Tree Protection News

tpcp

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

VOL: 21 May 2011

FROM THE DIRECTOR'S DESK

As I write this introductory note over the Easter weekend, at the very forefront of my mind is the fact that the annual meeting of the Tree Protection Co-operative Programme (TPCP) begins in only two week's time. It is remarkable to think that this will be the 22nd consecutive year in which we have met with forest industry partners to discuss the broad field of tree health. It is also a time to reflect on the accomplishments of the Programme during the past 22 years and also to consider our approach to the many pressing issues that challenge the future sustainability of plantation forestry in South Africa. In this regard, I remain of the firm belief that a solid investment in ever-emerging new technologies relating to plant production, will allow us to continue to grow and develop.

DFP disease of *Pinus radiata* Chile – an unexpected disease with far reaching consequences.

Getting closer to South Africa – Rust disease pathogen of Eucalypts now in Australia

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South African forestry has embraced new technologies in the past and there is no question that our current position rests firmly on these. There is no reason to believe that the future will be any different.

During the past few months, the world has witnessed a number of dramatic upheavals. The rising unrest broadly across the Middle East has and will continue to unsettle our lives. The devastation caused by the tsunami in Japan and the resultant death of some 20 000 people has added substantially to a feeling of unease globally. These events are fundamentally different to each other, but they are also closely linked in terms of one of the greatest threats to global stability. The congruence relates to the matter of energy, which is affected by the instability of oil production and by our capacity to produce nuclear energy safely. I believe that there are many lessons relating to TREE HEALTH that we can learn from these events. Some key issues and points of comparison are as follows:

- Tree health problems can appear rapidly and be highly dramatic. This is akin to situations encountered when nuclear power stations experience problems. Some pest and disease problems establish slowly and debilitate gradually but often times more seriously than the cataclysmic problems that can be dealt with more directly. The latter group are akin to power generation using coal, where damage is gradual, but horrific.

- Tree health problems can be dealt with in ways that would not have been possible in the past. These relate to new technologies that make it possible to change the genetic composition of trees relatively rapidly, to diagnose problems rapidly and effectively and to understand, for example, biological control agents better. The crux of the matter is for us to have the vision to engage and invest in these technologies. Relating back to power generation, the problems encountered at the damaged Fukushima power plant would almost certainly not have occurred in a modern nuclear facility. The fact that the Fukushima plant is over 40 years-old and susceptible to damage is fundamentally important. The sad reality here is that investment was not made in time to prevent catastrophic damage.

The invasion of the Sirex wood wasp and the impact of the pitch canker pathogen in South Africa have provided us with vivid examples of the impact that pests and pathogens can have on our forestry operations. Ironically, they have also enabled us to better understand the actions that we need to take to guard against future losses. These two problems for example provided a foundation for many elements of the process in 2010 that led to the development of the new Forest Protection Strategy. They have further challenged us to develop integrated management strategies that include operations level activities, engagement with the public, large scale monitoring and field trials as well as short and longer term research. We have consequently learned many lessons and hopefully these will enable us to deal with new challenges in the future.

By the time you read this note, the 22nd annual meeting of the Tree Protection Co-operative will have passed. Amongst the many elements of this year's meeting, we will have inaugurated the new Insect Biocontrol Centre that has been built on the University of Pretoria Experimental Farm. Completion of this facility has been eagerly awaited and it will have a huge impact on our efforts to reduce the negative impacts of a growing number of damaging forest pests in South Africa. We have already moved the Sirex-parasitic nematode production to the new facilities and this alone will make a substantial difference to our ability to support commercial pine production. Furthermore, our well-established programmes to establish effective biological control of the Eucalyptus Bronze Bug (*Thaumastocoris peregrinus*) and the Eucalyptus Gall Wasp (*Leptocybe invasa*) will be able to progress much more effectively than in the past.

Continue

We are particularly grateful to the University of Pretoria for providing the approximately R5 million capital to build the facility and to various other funding sources that have enabled us to equip the facility appropriately. Towards the end of 2010, we learned that the DST would provide the funding for our Centre of Excellence, the DST/NRF Centre of Excellence in Tree Health Biotechnology (CTHB) to become a fully funded Centre. In effect, this has doubled the funding to the CTHB and we have needed to move rapidly towards funding projects concerning the broad field of tree health at other tertiary institutions in South Africa.

The process of identifying new collaborators and associated students, signing of contracts and transferring some R2 million to our new "Core Team Members" has been a time consuming yet interesting challenge. Although the CTHB projects all concern the health of native trees, there is significant overlap between these and projects linked to commercial forestry in South Africa. Thus, the TPCP will clearly also benefit strongly from the expanded activities of the CTHB.

This time last year we celebrated the 21st Anniversary of the TPCP. Looking back on that occasion, you might remember that we were fortunate in being able to bring to the meeting the three original founder Board members of the TPCP. Thus Neville Dennison (previously of Mondi), Mike Shaw (previously of Sappi) and John Tew (previously of HL&H) shared with us the vision that they had for the TPCP, when the Programme was first launched. They all remarked on the fact that they could not have imagined the TPCP growing in the way it has and how the Programme has become the envy of many forestry companies around the world. While the TPCP research and management team is deeply proud of the Programme, we are also aware of the fact that we should not be complacent and that there are many challenges that lie ahead. Research pertaining to tree health is a long-term investment.

While the TPCP deals with many immediate problems relating to monitoring, disease and pest diagnosis and short-term problem solving, we rely deeply on research results that were considered by some as "blue sky" 22 years ago. There are important lessons to be learned through studying the 22 year history of this remarkable programme. Perhaps the most relevant of these is that a programme such as the TPCP must cover many bases. Short-term problem solving, disease and pest diagnostics, extension and monitoring, education and longer-term enabling research are all important. A reasonable and effective balance between these is fundamental to ensuring sustainability of plantation forestry in South Africa.

New tree health challenges continue to appear and this is likely to continue to be true in the future. Just this year, we have seen a growing threat due to the relatively new *Leptocybe invasa* (Eucalyptus Gall Wasp) invasion. While we are concerned about this problem, we are also in the comfortable position of having already established a relatively robust research and management programme for the pest.

Thus, a very promising biological control agent, unknown elsewhere in the world, is being developed and clonal screening programmes were established two years ago. Every effort must now be made to expand these activities to ensure the minimum long-term impact.

As it relates to pests and diseases, the future of tree health and sustainable plantation forestry in South Africa depends on wise investment and a team effort. Integration of the activities of field foresters, contractors, forestry managers and researchers is a fundamental requirement. The TPCP together with its partners has promoted this philosophy and there are consequently abundant examples of serious problems having been effectively treated. From my position as Director of the TPCP, I thus take this opportunity to thank members of the Board of the Programme but also the many field foresters and plantation managers for their support in achieving our singular goal of "KEEPING TREES HEALTHY"

2011 - International Year of Forests

The year 2011 was declared the International Year of Forests by the United Nations. The aim is to raise awareness about the importance of forests and healthy ecosystems and to strengthen sustainable forest management and conservation of all types of forests for the benefit of current and future generations.

