



Tree Protection News

Newsletter of the Tree Protection Co-operative Programme (TPCP) and DST/NRF
Centre of Excellence in Tree Health Biotechnology (CTHB)

Volume 49

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FROM THE DIRECTOR'S DESK

As I write this note for the first of the two annual newsletters of the Tree Protection Co-operative Programme (TPCP) and the DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB), I cannot help but reflect on the annual meetings of these two remarkable programmes, held a few days ago in mid May. This was the 25th Anniversary meeting of the TPCP, which in itself, is a remarkable achievement on the part of the South African forestry industry, academic institutions, the various organisations that provide co-funding, many researchers and a large number of exceptional students. In terms of co-operative research ventures, the TPCP/CTHB stands alone in South Africa but I believe it would be fair to say that this is also true internationally. Heartiest CONGRATULATIONS to all that benefit and have benefitted in the past from a truly exceptional (and complex) network of positive associations!!



The TPCP celebrates 25 years in 2014. The programme grew from a small group of less than five people to the largest of its kind in the world!

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Layout and design: Jolanda Roux

The TPCP is celebrating



25 Years of "keeping trees healthy"

Preparing for and then presiding over a meeting strongly focused on activities over a 25 year period allows one to 'look back' and reflect on achievements and milestones. I remember so vividly a meeting held in 1988, unusually in a small holiday apartment overlooking the Durban bay, where I discussed with the research directors of Mondi (Neville Denison), Sappi (Mike Shaw), H.L.&H. (John Tew) and the Executive Director of the then Forestry Council (Bruce McKenzie), the prospects of establishing an initiative to support South African Forestry in dealing with the growing threat of pests and pathogens. The following year, we began more serious discussions at the University of the Orange Free State and in 1990, we signed the first TPCP contract and held our first meeting. There were certainly less than ten people in attendance, these including my first few students. Placing this in perspective, our meeting last week included more than 200 people, at least half of them graduate students.

The TPCP (now supported by and supporting the CTHB) has come a long way in 25 years. There are many more important milestones than I can reasonably list in this brief 'forward' note. The most important of these has been the ability of the programme to deal with a large and growing number of forest pest and pathogen problems. Some remarkable achievements have been made, and again these are too numerous to mention in any detail. Certainly the achievements of the Programme in dealing with diseases such as pine pitch canker and various Eucalyptus stem canker problems are notable. Likewise, contributions towards managing the devastating Sirex Wood Wasp and the growing numbers of Eucalyptus pests have been impressive. Importantly and sometimes forgotten is the fact that the Programme has also contributed very substantially to education and human capital development (South Africa as well as internationally) and to many community and social upliftment initiatives. Thus, while contributing to 'keeping trees healthy', the collateral benefits should neither be forgotten nor under-emphasized.



25 years of tree health news

The damage by and future threats due to tree pests and pathogens to forestry in South Africa and globally, remains huge. Just in the few weeks preceding the TPCP/CTHB meetings, two new and worrying problems have arisen. One is a serious rust disease on *Acacia mearnsii* and the other a new Eucalyptus leaf-feeding insect. Unfortunately, it would be naïve to believe that there will not be others. There is no question that we will need to build and expand our capacity to deal with this growing and important impediment to the long-term sustainability of forestry in South Africa. And let us not forget the importance of the health of our natural woody ecosystems, which are deeply connected to commercial forestry operations. These threats might seem daunting yet I believe sincerely that they can be managed. My confidence in this regard emerges from simply looking back at what has been achieved through the activities of the TPCP during the course of the past 25 years.

Warm Regards, Mike Wingfield



ANOTHER NRF A RATED SCIENTIST IN FABI!

The National Research Foundation (NRF) of South Africa rates scientists in the country based on the quality of their research outputs. The evaluation is undertaken by national and international reviewers who are requested to critically scrutinise the research completed during the assessment period. This is a very tough process which aims to encourage scientists to actively publish their work and participate in international research activities. The highest rating that can be achieved is an "A" rating.

Recently Prof. Brenda Wingfield, a research team leader in the TPCP and CTHB programmes, became the second team member of these programmes to obtain an NRF A rating. Brenda conducts research focussed on speciation and evolution of fungi, predominantly non model Ascomycetes. This includes research on genetic variation within as well as between species. She was the initiator and driving force behind the sequencing of the first Eukaryote genome in Africa.



Professor Wingfield receiving recognition for obtaining an A rating from the NRF

Besides her leadership in the TPCP and CTHB research programmes, Brenda also serves as the Deputy Dean of Research and Post Graduate Studies of the University of Pretoria. Brenda is a perfect example of "give a busy person something to do and it will get done timely and thoroughly!"

CONTACTING THE TPCP AND CTHB RESEARCH TEAM AND DIAGNOSTIC CLINIC

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BIOLOGICAL CONTROL AT FABI

Biological control remains one of the most important strategies to manage insect pest populations in plantation forestry systems. In South Africa, the first biological control agents for forest insect pests were introduced in 1910 for the long-horned eucalypt borers, *Phorocantha recurva* and *P. semipunctata*. Since then biological control agents have been released for most of the major forest insect pests in South Africa (Table 1), and are in some cases the main, if not only, management strategy available. Most recently, this has included the release of biological control agents for two new pest introductions; the eucalypt gall wasp, *Leptocybe invasa*, and the bronze bug, *Thaumastocoris peregrinus*.

