, while recently Prof. Jolanda Roux was promoted from Associate Professor to full Professor and Dr. Emma Steenkamp to Associate Professor.