Some Forest Facts from South Africa

Forest type	Area (hectares)	% land area of SA
Indigenous/Natural Forests	0,5 million	0,5
Woodlands/Savannas	42 million	35
Plantations	1,2 million	1,1

Trees of the year - South Africa

Pappea capensis
Jacket plum / Doppruim / iNdaba / liLetsa / Gulaswimbi / Mopsinyugane

Pavetta
Bride's Bushes / Bruidsbome

Nuxia congesta
Common wild elder / Gewone wildevlier

Upcoming forestry related activities

June 5
World Environment Day

June 17
World Day to Combat Desertification and Drought

September 1 - 7
Arbor Week Campaign, South Africa

November 28 - December 9
United Nations Framework Convention on Climate Change (NFCCC) COP 17, Forests and Climate Change, Durban

BIOLOGICAL CONTROL CENTRE

A world class Biocontrol Centre for forest pests at FABI

The number of insect pests that threaten trees in forests and plantations are increasing at an alarming rate internationally. For many of these pests biological control is the best, if not the only, option for control. However, biological control needs extensive and specialist research to develop and typically takes years. The rate of arrival of new pests, means that the forestry industry needs significant capacity in this field. The Tree Protection Co-operatove Programme provides the industry with support for the biological control of forest pests, including developing human capacity, doing the basic research, engaging with authorities and in some cases producing biological control agents.

The academic excellence delivered by researchers in FABI has, however, enabled us to convince the University of Pretoria that it is worth further investing in this research. With investment from UP and with leveraged funding from other sources, the required facilities and equipment was eventually secured.

The biological control programme of the TPCP has been hampered by two major constraints in terms of facilities: Firstly, the production of biological control nematodes to support the industry programmess to control the Sirex woodwasp has put serious strains on the facilities and activities of FABI.

Gudrun Dittrich-Shröder showing some of her research to visiting company representatives.

Secondly, no dedicated facility existed to import and study quarantine organisms needed for the development of biological control programmess of a number of newly arrived forestry pests. This leaves the industry in a seriously vulnerable position given the increasing pressure from insect pests. During the past five years, various avenues have been explored to fund the required specialized facilites to enable the production and study of biological control agents.

Options have included seeking industry support and exploring avenues to develop an independent business model to run such a facility.

The new FABI Biocontrol Centre facilities include a certified quarantine building and greenhouse, three laboratories, numerous growth rooms and walk-in cold storage facilities. In addition it includes outside insect rearing cages, office space for key staff that will run the facility, and specialised equipment that will allow controlled fungal and insect handling, chemical ecology and physiological research. The greater facility, together with the nursury environment that is connected to it, is amongst the most modern in the world where forest biological control work can be undertaken. It is sure to serve the industry's increasing needs for biological control well into the future. The facility will be officially opened on the eve of the 22nd Annual TPCP meeting, on 9 May.

This article first appeared in Wood and Timber Times SA (November 2010)

FABI work in native pine forests in Guatemala

Project title: Understanding pest and pathogen threats to pine under expanding global cultivation

To meet global demand for timber, fibre and forest products, tree growers worldwide rely heavily on introduced species, which typically outstrip native trees in productivity and show greater consistency in growth form when cultivated outside their native range in the absence of native pests and pathogens.

The global translocation of insects and fungi with increasing global trade threatens natural and cultivated tree species worldwide. For example, the recent discovery of the pitch canker fungus (*Fusarium circinatum*) in South Africa and South America has already led to huge losses for growers and nursery managers and is very likely to change the suite of species that can be efficiently grown. The invasive European wood wasp (*Sirex noctilio*) has likewise affected thousands of hectares of plantation forests around the globe including South Africa.

Mixed forest of *Pinus oocarpa, P. tecunumanii,* and *P. maximinoi* in San Jerónimo, Baja Verapaz, Guatemala. The source material for the vast majority of pine species planted in South Africa and worldwide has its origin in Mexico and Central America. Mexico and Central America are centres of pine diversity with over 54 of the 111 species worldwide.

A promising approach to combating biotic threats to pine growth and yield involves the production of hybrids, with the goal of combining high growth rates, timber and pulp properties with increased resistance to insects and disease.

However, very little is known about the community of insects and pathogens attacking these putative hybrid partners.

The main objective of our proposal is to establish a baseline understanding of insect and pathogen diversity and distribution on common pine species in Guatemala, particularly those under testing as hybrid partners with *Pinus patula* in South Africa and worldwide.

In October 2010, Juan Lopez of Camcore at NCSU, Jeff Garnas and Irene Barnes of FABI, University of Pretoria met with representatives of the National Institute of Forests, the University of San Carlos and the private forestry sector in Guatemala to discuss the project and avenues of future work and collaboration. All parties were quite positive about the prospects of future collaboration on various basic and applied projects. Following the initial meeting, we spent 10 days traveling through important pine regions, sampling insects and potential pathogens.

Field observations and collections coupled with extensive knowledge sharing by local forest health professionals facilitated a basic understanding of the diversity, distribution and prevalence of pine species and their dominant insect pests and pathogens.

Overall, Guatemalan forests appear to be quite healthy, including both naturally-regenerated and plantation stands. Local areas with poor management and high levels of damage due to bark beetles (i.e., ongoing outbreaks of *D. adjunctus* on *P. hartwegii* in San Carlos Sija), *Cronartium* canker (countrywide, but particularly abundant near Jalapa) and *Dothistroma* needle blight (patchily distributed, but abundant on *P. oocarpa* planted at an unsuitably high elevation at Finca La Soledad, Jalapa) demonstrate that threats to forest health and productivity do exist.

As expected, in most sites, low intensity insect feeding and colonization by pathogens was present. While damage from these agents was typically quite minor, we were able to collect material for identification. Sample processing and the species designations for insects and pathogens collected on pine is currently in progress using taxonomic keys and genetic fingerprinting.

A second trip to Guatemala is scheduled for June 2011 to visit other sites and complete sample collections.

FEATURED RESEARCH PUBLICATION

DNA bar-coding reveals the origin of the invasive Bronze bug (*Thaumastocoris peregrinus*)

Nadel, R.L., Slippers, B., Scholes, M.C., Lawson, S.A., Noack, A.E., Wilcken, C.F., Bouvet, J.P., Wingfield, M.J. 2010

DNA bar-coding reveals source and patterns of *Thaumastocoris peregrinus* invasions in South Africa and South America. *Biological Invasions*: Volume 12, Issue 5 , Page 1067 – 1077. The original publication is available at www.springerlink.com

The Bronze bug (*Thaumastocoris peregrinus*) is a recently introduced insect pest of *Eucalyptus* plantations throughout South Africa and South America. *Thaumastocoris peregrinus* is a small (2 – 4.5 mm) sap sucking bug (Figure 1) resulting in significant damage to more than 26 different *Eucalyptus* species, including three commercial hybrids in South Africa. Worldwide, very little research had been conducted on *Thaumastocoris,* prior to 2002 when *Thaumastocoris australicus* was reported as a major pest on planted *Eucalyptus* in Sydney Australia.