Initial efforts to release the parasitic wasp *Selitrichodes neseri* to manage populations of *L. invasa* were reported in previous issues of the TCP/CTHB Newsletter. Releases have continued and as of April 2014 approximately 15 500 wasps

(males and females) had been released in various sites across the country. Importantly, post-release studies carried out by PhD student Mr Kwabena Baffoe have shown that *S. neseri* has established at nearly all release sites and is spreading within sites. Studies to investigate the establishment of this important biocontrol agent will continue, as will releases in key areas after the winter period.

October 2014 marked the first releases of a biological control agent for the bronze bug *T. peregrinus* in South Africa. This followed six years of intensive research on the minute parasitic wasp, *Cleruchoides noackae*, followed by the successful application to the Department of Agriculture, Forestry and Fisheries (DAFF) for its release. Releases have so far been made at thirteen highly-infested *Eucalyptus* sites in the Limpopo and KwaZulu-Natal region, as well as at sites around Pretoria. In total approximately 2 450 parasitized eggs have been released – a monumental task

Table 1. Classical biological control agents introduced to manage insect pests of plantation forestry in South Africa.

Pest	Classical biocontrol agents	Year biocontrol first introduced
<i>Phorocantha semipunctata</i> ; <i>P. Recurva</i>	<i>Megalyra fasciipennis</i> <i>Avetianella longoi</i> <i>Syngaster lepidus</i>	1910
<i>Gonipterus</i> spp.	<i>Anaphes nitens</i>	1926
<i>Cinara cronartii</i>	<i>Pauesia</i> sp.	1983
<i>Orthotomicus erosus</i>	<i>Dendrosoter caenopachoides</i>	1984
<i>Trachymela tincticollis</i>	<i>Enoggera reticulata</i>	1986
<i>Sirex noctilio</i>	<i>Deladenus siricidicola</i> <i>Ibalia leucospoides</i>	1996
<i>Leptocybe invasa</i>	<i>Selitrichodes neseri</i>	2012
<i>Thaumastocoris peregrinus</i>	<i>Cleruchoides noackae</i>	2013
<i>Glycaspis brimblecombei</i>	<i>Psyllaephagus bliteus</i>	Research in quarantine
White grubs; cutworms	Entomopathogenic nematodes	Exploratory research

BIOLOGICAL CONTROL AT FABI (continued)

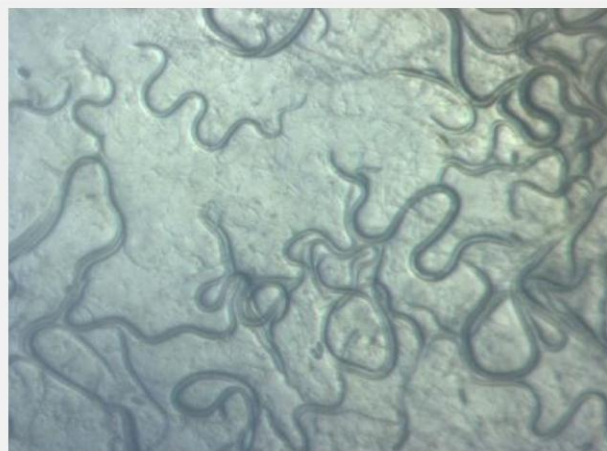
considering the delicate procedures required to rear this insect. The parasitoid wasp has already been recovered from the release sites in Pretoria but further post-release monitoring is required to confirm its establishment in other areas.

Biological control work on the Sirex woodwasp, *Sirex noctilio*, using the parasitic nematode *Deladenus siricidicola*, is ongoing with approximately 1 billion nematodes produced again this year at the FABI Biocontrol Centre. FABI's involvement with the biocontrol of Sirex started in 2003 and it has currently produced and shipped close to 14 billion nematodes to the forest industry. In addition, numerous MSc and PhD students continue to unravel the complexities of the Sirex-fungus-nematode system, making substantial contributions to our understanding and management of this serious threat to the pine industry.

In response to the increasing threats that forestry in South Africa faces from new introductions of insect pests, FABI has significantly extended and intensified its focus on biological control. Host specificity trials have started this year to test the potential use of *Psyllaephagus bliteus* for release as a biological control agent against the red gum lerp psyllid, *Glycaspis brimblecombei* in South Africa. *Glycaspis brimblecombei* was first detected in South Africa in 2012 and is already causing damage in many *Eucalyptus* growing areas. Biological control and other management strategies are urgently needed for this insect. Depending on the outcome of studies to investigate the threat of the recently detected shell lerp psyllid (preliminary described as *Spondylia sp. plicatuloides*), efforts to explore biocontrol options may also be required for this insect. In this case very little is known about the insect or its natural enemies so such an initiative is likely to require considerable investment of both time and money.

The high inputs often required for biocontrol confirm the importance of international collaboration such as the BiCEP (Biological Control

of Eucalypt Pests, www.bicep.net.au) initiative, which the South African forestry industry has recently joined.



Deladenus siricidicola*, the nematode biological control agent of *Sirex noctilio

In addition to the aforementioned projects, FABI has also started exploratory work to investigate the potential use of entomopathogenic nematodes (EPNs) as biological control agents against white grubs and cutworms (larvae of Scarab beetles and moth larvae respectively, that feed on and kill young eucalypt, pine and wattle plants). These insects, which can cause over 80% mortality in newly planted stands, are generally controlled using insecticides. However, tighter regulation from bodies such as FSC (Forestry Stewardship Certification), as well as the possible development of insecticide resistance in insect populations has necessitated the consideration for alternative management strategies.

In an increasingly interconnected world and the subsequent increased introduction of alien invasive species, biological control remains a key component to protect plantation forestry in South Africa. To this end we are very grateful for the ongoing support of the University of Pretoria; Forestry South Africa; members of the Tree Protection Cooperative Programme; Department of Agriculture, Forestry and Fisheries; Department of Science and Technology; and our many international collaborators.

NEWS FROM THE DIAGNOSTIC CLINIC

Every year brings with it an air of the unexpected; you end off one year with plans, a sense of direction, but once the clock rings midnight those plans can change, and you end up somewhere else. This is a reality we all face, especially within the industry in which we work. At the 25th Annual TPCP meeting, during my report back for the past year, I spoke about the importance of plant diagnostic clinics and their role in change, particularly the necessary change brought about by pests and pathogens. One of the tools available to us are plant diagnostic clinics; which through accurate diagnoses and pathogen surveillance can help predict outbreaks and allow for the development and application of mitigation strategies.

Within the TPCP/CTHB clinic we regularly experience change. Change in the number of samples we get, the species we need to identify and even the protocols we use. One change which is always guaranteed is the students. Every year the clinic brings on new students who want to work closer with industry and learn the basic skills of diagnostics. Last year, I was helped by Dong Hyeon Lee (KOR), Mkhululi Maphosa (ZIM), Katie Termer (USA) and Khumbuzile Bophela (RSA)

Together the diagnostic clinic processed more than 1700 samples in 2013, the majority of which was pine.

In 2014, we welcomed Dong Hyeon Lee (KOR) (his third year of service) and two new students, Simone Fouché (RSA) and Tanay Bose (IND) to the team. Each student, within their own projects, work on different organisms, bringing to the clinic some extra experience and knowledge. Please have a look at their personal pages on the FABI personal page to get more information on them.



Left to Right: Tanay Bose, Simone Fouche and Dong Hyeon Lee, the Diagnostic Clinic Team for 2014

Part of the training the students receive is the annual diagnostic clinic field trip. This year we wanted to try something a little different and try and put the Diagnostic clinic and the research conducted here at FABI into perspective – where do we fit in with the “bigger picture”? With that in mind, the trip was planned to ensure that the new students could get an idea of just how important their, the Diagnostic Clinic’s, and the rest of FABI’s work is to the forestry industry.

To understand the bigger picture we had to look at all the aspects within the forestry industry. Our schedule therefore included visits to nurseries, plantations and the Mondi Richards Bay mill. We also visited Prof Colin Dyer and Sally Upfold at the ICFR. We would like to thank everyone from Mondi, Sappi, the ICFR and Top Crop for their help in making this trip a success.



Katie Termer, Donghyeon Lee, Khumbuzile Bophela, Mkhululi Maposa and Darryl Herron receiving certificates from Profs. Mike Wingfield and Jolanda Roux in recognition for their services in the Diagnostic clinic in 2013.

CTHB & TPCP EXTENSION ACTIVITIES

Extension forms an integral part of the activities of the TPCP and CTHB research programmes. These activities include diagnostic visits to plantations, forests and gardens, participation in field days, lectures at other Universities, participation in workshops, industry research trials and the publication of information on pests and diseases in forestry, agricultural and botanical magazines.



Participants during an ICFR/TPCP field day in Louis Trichardt, Limpopo Province, in March



Advising the Pretoria Botanical Gardens on cycad diseases and pests

Do not hesitate to contact the CTHB & TPCP teams if you suspect pests and/or disease problems on your trees. Knowledge gained through field extension is crucial in the early detection of new problems, and thus the initiation of timely management strategies.



Who to contact regarding pest & disease problems in plantations and forests



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ALERT: NEW DISEASE OF BLACK WATTLE IN SOUTH AFRICA

A previously unknown disease of *Acacia mearnsii* (black wattle) has recently been detected in the KZN Midlands. Research by TPCP scientists has shown that the disease is caused by a rust fungus, the identification of which has yet to be determined. The disease appears to be relatively wide-spread in the Natal Midlands and the ICFR together with the TPCP and forestry industry partners (NCT) are working to test the susceptibility of some of the commercially grown *A. mearnsii* for resistance to this disease. DNA sequencing and other techniques are currently being used to identify the species of rust involved and plans are underway to understand the biology of the pathogen and thus to be able to enhance management options.

Please report occurrences of this disease to Jolanda Roux (jolanda.roux@fabu.up.ac.za) or the diagnostic clinic (Darryl.herron@fabu.up.ac.za). Early detection of the disease in new areas will greatly assist in assessing its status and informing management strategies.



Defoliation of leaves and brown rust spores and pustules covering the pinnules and rachis



Early infection: Yellow spots with developing brown/black rust pustules in their centres



Brown rust spores and pustules covering an infected rachis and leading to malformation



Brown rust pustules on a young branch



Brown rust spores and pustules covering infected branches and leading to malformation