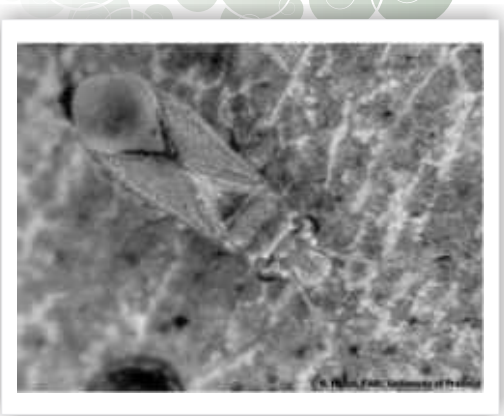


Figure 1: *Thaumastocoris peregrinus* adult

Originally misidentified as *Thaumastocoris australicus*, *Thaumastocoris peregrinus* was first discovered in South Africa in 2003 and Argentina in 2005. The initial misidentification of *Thaumastocoris peregrinus* highlights the difficulty in morphologically differentiating between these two species. The misidentification of species has implications for species specific control strategies, collection of potential biological control agents in addition to understanding the spread of a species. A solution to overcome this problem is through the use of mitochondrial DNA (mtDNA) bar-coding for species identification. DNA bar-coding uses a region of the mtDNA cytochrome c oxidase subunit I (CO I) gene to identify species based on sequence variation from an identified species. mtDNA sequencing of the CO I gene results in significant sequence variation among different species in comparison to little sequence variation occurring within individuals of the same species.

In this study we used DNA bar-coding sequences from native populations of *T. peregrinus* from three regions in Australia (Sydney, Brisbane and Perth) and compared these to those of specimens from both South African and South American *Eucalyptus* plantations. Analysis of the bar-coding sequences of native Australian populations revealed three distinct species based on the level of mtDNA sequence divergence (Figure 2). One species occurs exclusively in the Perth region of Western Australia, the second species occurs within the Sydney region and third species identified as *Thaumastocoris peregrinus* occurs in Brisbane, Sydney Australia in addition to the non native regions of Argentina, Brazil, South Africa and Uruguay.

Bar-coding was also used to assist in determining the potential source and pattern of invasion of *T. peregrinus* in South Africa and South America. Three *T. peregrinus* haplotypes, dominant in Sydney, were also found among the populations in South Africa and South America, indicating that most likely a small number of individuals were introduced into these areas. The presence of three distinct haplotypes, two in South Africa and one in South America indicates that *T. peregrinus* has not moved between these continents, but they almost certainly represent separate introductions from Australia. This study has shown that Sydney populations of *T. peregrinus* that regularly reach outbreak levels in recent years might thus have served as the source populations of these three distinct introductions of *T. peregrinus* into other regions of the Southern Hemisphere.

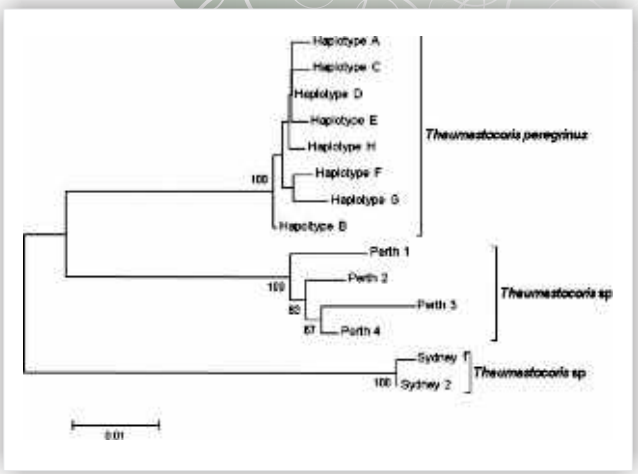


Figure 2: A neighbour joining tree, between *Thaumastocoris* species and their associated haplotypes based on mtDNA CO I data.

SELECTED ABSTRACTS FROM CONFERENCES

FACTORS ASSOCIATED WITH THE DECLINE OF *EUPHORBIA INGENS* IN THE LIMPOPO PROVINCE, SOUTH AFRICA.

J. A. van der Linde, D. L. Six, M. J. Wingfield & J. Roux

The plant genus *Euphorbia* has a global distribution and includes more than 2100 species. South Africa has a rich diversity of *Euphorbia* spp. of which *Euphorbia ingens* (naboom) is the largest in size. Huge numbers of *E. ingens* trees, in the Limpopo Province, have increasingly become diseased and died during the last 10 years. During the course of 2006 and 2007, preliminary studies revealed various insects and fungi on symptomatic *E. ingens,* but with no clear evidence that they might be involved in tree mortality. Symptoms included grayish discoloration, rotting and browning of the succulent branches, white and yellow spots on succulent branches, blue stain and insect damage. In 2009, a more detailed study was launched to better understand the cause of *E. ingens* decline in the Limpopo Province. Diseased plant material and associated insects were collected from four sites in the Limpopo Province. Fungi were isolated from insect tunnels in the succulent branches, blue stained wood as well as from insects collected from diseased plant material. Insects included weevils and bark beetles belonging to the Scolytinae and Cossoninae. A wide diversity of fungi were isolated belonging to the Botryosphaeriaceae, Cordycipitaceae, Microascales, Nectriaceae, Ophiostomataceae and the Teratosphaeriaceae.

Three undescribed species of *Gondwanamyces* as well undescribed species of *Lasiodiplodia* and *Neofusicoccum* were described based on morphology and a multiple gene phylogeny. Statistical analysis (Analysis of Variance and Principle Component Analysis) of climatic (temperature and rainfall) and symptomatic date revealed the occurrence of higher temperatures and reduced rainfall, over the last 40 years, in areas of severe *E. ingens* tree decline. Based on data collected to data it seems likely that the declince of *E. ingens* trees in Limpopo may be climate driven, but more in depth studies of an increased number of sites are required to prove this beyond any doubt.

DISEASES AND INSECT PESTS ON EUCALYPTUS IN MOZAMBIQUE

S.N.D. Maússe-Sitoe, B.D. Wingfield, M.J. Wingfield, G. Dittrich-Schröder, A. Chauque & J. Roux

Various groups in Mozambique have recently embarked on extensive afforestation programmes, most commonly utilizing *Eucalyptus* spp. and especially *E. grandis* and its hybrids. Even though pests and pathogens are widely regarded as one of the most serious constraints to *Eucalyptus* forestry, virtually nothing is known regarding pests and pathogens of these trees in the country. Recently, two field trips were conducted in five Provinces of Mozambique to identify disease and pest problems on these trees. Cankers caused by fungi in the *Cryphonectriaceae, Teratosphaeriaceae* and *Botryosphaeriaceae* were isolated from diseased tissue. Leaf blight and leaf spots, caused by a species of *Pilidiella (Coniella), Calonectria* and an unidentified rust fungus were also commonly found. In addition, an *Ophiostoma* sp., and a *Valsa* sp., were isolated from wounds and cankers on trees. Insect infestations included those caused by the gall wasp, *Leptocybe invasa* and *Thaumastocoris peregrinus* that feeds on leaf tissue, were also found.

Diseases, such as canker caused by *Teratosphaeriae zuluense,* species of *Botryosphaeriaceae* and *Chrysoporthe* spp. can impart serious economic losses. They would justify the rapid development of breeding programmes to reduce their impact. The insect pests are also serious and biological control will be necessary to deal with them. Further studies are underway to better understand the origin and diversity of the most important pathogens and pests as well as to develop appropriate disease and pest management strategies for the country.

DIVERSITY OF *CERATOCYSTIS* SPECIES AND THEIR NITIDULID BEETLE VECTORS ON TREE WOUNDS IN KRUGER NATIONAL PARK

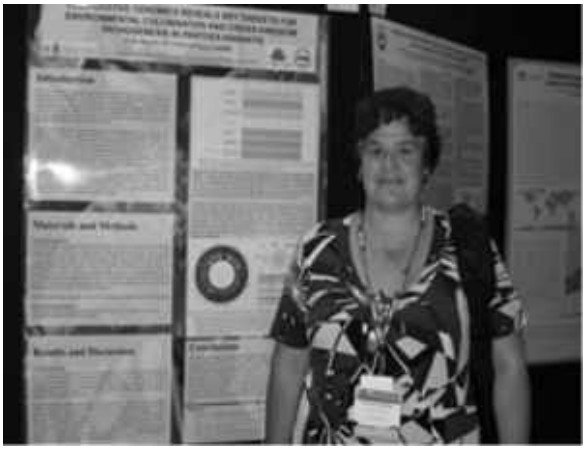
M. Mbenoun, B.A.D. Begoudé, M.J. Wingfield & J. Roux

The fungal genus *Ceratocystis* includes many important tree pathogens. These pathogens rely on insects to spread and they have the capacity to infect a wide range of tree species via wounds. In their native ecosystems they appear to colonize limited areas around wounds and are benign pathogens. Severe diseases generally result from their interaction with non-native hosts, most commonly observed in commercial plantations or orchards, or where these fungi have been introduced into new environments. The incidence of *Ceratocystis* spp. colonizing wounds on trees in natural environments has received limited attention. Following a similar study carried out in 2007 around the Skukuza area, surveys of elephant damage on trees to collect *Ceratocystis* species were undertaken in 2009 and 2010 in different regions of the Kruger National Park. The study targeted various biotopes and vegetation types around Punda Maria, Satara, Letaba and Pretoriuskop, and also included collections of nitidulid beetles, which are known as vectors of these fungi. *Ceratocystis* spp. were isolated from 25 tree species as well as insects. The isolates were identified based on morphology and DNA sequence comparisons. Three known species including *Ceratocystis albifundus*, *C. savannae* and *C. oblonga*, and at least five undescribed taxa were identified. At least five different species of nitidulid beetles were collected, including *Carpophilus bisignatus* and *C. hemipterus*, which have been reported to carry *C. albifundus* and *C. oblonga* in commercial tree plantations. Investigations are currently underway to determine if any ecological specialization pertaining to host, insect vector and geographic region exists amongst the *Ceratocystis* spp. collected in KNP.

BACTERIAL DISEASES OF EUCALYPTUS

T.A. Coutinho, S.N. Venter, J. Roux, X.D. Zhou & M.J. Wingfield

Plantation forestry, based on rapidly growing *Eucalyptus* species, hybrids and clones, supports important timber as well as paper and pulp industries in many parts of the world. Pests and pathogens represent one of the most important constraints to the future sustainability of these plantations. Phytopathogenic bacteria affect *Eucalyptus* trees in nurseries, at establishment and during their first two years of growth. They are capable of causing wilt (root infection), blight and die-back. Bacterial wilt, caused by *Ralstonia solanacearum*, is a serious disease in tropical parts of Asia and has also been reported from Africa and South America. A number of bacterial species appear to be able to cause blight and die-back. These include *Xanthomonas campestris* pv. *eucalypti, Pantoea ananatis, X. axonopodis* and *X. vasicola*. The occurrence of leaf- associated bacterial pathogens appears to be country specific with *Xc* pv. *eucalypti* only known from Australia, *P. ananatis* and *X. vasicola* from South Africa and *X. axonopodis* from Brazil. To complicate the identification of the causal agent of this disease, *Pantoea vagans* and *P. eucalypti* have also been isolated from leaf tissue exhibiting leaf blight but their role, if any, in disease development has not been clearly established.



Erwinia psidii has recently been found causing shoot and branch die-back and appears to have jumped hosts from guava (*Psidium guavaja*) trees to *Eucalyptus* in Uruguay and Argentina. Bacterial diseases of *Eucalyptus* in plantations appears to be growing in importance. They not only threaten the sustainability of forestry operations in some countries but some of the pathogens could serious damage Myrtaceae in their native range.

KEEPING EARTH'S LUNGS HEALTHY IN AUSTRALASIA

News from the combined ACPP and APPS congress, Darwin 2011

Tree health featured strongly at the joint meeting of the APPS (Australasian Plant Pathology Society) and ACPP (Asian Congress on Plant Pathology) in Darwin, recently held in Australia, from the 26th – 29th of April. Apart from a full session dedicated to forest pathology, Dr. Xudong Zhou of the Chinese Academy of Forestry and the China Eucalypt Research Centre (CERC), provided a keynote lecture on the fungal diseases of eucalypts in China, while Dr. Angus Carnegie (Forest Science Centre, Industry & Investment, New South Wales) provided a keynote lecture on the recent incursion of the eucalypt rust pathogen, *Puccinia psidii*, into Australia. There were also several forest pathology talks in other sessions of the conference, as well as a poster session dedicated to tree diseases.

Presentations in the forest pathology session included two on *Phytophthora cinnamomi* in natural ecosystems in Australia, bacterial diseases of eucalypts, *Ceratocystis* spp. and their threat to hardwood trees, Ganoderma root rot of *Acacia mangium* and spring needle cast in Tasmania. Forest pathology posters included work on spotted gum canker, an emerging threat to eucalypts in Australia; Phytophthora diseases of *Agathis australis* and other Australasian trees; *Puccinia psidii* taxonomy and diversity; diseases of eucalypts in Mozambique; *Gnomoniopsis* on chestnut in Australia; the management of forest declines and the biogeography of *Celoporthe* spp. (Cryphonectriaceae) on trees in the Myrtales.