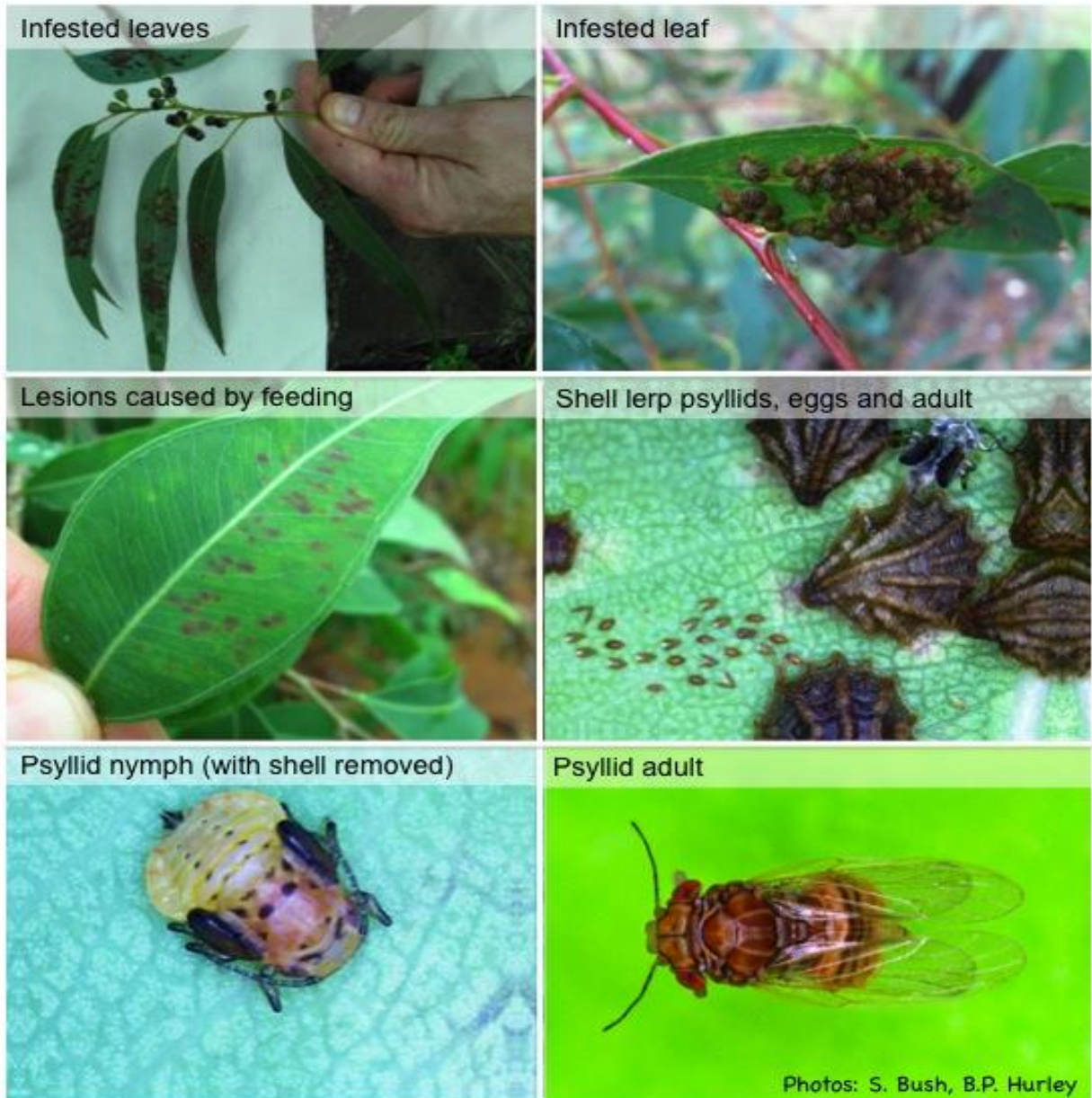


Malformation of an infected rachis

PEST ALERT: Shell Lerp Psyllid, *Spondylaspis c.f. plicatuloides*

Another insect feeding on *Eucalyptus* species was detected in Pretoria in March 2014. The insect has been identified as a shell lerp psyllid in the genus *Spondylaspis*, possibly *Spondylaspis plicatuloides*, and is native to Australia. As with the red gum lerp psyllid (*Glycaspis brimblecombeii*), detected in South Africa in 2012, this psyllid is a sap-sucking insect where the nymphs are covered by a protective casing called a lerp. In the case of *Spondylaspis* the lerp has the appearance of a shell, hence the common name. The distribution and pest status of this insect is currently unknown but studies are underway to test the susceptibility of some of the commercially grown *Eucalyptus* to this insect.

Please report infestations of this insect to Dr Jeff Garnas (jeff.garnas@up.ac.za) OR Dr Brett Hurley (brett.hurley@up.ac.za). Early detection of this psyllid in new areas will greatly assist in assessing its pest status and informing management strategies.



ANNUAL TPCP STAKEHOLDER MEETING – MAY 2014

The annual meeting of the Tree Protection Cooperative Programme (TPCP), held at the University of Pretoria on 13 and 14 May 2014, marked the 25th year of the programme. Presentations during the meeting not only updated foresters present on research progress during the past year, but also reflected on the past 25 years of advancing science and technology to keep plantation forestry trees healthy. Importantly, through the participation of a number of international tree health experts, the situation in South Africa was also placed into a global perspective. The meeting was attended by more than 100 people which included foresters, tree breeders, plantation and nursery managers, as well as higher level managers representing all the major role players in commercial forestry in the country.

Mr. Patrick Kime, CEO of NCT Ltd. was the opening speaker for the meeting. Mr. Kime gave an insightful review of the value and growth of private-sector timber farming in South Africa. He explained how commercial forestry in South Africa has changed over the years from being dominated by a few large companies, to a multi-faceted collage of plantation owners, ranging from major international companies to small scale farmers, some of whom own as little as one hectare of plantation. The changing landscape of plantation forestry in South Africa has brought additional challenges in terms of tree health, as management of pests and diseases in the smallest plantation can have an enormous impact on neighbouring commercial plantations and should receive more attention.