A significant focus at the conference was on biosecurity issues and included an entire session on this topic. The recent incursion of *P. psidii* into Australia, despite Australia's superb quarantine systems, received significant attention. This included not only the keynote talk by Angus Carnegie, but also several posters dealing with the identification and diversity of the pathogen, its distribution in the country as well as surveillance programmes to monitor its spread.

Presenters and chairs of the Forest Pathology Session at the ACPP and APPS joint meeting in Darwin. F.L.T.R. Zoe-Joy Newby, Budi Tahjono (Chair), Abdul Gafur, Teresa Coutinho, Jolanda Roux, Nari Williams and Morag Glen (presenter and chair).

Angus provided a step-by-step account of the process followed in reaction to the incursion, starting when the first sample was received from a farmer, through the process of identification of the pathogen, surveillance to establish its spread, research to determine its possible host range and diversity, to the current situation, one year after its first detection in Australia. Although the pathogen has not yet been found in other areas of Australia, it has already been detected in nurseries and native bush in New South Wales and Queensland. Research by the CSIRO has also determined that of 100 plant species in the Myrtaceae tested, 95% are susceptible to infection by the pathogen.

With *P. psidii* now having been confirmed in South America, Hawaii and Australia, it has clearly shown its ability to spread between continents. This pathogen presents a significant threat to commercial plantation forestry using species of eucalypts. Additionally, it is a significant threat to the spice trade (eg. *Syzygium aromaticum*), tea tree industry and all others based on trees in the Myrtaceae. For additional information please visit the website of the New South Wales Department of Industry & Investment at: http://www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust

Searching for new nematode strains in New Zealand: A strategy to improve Sirex biocontrol

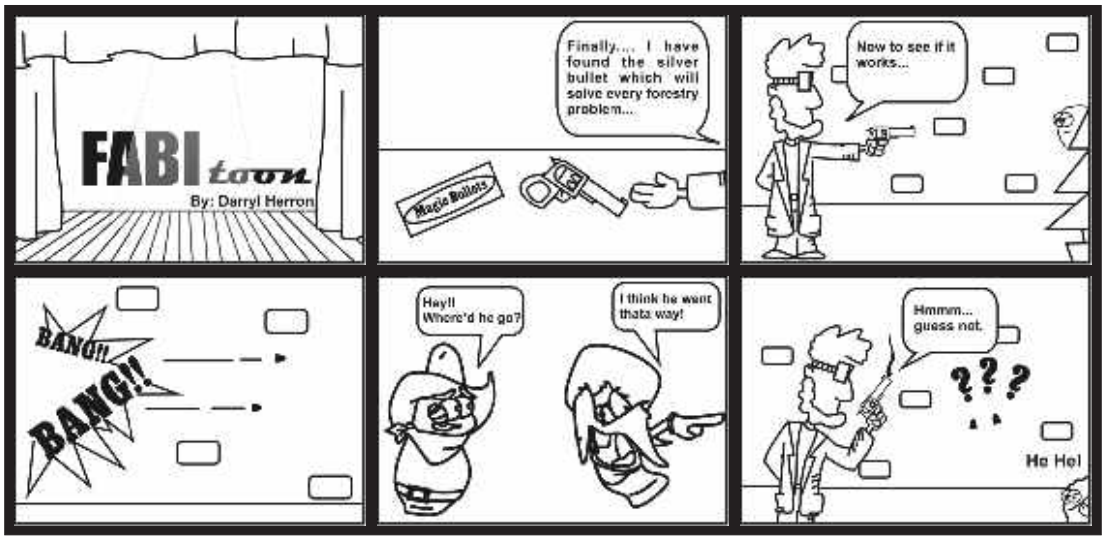
Populations of the Sirex woodwasp, *Sirex noctilio*, have been under control for decades in New Zealand. The same cannot be said for populations in South Africa, where *S. noctilio* still causes significant damage to pine plantations. The parasitic nematode, *Deladenus siricidicola*, is considered the primary biological control agent of *S. noctilio* in both these environments.

Amy checking traps for *Sirex noctilio*

A single strain of this nematode, the Kamona strain, has been introduced to all southern hemisphere countries where *S. noctilio* is present, except New Zealand. Although generally effective, the Kamona strain has obtained low levels of inoculation success in some areas of South Africa. Researchers at the TPCP have been actively looking for different strains of the nematode that might improve inoculation success in these areas. Genetic diversity of *D. siricidicola* would be expected to be higher in the native range of the nematode (Eurasia and North Africa) or in areas where there have been natural introductions of the nematode, such as New Zealand. For this purpose, Ms Amy Wooding and Dr Brett Hurley visited the Forest Protection team of Scion, in Rotorua, New Zeland earlier this year. Amy stayed for two months and Brett for two weeks.

The objective of the visit was to collect wasps during their peak emergence period and obtain as many different strains of the parasitic nematode *D. siricidicola* as possible. Kairomone baited traps (using plant volatiles such as alpha and beta pinene) were used to trap the wasps. The population of *S. noctilio* in New Zealand is very low and catching the wasp proved very difficult. Only a small number of wasps were caught in the traps, but fortunately additional wasps were found in infested timber. These wasps were dissected and nematodes extracted and sent back to the FABI Biocontrol Centre at the University of Pretoria. Molecular markers developed at FABI will be used to differentiate between nematode strains, and these strains will be reared for inoculation trials and other experimentation to determine their parasitism efficacy and survival in the summer rainfall areas of South Africa.

We are indebted to Scion, particularly Dr Lisa Berndt and the Forest Protection team for hosting us and assisting us with the logistics that made the trip possible. We also thank SPS Biosecurity and Timberlands for their assistance with obtaining infested logs and finding trap sites, respectively.



WHO'S WHO?

Eston Mutitu

PhD Student from Kenya

Research / Expertise: I am a principal research scientist with the Kenya Forestry Research Institute (KEFRI) in Kenya and a member of the Forest Invasive Species Network for Africa (FISNA) executive committee. My major areas of research interest includes: forest insect population dynamics and ecology, insect-host plant interactions, and classical biological control. I have joined the TPCP to do my PhD, where my aim is to elucidate scientific information that will lead to the implementation of a classical biological control programme for *Thaumastocoris* peregrinus in its areas of invasion including South Africa and Kenya. Biology and population genetic structure of both the pest *T. peregrinus* and its solitary endo-parasitoid *Cleruchoides noackae* will be studied and documented. Factors that covary with the population dynamics of *T. peregrinus* like weather parameters, host trees species and agro-climatic zones will also be studied. This information will play a key role in the development and implementation of management options for this pest.

Hobbies: I play lawn tennis and also enjoy reading autobiographies.

James Mehl

PhD Student from South Africa

Research / Expertise: The Botryosphaeriaceae continue to play a major role as plant pathogens in both forestry and agricultural ventures. The aim of my research is to investigate more applied and ecological aspects of this group of fungi. How these fungi cause disease of plants, their epidemiology, and their potential for movement and dispersal between continents are just some of the questions that are being addressed in the course of my study. It is envisioned that the results and data will help in the control and management of these pathogens and may give some insight into the behaviour of other similar pathogens.

Hobbies / Interests: At the moment; I enjoy studying the Bible, reading theological books, as well as biblically-based practical books on living life.

Contacting The TPCP & CTHB Research Team & Diagnostic Clinic

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Tel: 012 420 3938/9

Extension Services:
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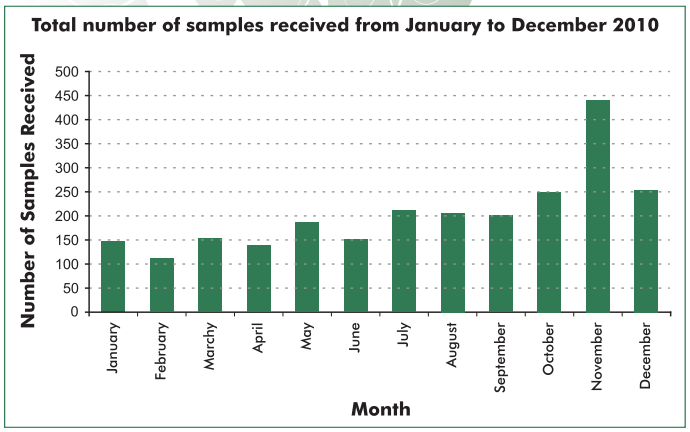
Tel: 012 420 3938/9

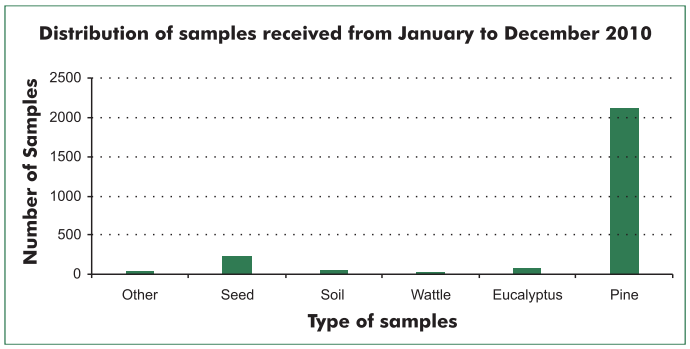
Contact numbers & Web address:
Tel: 012 4203938/9
Fax: 012 4203960
http://www.fabinet.up.ac.za/

Address for couriering samples:
FABI
Lunnon Road
University of Pretoria, Main Campus
Hilcrest, Pretoria, 0002, Gauteng

The Diagnostic Clinic

The TPCP/CTHB diagnostic clinic is a service provided to the industry and stakeholders in the CTHB to assist in the identification and management of disease and pest problems of trees. This is a free service, available to all member companies of the TPCP/CTHB Programmes. The Clinic also serves as a surveillance tool in monitoring the occurrence and spread of known pests and pathogens as well as in the detection of new pests and pathogens.





The clinic received a total number of 2472 samples from January until the end of December. Pine samples comprised 85 % of the total number of samples received, with the majority of these samples received for *Fusarium* screening.

From left to right: Phathie Sibanda, Juanita Engebrecht, Izette Greyling, Johan Bekker, Jean Hakizimana and Darryl Herron.

Eucalyptus samples made up 2.8 % and *Acacia mearnsii* (Wattle) samples only comprised about 0.7 % of the total amount of samples. Soil samples received comprised 1.5 % of all samples received.

Seed samples, received for *Fusarium* screening comprised 9% while samples from non-forestry and indigenous trees as well as water samples, categorized as "other", comprised 1 % of received samples.

We have made a few changes with regards to our Pine seed screenings for *Fusarium* spp. We have, in consultation with various industry partners, standardized the number of seeds per batch to be sent for screening. Batches of 450 seeds per batch are now received, with 400 of these being used in analyses. The remaining 50 are kept as back up if some analyses need to be repeated. This would mean that fewer seed batches can be tested at any given time. We kindly request that you contact Izette Greyling (Izette.greyling@fabi.up.ac.za) before sending any seed batches in order for the necessary arrangements to be made.

Diagnostic Clinic Members with foresters from the Department of Agriculture, Forestry and Fisheries (DAFF) and forestry students.

Darryl hard at work peeling bark from a tree in an attempt to catch a beetle.

If you have any questions on pests or diseases, need us to come and look at problems in field or want to send samples to the clinic, we would like to ask that you contact Izette Greyling (izette.greyling@fabi.up.ac.za) or Jolanda Roux (jolanda.roux@fabi.up.ac.za). 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 necessary. Please also join our online tree health forum, Treehealthnet, for regular updates on pests and diseases, fieldtrip advertisements and other issues related to tree health.

DST/NRF CENTRE OF EXCELLENCE DAY 2011

Prepared by Kershney Naidoo and Jenny Hale

The NRF in conjunction with the DST hosted the Annual National CoE Symposium at the University of Cape Town on 1 February 2011. This event aimed to provide a platform for the CoEs to showcase their work, share ideas and experiences and raise pertinent issues in pursuit of enriching South Africa's research culture. Each of the nine NRF/DST CoEs in the country set up an exhibition, which attractively portrayed the impact and outputs of their research programmes.

Other than presentations by the Centres, the event also offered an opportunity for interaction and discussion with the Minister of Science and Technology, Mrs NalediPandor, and other key stakeholders within the National System of Innovation.

Dr Max Price, Vice-Chancellor and Principal of UCT, welcomed everyone to the Symposium, extending a special welcome to Minister Pandor. Dr Albert van Jaarsveld, CEO of the NRF, referred to two of the pinnacle investments that the DST had made over the past six years, being the establishment and funding of the DST/NRF Centres of Excellence and the SA Research Chairs initiative. Approximately 50million rand had been allocated for CoEs, which had had a very effective impact towards meeting some of the 12 outcomes set by the Government's medium term strategic framework. More than 400 PhD students had been supported through these initiatives, 50% of whom were black, and a high percentage female. In future, DST/NRF would like to see the establishment of CoEs working in sciences and humanities, pharmaceuticals, chemistry, engineering and materials science.

The CTHB group with Minister Naledi Pandor. (From left to right): Osmond Mlonyeni, Mike Wingfield, Mmatshepho Phasha, Minister Naledi Pandor and Kershney Naidoo.