Mr. Patrick Kime (CEO, NCT) and Prof. Mike Wingfield (Director of the TPCP).



Ronald Heath (DAFF), Sonia du Buisson (HM), Tammy Swain (ICFR), Steve Verryn (Creation Breeding Innovations) and Gert van den Berg (Mondi).



Prof. Manuel Mota from Portugal, talking about their experiences with the introduced Pine wilt nematode.



Mesfin Gossa, PhD student in the TPCP, presenting his work on the pine weevil, *Pissodes* sp.

ANNUAL TPCP STAKEHOLDER MEETING – MAY 2014 (continued)

There was a “golden thread” in most of the talks held this year – as a country South Africa requires an improved understanding of species arriving in the country accidentally. Because we live in an era of extensive advances in world travel, we must focus on trade-pathways; quarantine plant material as a ‘preventative step’ to keep trees healthy and continue to strengthen and increase collaboration with developing plantation forestry nations. New disease combinations (novel encounters) are increasing because of the increased movement of plant material and their associated insects and fungi. Using new technologies, including genomics, will be important components in any integrated pest/disease management programme. Knowing which species exist in ecosystems aids in early detection and focused management of tree diseases. Similarly, knowledge of how pathogens, pests and their hosts interacts, also at the molecular level will assist in improving tree health management.

The meeting was not all work and seriousness. During the annual dinner at the Tuscan BBQ, foresters and students had the opportunity to interact on a social level and practice some acrobatic skills – another indication of the great spirit of the South African forestry industry!

The success of the TPCP can be ascribed to many factors, two of which include the ‘open information to all members’ policy within the programme and the strong international collaborations that researchers in the programme has established over its 25 years of existence. All involved in the TPCP, therefore, takes this opportunity to thank all foresters and farmers in South Africa for their contribution to making the programme such a success and a pleasure to work in!



Craig Norris (NCT), Geoff Galloway (Sappi), Johan Coetzer (NCT) and Johan Nel (TWK) catching up over a cold one.



Jolanda Roux still demonstrating the “hands free beer slug” successfully!



Kitt Payne of Mondi ensured that the “hands free beer slug” trophy returned to Mondi.



Kitt Payne (front) and Craig Norris competing for the “hands free beer slug” trophy on behalf of their companies.

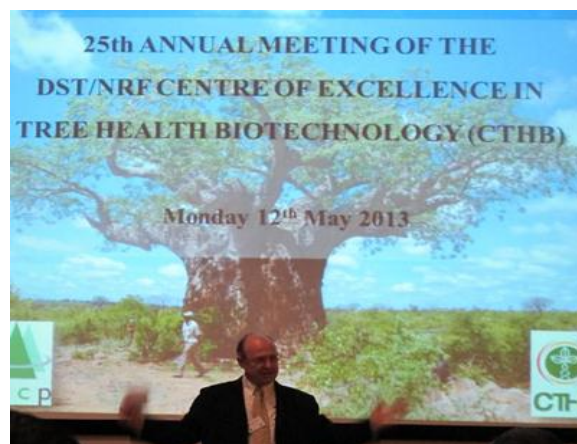
ANNUAL CTHB RESEARCH MEETING – MAY 2014

There is no doubt that trees are life-giving entities across all hierarchies of needs - from their fibre and food, to their aesthetic value. Unfortunately, many of the trees you see this autumn, which you might have perceived as being deciduous, are actually sick. Due to pest and pathogens, many of our native tree species are dying at unprecedented rates. Fortunately, the DST-NRF Centre of Excellence in Tree Health Biotechnology (CTHB), at the University of Pretoria, has risen to become the national guardian of our native tree heritage. Every year the CTHB organizes a research get-together, to showcase some of the important research currently underway to help keep our native trees healthy. It is thus very apt that this truly important research meeting is being held in autumn each year.

Selected CTHB-funded postgraduate students from across the country give presentations in this one-day research meeting. Moreover, each year many prominent plant-health scientists from across the globe are also invited, which provides a great opportunity for these budding scientists to interact with established researchers. This year included, among many, Dr. Manuel Mota from the University of Évora in Portugal, Prof Diana Six from the University of Montana in the USA, Dr. Lilliane Petrini from Switzerland, and Dr. Treena Burgess from Murdoch University in Australia.



Participants of the annual CTHB research symposium getting to know each other better.



Prof. Mike Wingfield, welcoming all participants to the annual CTHB research symposium.

Twelve students, and a postdoctoral fellow, gave 15-minute long presentations relating to their research. The presenting students represented five universities - Stellenbosch University, Rhodes University, University of the Free State, University of the Witwatersrand, and of course, University of Pretoria. The research topics discussed were highly diverse, ranging from those aspects of plant physiology which helps to sustain a healthy tree, to a more socio-ecological perspective of the value of healthy forests for sustaining rural livelihoods. This broad range of research topics was a striking feature of the meeting, and highlighted the complexity of native tree pest and pathogen interactions, and the role that inter-disciplinary science plays in finding the answers to native tree demise in South Africa. It is, therefore, difficult to single out one talk that stood out, as they were all unique and relevant. However, the talk, or perhaps, wake-up call by Rofhiwa Nesamari (FABI), concerning the diseases and pests which threatens our magnificent native cycads, were highly telling of what we are about to lose if not for the continuation of tree health research in the country. Overall, this was a great showcase of contemporary problem-solving, and it is clear that in promoting such a multi-disciplinary approach to tree-health problem-solving, the CTHB is indeed seeing the forest for the trees.