Minister Pandor expressed her excitement at seeing the focus on science and technology (S&T) appearing on the agenda of the African Union and the SADC protocol. DST's commitment was to grow S&T in the country and she stressed the importance of multi-lateral collaboration and partnerships with other countries in Africa. She referred to the importance of higher education and the establishment of new universities. She considered that a priority for improving the quality of education in general was to improve the quality of teaching. The CoEs had been established as one of the agencies to promote innovations in new unique areas of importance, to solve problems and to look at elements of improving the quality of life of people. One of the core competencies of the CoEswas the level of collaboration they offered both nationally and internationally. They expanded the opportunity for the production of more PhDs and of relieving the brain drain by providing resources to keep high calibre researchers in South Africa and bringing back talent to this country. She praised especially the triumvirate of the Western Cape Universities for the positive role they were playing in raising the ranking of SA Universities in the World. She congratulated the Directors of the CoEs on the stirling work achieved to date.

Prior to returning to Parliament, Minister Pandor spent about 40 minutes visiting each of the nine exhibits set up by the CoEs and manned by their Directors, staff and students. The CTHB exhibit had been prepared with material demonstrating the work being done in the CTHB at the Universities of Stellenbosch and Pretoria. Prof Leanne Dreyer and Dr Francois Roets (US) had supplied microscopes, beetles with mites as well as a beautiful display of proteas and fynbos. Kershney Naidoo, Osmond Mlonyeni and Mmatshepho Phasha (UP) were responsible for producing a most impressive and attractive CTHB exhibit, and for explaining to visitors the research being done in the CTHB.

After a brief tea and snacks session, each of the Directors/representatives of the nine CoEs presented the achievements, outputs and new developments of their CoEs to the DST and NRF. Two of these CoEs were newly established. These are the Applied Centre for Climate and Earth Systems (ACCESS) led by interim Director Prof Jimmy Adegope (CSIR) and Research Manager Neville Swiejd (US) and Center for Theoretical Physics (NiTHeP) led by Director Prof Frikkie Scholtz (US).

Continue

The other six CoEs had been established since 2004 and were the CoE for Invasion Biology, led by Prof Steven Chown (US), the CoE in Tree Health Biotechnology, led by Prof Mike Wingfield (UP), the CoE in Catalysis, led by Prof Michael Claeys (UCT), the CoE for Strong Materials, led by Prof Lesley Cornish (UW), the CoE for Epidemiological Modelling and Analysis, led by Dr Alex Welte (US), the CoE in Biomedical TB Research, jointly led by Prof Paul van Helden (US) and Prof Valerie Mizrahi (Wits); and the CoE in Birds as keys to Biodiversity Conservation, led by Prof Phil Hockey (UCT).

Proud of their display.
From left to right: KershneyNaidoo, Osmond Mlonyeni, Mmatshepho Phasha, Emma Steenkamp, Mike Wingfield and Francois Roets.

In his closing address, Dr Gansen Pillay, NRF Vice-President, extended three challenges to the CoEs. He encouraged them to collaborate with SAASTA, which was responsible for science communication and promotion of S&T (led by Dr Beverley Damonse); to work to establish a partnership between the Universities and the NRF to lobby government to support the CoE initiative; and to encourage the social science and humanities faculties at the Universities to apply for a CoE.

He thanked all concerned in making it a very successful CoE day and gave the CoEs the good news that Minister Pandor was planning to make personal visits to individual CoEs.

After the close of proceedings, the CoE Directors, DST and NRF Executive met to discuss the way forward for the CoEs. The rest of the CTHB team celebrated a most successful day with a trip to Signal Hill and the Victoria & Alfred Waterfront.

Communication is everything

By Darryl Herron

In February 2011, a Professional Communications Workshop was held at FABI. The aim of this workshop was to help those who attended become more professional, confident and competent with regards to their communication skills. The workshop was presented by Sally Upfold from the Institute for Commercial Forestry Research (ICFR) and was attended by many of the students in FABI. The course covered everything about communication from the do's and don'ts, using your voice and gestures to preparing a presentation and email etiquette.

Communication is very important in the scientific field, especially when sharing work with other scientists in the scientific community or with members of the public. Sharing information with the scientific community is a little bit easier compared to the public as there is usually a lot of jargon associated with a talk/presentation and usually complex concepts or techniques. This workshop provides the attendees the tools necessary to improve the way they present their work to others.

Students were given a basic introduction to communication and a few pointers about: fears when presenting, use of voice, tone and volume, posture and gestures, preparation of presentations, use of visual aids, use of a microphones, handling questions and answers and written communication like emails. The course also offered the students the chance to use what they had learnt and do a few hands-on exercises including impromptu talks.

The course was well presented and all of the students benefited greatly. The feedback received from some of the student was positive. This workshop was especially useful, as all of the students in FABI present at least two to four times a year, and often have to share their work with others through emails, articles, posters etc. Although many of the students have learnt some new techniques, many feel getting over their nerves will be the biggest test.

Congratulations & Graduations

Prof. Emma Steenkamp: Exceptional Young Researcher Award from the University of Pretoria

Prof. Jolanda Roux: Honorary Professor of the Chinese Academy of Forestry and an award from the Southern African Plant Pathology Society for her contribution to Applied Plant Pathology

B.Sc Honours

Amy Wooding

Cornell Kortenhoeven

Dylan Chapman

Phia van Coller

Tracy Hall

M.Sc.

Bernice Porter: Pathogenicity and competition studies on *Fusarium circinatum*, a pathogen of pine trees.

Simon Martin: Mating type and pheromone genes in the *Giberella fujikoroi* species complex: an evolutionary perspective (With destinction).

Ph.D

Guillermo Perez-Suarez: Global genetic diversity of the Eucalyptus leaf pathogen *Teratosphaeria nubilosa* species complex in native forests and commercial plantations.

Magriet van der Nest: Mycelial compatibility in *Amylostereum areolatum*

Continue

Ph.D

Maria-Noel Cortinas: Taxonomy and population genetics of *Kirramyces* spp. causing stem cankers of *Eucalyptus* trees.

Peter de Maayer: Genome comparison to identify selected pathogenicity factors of a plant-associated *Pantoea ananatis* strain.

Riana Jacobs: Taxonomy of species within the *Gibberella fujikuroi* complex.

Shuaifei Chen: Fungal diseases of Eucalypts in China

Wubetu Bihon Legesse: Understanding the global population genetics of *Diplodia pinea* and its life cycle in plantation pines.

WELCOME TO THE TPCP/CTHB

Jhon Alexander Osorio is from Colombia and joined the CTHB in February for a Ph.D degree. Alex will be working on mangrove trees in South Africa. He studied in Colombia and Brazil before joining FABI.

Alain Misse started a Ph.D degree in the CTHB programme in April and will be looking at *Ceratocystis* spp. and their insect vectors on native trees in South Africa. Alain is from Cameroon, where he previously worked on plant parasitic nematodes with IRAD.

Teboho Letsoale completed her B.Sc degree at UCT and joined the CTHB programme for her B.Sc. honours degree. She is working on fungi in the Microascales (eg. *Ceratocystis* spp.) in the Marico region and also developing microsattelite markers for a *Ceratocystis* sp.

Janneke Grove is doing her B.Sc. honours. Her project is on the identification and characterisation of transposable elements in the pitch canker fungus, *Fusarium circinatum*.