CONGRATULATIONS

Congratulations to the following CTHB and TPCP students who received their PhD degrees during the University's Spring Graduation!

PHD

Rodrigo Ahumada

Emerging new diseases of plantation-grown *Pinus* spp. in Chile



Dawid Degefu

Ecology and genetic diversity of *Coryphodema tristis* on *Eucalyptus nitens* in South Africa



Fahimeh Jami

Taxonomy and ecology of Botryosphaeriaceae associated with *Acacia karroo* in South Africa



James Harrison

Phylogeny of the *Pegylina* and taxonomy of selected southern African *Leucopholina* (Coleoptera: Scarabaeidae: Melolonthinae}, with an emphasis on genera of agricultural concern



MSc

Caryn Oates (cum laude)

Transcriptional responses of *Eucalyptus* clones to the gall wasp, *Leptocybe invasa*



Darryl Herron (cum laude)

Characterization of *Fusarium* species from *Pinus* and *Eucalyptus* nurseries in Colombia and South Africa



BSc Honours

Colan Balkwill (cum laude, prize for the top student in Genetics Honours). Sexual identity in the *Gibberella fujikuroi* species complex



Kavani Sanasi

Ophiostomatoid fungi associated with pine-infesting bark beetles in Guatemala.



Angelique du Preez

EPS production in the bacterial pathogen, *Pantoea ananatis*



ACADEMIC ACHIEVERS OF THE CTHB & TPCP TEAMS

The University of Pretoria Academic Achievers Awards function, held on Tuesday 6 May, is a highlight on the calendar of the University. The function celebrates highlights in research, teaching and innovation at the University, which are the core functions of the University. Awards are made for 'Exceptional Researchers', 'Exceptional Young Researchers' and 'Teaching Excellence and Innovation'. Researchers who have received 'ratings' from the National Research Foundation in the previous year are also recognized at this function. These ratings reflect evaluations of peers around the world of the quality and impact of the research of the candidates. The TPCP and CTHB was well represented at the UP achievers function, with Jeff Garnas, Jolanda Roux and Brenda Wingfield receiving recognition for excellence in science.

The function was attended by most of the administrative and academic leaders of the University, as well as high-level leaders in science from outside the University. Amongst the guests was the Director General of the Department of Science and Technology, Dr Phil Mjwara, and Prof Daya Reddy, President of the Academy of Science of South Africa. Prof Reddy was the keynote speaker of the evening, and reflected on the 'beautiful minds' that have defined what true scholarship is over the years. In so many cases, these giants of the academic world have dedicated their lives to making the world a better place to live in, while at the same time striving to advance the boundaries of human knowledge.



Prof. Brenda Wingfield, who obtained an NRF "A" rating, the highest rating a scientist can obtain from the NRF.



Dr. Jeff Garnas receiving a certificate from Dr. Albert van Jaarsveld of the NRF, in recognition of receiving his first NRF rating.



Prof. Jolanda Roux receiving a certificate from Prof. Cheryl de la Rey, Vice-Chancellor and Principal of the University of Pretoria, in recognition of receiving an award as Exceptional Academic Achiever.



TWO NEW POST-DOCTORAL RESEARCHERS JOIN THE TPCP &CTHB TEAMS

Dr Casper Crous

Casper is an ecologist, who comes from a conservation background, and has worked with both flora and invertebrates. He obtained his PhD from Stellenbosch University and joined FABI as a research fellow. His previous research focussed on gaining insights into how the physical environment influences plants, and what this means for pathogenic manifestations. He states that "There is a need for in-depth knowledge of specific environmental conditions that allow trees to either grow more vigorously, or show stress, and then to relate the observed pest and pathogen communities to this gradient. Understanding the ecological basis of plant-herbivore patterns would complement existing research in alleviating current tree die-back problems in either plantation forestry, or native forests." Previous projects included looking into the drought-tolerance of *Acacia mearnsii* compared to native plants in fynbos riparian zones, looking at associations between plant growth forms and their diversity patterns, as well as looking into grasshopper assemblages in response to surface rockiness.

Casper joined the team as a research fellow and has already become involved in a number of TPCP and CTHB related projects.



Dr Maria Vivas

Maria is from Spain, where she obtained her PhD from the University of Extremadura. She worked on the susceptibility of *Pinus pinaster* to *Fusarium circinatum*. The overall aim of her PhD was to evaluate the variability of *P. pinaster* susceptibility to *F. circinatum* and to test the influence of environmental maternal effects in such susceptibility. She also worked on Ectomycorrhizal symbiosis in *Quercus ilex*, biotic stress on Pines, methyl jasmonate and anti-oxidants in plant defense.

During her time at FABI Maria will be working as a Postdoctoral fellow. Her project will be on the influence of environmental maternal effects on the resistance of *Eucalyptus* species to Botryosphaeriaceae and the structuring of fungal endophytic communities.



WELCOME TO THE CTHB AND TPCP TEAMS

Ludwig Eksteen

MSc Entomology
Host utilization and spatial patterns of the European woodwasp in South Africa.



Lizahn Zwart

PhD Genetics
Characterising the early defence responses of *Eucalyptus grandis* to the fungal stem canker pathogen *Chrysosporthe austroafricana*.



Mohammad Sayari

PhD Microbiology
Ceratocystis pathogenicity genes and mycoviruses.



Kavani Sanasi

MSc Microbiology
Ophiostomatoid fungi associated with pine-infesting bark beetles in Guatemala and Mexico.



Nyasha Yolanda Musasira

Msc Genetics
Assessment of the threat Armillaria root rot in the iconic Kirstenbosch National Botanical Garden and Table Mountain National Park.



Miranda Erasmus

BSc Honours Microbiology
Investigation of the *Ophiostoma abietinum* species complex and the association with bark beetles and mites.



Inge Pietersen

BSc Honours Microbiology
Insight into the evolution and origin of the *Gibberella fujikuroi* complex: A comparative phylogenetic analysis of specific mitochondrial and nuclear genes of *Fusarium* representatives.



Ashleigh Geldenhuys

BSc Honours Microbiology
Population diversity of *Ceratocystis pirilliformis* from *Acacia mearnsii* in the Western Cape.



Benedicta Swalarsk-Parry

BSc Honours Microbiology
Association of phenotypic properties/traits with specific locations on the genomes of *Fusarium circinatum* & *F. temperatum*.



THREE RESEARCHERS VISIT FABI FOR COLLABORATIVE WORK ON THE SIREX WOODWASP

The quality and extent of work done on the Sirex woodwasp at FABI continues to draw international attention and collaborators. In September 2013, Prof Bernard Slippers represented the research group at an international Sirex meeting at Cornell University (USA). The invasion of *Sirex noctilio* into the USA and Canada has raised much concern about its potential impact on native ecosystems and *Pinus* plantations, especially in the southern USA. Consequently a growing number of researchers from various research organizations and Universities are turning their attention to this pest. This has already led to a number of surprising novel facts about Sirex and its symbionts, and breakthroughs which contribute to better monitoring and control of this pest around the world.

Following this meeting, discussions were started with three of the attendees about a possible research visit in November 2013. While the timeline was short, the potential benefit for all parties was very obvious. It was with great joy that the research team thus learned that all three eventually managed to make the necessary arrangements for the trip to South Africa.

The visitors included:

- Dr Katalin Boroczky, North Carolina State University, a leading researcher on chemical ecology of pheromone communication between Sirex wasps, as well as their attraction to pine volatiles. Her work is extensively used in development of lures for trapping the wasp.
- Dr Brian Thompson, University of Maryland, who is doing ground breaking work on the biology of Sirex larvae, showing that they eat neither the fungus nor the wood, but rather pre-digested liquids from the wood substrate. He



Katrin Fitza (PhD student) and Flora Krivak-Tetley (visiting researcher) discussing nematode infections in eggs of *Sirex noctilio* wasps from a trial to evaluate the virulence of different strains of the nematode from various parts of the world.

is busy investigating the role of previously unknown microbial symbionts of Sirex.

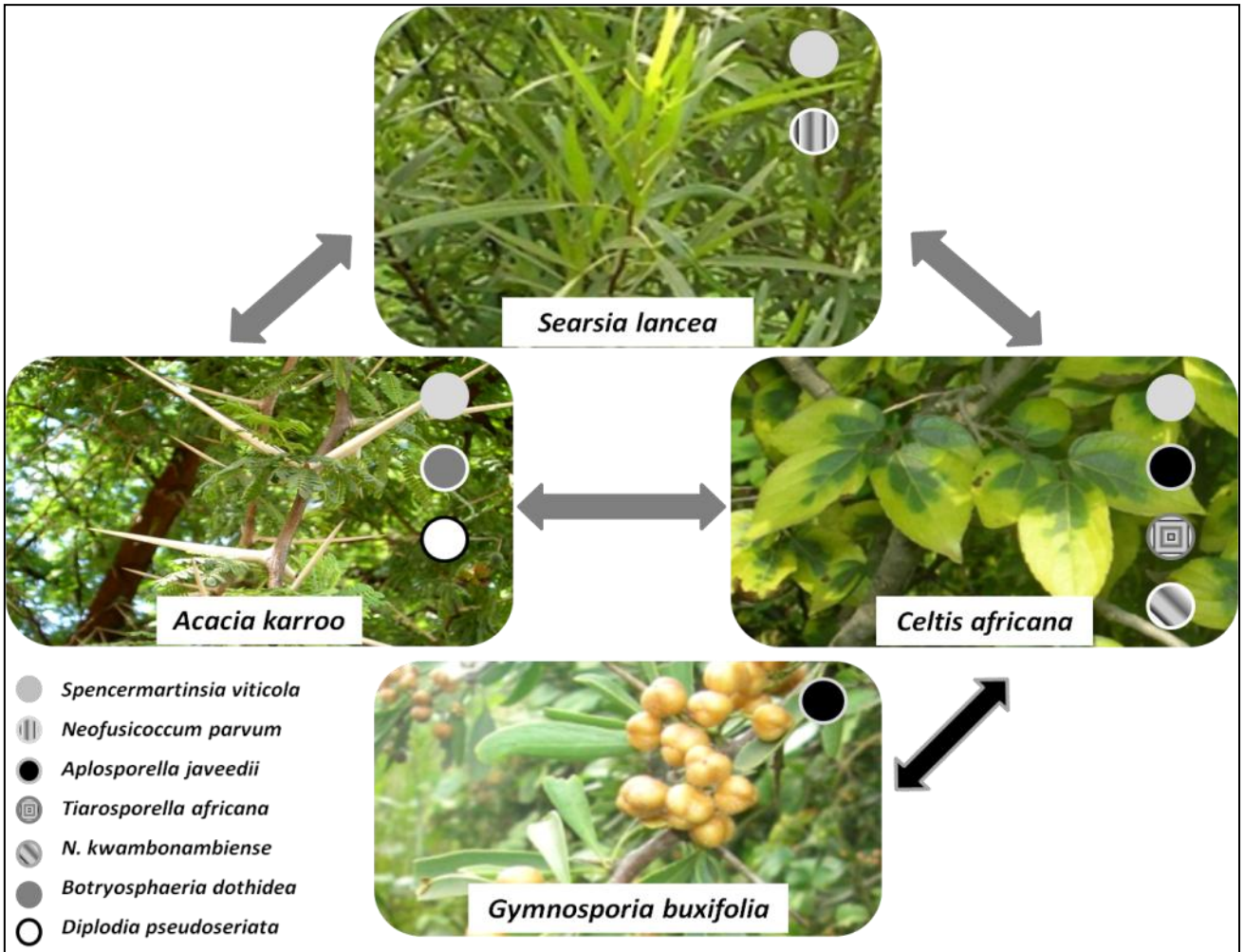
- Me Flora Krivak-Tetley, Dartmouth College, lead researcher in an international team that investigates the native and non-native ranges of Sirex in the USA, Spain, Argentina and South Africa, to assess key factors influencing population outbreaks and spread of Sirex.