Continue

WELCOME TO THE TPCP/CTHB

Jon Ambler is currently doing his B.Sc. honours on the pine pitch canker pathogen, *Fusarium circinatum* using a bio-informatics centered approach. Jon obtained his B.Sc. degree from the University of Pretoria, before joining FABI.

Jeanne van Rensburg obtained a B.Sc degree in Genetics from the University of Pretoria and is currently working towards a B.Sc. Honours degree in Genetics. Her project is based on identifying genetic differences between pathogenic and non-pathogenic *Mycosphaerella laricina* populations by use of AFLP techniques.

Arista Fourie joined the group for a B.Sc. Honours degree in Genetics. She will be working on the development of novel phylogenetic markers for the tree pathogen *Ceratocystis fimbriata sensu lato*. Arista holds a B.Sc. degree in human genetics from the University of Pretoria.

Mingliang Yin (Leon) holds a B.Sc. degree in gardening and a M.Sc in Plant Pathology and recently joined the TPCP for his Ph.D studies. His research at FABI will be focussed on the Ophiostomatoid fungi and their bark beetle associates on conifer trees.

Siphathele Sibanda is doing a M.Sc. in Microbiology, working on the eucalypt pathogen, *Pantoae ananatis*. She will be determining the virulence factors that contribute towards the pathogenicity of this pathogen. Phathie previously studied at Stellenbosch, where she worked on the characterisation of wild type yeasts for use in biofuels production.

Odirile Tabane joined the group for her B.Sc. Honours degree in Genetics. She will be working on the symbiotic relationship between the woodwasp *Sirex noctilio* and the fungus *Amylostereum areolatum*. She obtained her B.Sc. degree from the University of Pretoria.

Tanya Joffe joined the TPCP as a post-doctoral fellow after having obtained a B.Sc. and B.Sc. honours in Entomology from the University of Pretoria and a Ph.D from the University of Tasmania. As part of her work at the TPCP Tanya will be looking into the biological control of *Leptocybe invasa* and *Thaumastocoris peregrinus*.

SAAB and SASSB 2011

Prepared by Cornell Kortenhoeven, Gerda Fourie and Kershney Naidoo

The 2011 joint meetings of the 37th annual South African Association of Botanists (SAAB) and the 9th Southern African Society for Systematic Biology (SASSB) took place in the friendly and quaint town of Grahamstown from 16th to 21st January, 2011. The overall theme of these conferences, hosted by the Departments of Botany and Zoology at Rhodes University, was African Biodiversity with the specific theme of SAAB being "Plants in a changing world".

These meetings were attended by eight researchers from the CTHB and included Prof. Mike Wingfield, Prof. Jolanda Roux, Dr. Marieka Gryzenhout, Dr. Martin Coetzee, Kershney Naidoo, Cornell Kortenhoeven and Chrizelle Beukes.

The proceedings consisted of 40 poster presentations and 180 oral presentations. A series of plenary lectures was presented by world class speakers including Professors David Beerling, Peter Weston, Luciano Beheregaray, (Flinders University, Adelaide),

Continue

SAAB and SASSB 2011

Steve Goodman, (Field Museum, Chicago) and Tim Crowe, (DST/NRF Centre of Excellence in Birds at the Percy FitzPatrick Institute, University of Cape Town). Prof Mike Wingfield's plenary lecture was aptly entitled *"Global tree health: What next?"*.

The CTHB contingency at SAAB and SASSB. From left to right: Jolanda Roux, Cornell Cortenhoven, Gerda Fourie, Martin Coetzee, Marieka Gryzenhout, Albe van der Merwe, Chrizelle Beukes. Front row: Kershney Naidoo and Mike Wingfield.

The research presentations were organized in concurrent sessions according to themes that included: Climate change, Biodiversity, Medicinal plants, Ecology, Plant pathogens and Biocontrol, Pollination, Plant invasion and conservation, Ecophysiology, Phytogeography and Systematics. The majority of presentations served to enlighten fellow researchers as to the current state of affairs regarding the influence of climate change on animals and plants with only a handful of presentations aimed towards the eukaryotic or prokaryotic microbes.

Reference to state-of-the-art molecular approaches was, however, under-represented.

This conference was well organized with ample opportunities for interaction between delegates. The social events included a spit-braai, gala dinner and mid-conference field trip to nearby areas. Although exposure to research domains from other disciplines broadened scientific insights, major debates happened over a cold beer at the famous Rat and Parrot, which undoubtedly paved the way for thought-provoking scientific engagement.

SASPP 2011

Prepared by Darryl Herron

Every two years FABI sends students and members of staff to the biannual Southern African Society for Plant Pathology (SASPP) conference. This year was no different as FABI was represented by more than 40 students and staff. The 47th SASPP congress was held at the Berg-en-Dal conference center in the Kruger National Park from 23 – 26 January 2011.

The Kruger National Park is one of the few places in South Africa where one can get close to nature and enjoy its wild beauty, making this the perfect backdrop for this year's conference.

The conference hosted 197 people including students and scientist from industry and various local universities, together with well-known scientists from abroad; all interested in plant pathology and related fields. This platform therefore provides the perfect opportunity for people dealing with plant pathology and related areas to come together and discuss pressing issues and share information. For students this is especially important as it not only allows interaction with prominent scientists, but also provides them with the opportunity to engage with members of industry and to share experiences with colleagues.

Continue

Student and staff from FABI attending the 47th SASPP congress

The research presented in the talks this year encompassed a vast variety of subject areas including: Disease management, Disease resistance and breeding, Etiology and epidemiology, Pathogen identification and characterization, Post-harvest pathology and Mycotoxins. Of the 50 talks presented, 14 were from FABIans. Besides presentations there were also posters, with more than 65 of the posters presented by students and staff from the University of Pretoria and FABI.

Presentation and posters sessions during the SASSP conference

At the end of the conference, awards were made for the best poster and the best presentation.

FABI student, Alinke Labuschagne, at her poster

FABI won two awards – the award for the best poster was received by Pieter de Maayer, and the best student presentation in the molecular section was awarded to Elsie Cruywagen. FABI's success continued with the announcement of the new committee for the SASPP. Professors Teresa Coutinho and Jolanda Roux were elected to serve as the new president and vice president, respectively. Professor Roux also received the Applied Plant Pathology Award, one of the SASPP's premier awards.

Prof Jolanda Roux receiving the Applied Pathology Award from the SASSP president Prof Karin Jacobs

The SASPP conference is important for the local scientific community and for future researchers. Apart from the interesting and thought provoking research that was discussed, different research groups got together and learnt from one another. There was also opportunity for fun; for example, participants enthusiastically engaged in the traditional friendly competition of the Mildenhall Stakes. Work and play thus allowed for the building and strengthening of research networks upon which current and future collaborations are based. Overall, the conference was a success and enjoyed by all who attended. We are looking forward to the 48th SASPP conference in 2013.