The research visits allowed all three these researchers to do key work that they would not have been able to do, or not as efficiently, in many other places in the world. They also actively shared their knowledge and contributed fresh ideas to the Sirex research team in South Africa. The links that were established through the research visits of these three young, energetic and exciting researchers (and the research networks they represent) will be the foundation of collaboration for much future work.

CROSS INFECTION OF LATENT PATHOGENS AMONG FOUR NATIVE SOUTH AFRICAN TREE SPECIES

The *Botryosphaeriales* is an important and diverse group of latent fungal pathogens of woody plants. While some species appear to have wide host ranges, others are reported only from single hosts. It is, however, not clear whether apparently narrow host ranges reflect specificity or if this is an artefact of sampling. We address this question by sampling leaves and branches of four native South African

trees (see figure below). The results suggest that some intrinsic host factors, possibly combined with local environmental conditions, affect the distribution and co-infectivity of various hosts by the *Botryosphaeriales*. This would counteract the general ability of a species in the *Botryosphaeriales* to infect a broad range of plants.



Four native South African tree species that were sampled in this study and their fungal associates that were identified.

Read more: Jami, F., Slippers, B., Wingfield, M.J., Gryzenhout, M., 2014, Botryosphaeriaceae species overlap on four unrelated, native South African hosts. *Fungal Biology* 118: 168-179. www.sciencedirect.com/science/article/pii/S1878614613001724#

WHO IS WHO IN THE TPCP AND CTHB?

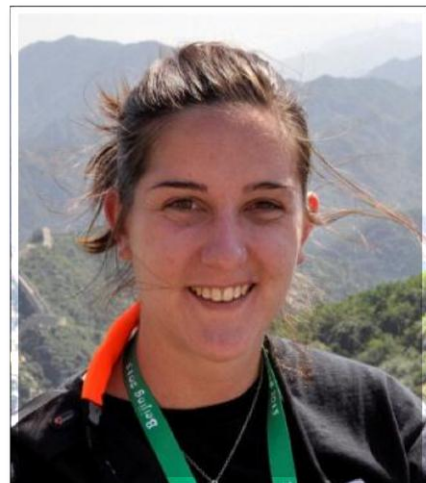
Gabrielle Carstensen

PhD student

Nationality: South African

Research/Expertise: Bacterial wilt, caused by *Ralstonia solanacearum*, is a disease that is commonly found to infect food crops such as tomatoes and potatoes but is also able to cause severe damage to *Eucalyptus* trees. Currently, bacterial wilt of *Eucalyptus* species is of major concern to the forestry industries in China and elsewhere. There is limited scientific knowledge on how this bacterium is able to cause disease in tree hosts and whether this phenomenon is a result of a change in pathogenicity of the bacterium or abiotic factors affecting tree vigour. My project aims to identify how this bacterial pathogen is able to cause disease symptoms in *Eucalyptus* by using techniques such as pathogenicity trials, population studies, metagenomics and genome sequencing.

Hobbies/Interests: I enjoy activities such as gardening, swimming, hiking and pilates.

**Vusi Letsoalo**

MSc student

Nationality: South African

Research/Expertise: Fungal pathogens that are present in microbial communities can compromise tree health in forest plantations and possibly result in disease emergence. Global trade further complicates the problem with exchange of plant material heightening cases of disease outbreaks. One of the suggested pathways of pathogen introduction between countries is through the trade of seeds. The hypothesis of my study is that seeds carry potential pathogens and that the fungal prevalence on seeds is influenced by the handling, treatment and distribution of seeds between countries. Characterizing microbial communities has recently been made possible through a combination of molecular tools, high-throughput sequencing technologies and bioinformatic data analysis pipelines in a discipline termed metagenomics. I aim to use these tools, specifically the Illumina MiSeq sequencing platform, to compare fungal diversity associated with pine and eucalypt seeds from Guatemala, Nicaragua, Colombia and South Africa.

Hobbies/Interests: I enjoy road trips, watching television and movies.

