TREE PROTECTION NEWS

Newsletter of the Tree Protection Co-operative Programme - University of Pretoria

NO 8 NOVEMBER 2004

CONTENTS

FROM THE DIRECTOR'S DESK

The energy, the passion and the progress of the Tree Protection Co-operative Programme (TPCP) team never ceases to amaze me. Just this week, I had a visit from the past and the future science councilor from the Chinese embassy. Councillor Lee, who has come to know the TPCP and FABI very well, shared with me some of his impressions of this programme. He noted accomplishments that even I have not thought of and he made me realize that the TPCP is so much bigger than the group that lead it. The students, administrative staff, technicians and the small group that lead the TPCP represent a unique assemblage, in which all the parts are crucial to the effective functioning of the whole.

The dynamics of the TPCP and elements that make it work so well have also recently been highlighted in a paper that is being prepared by the Human Sciences Research Council. This emerges from a project in which the HSRC investigated a number of Industry/ Education linkages. The TPCP was chosen as one of these and many of our forestry industry colleagues participated in interviews and interrogation. The result is a fascinating report with the unusual title "The Centre Holds: Maintaining the equilibrium in the Tree Protection Co-operative Programme" by Michael Cosser, which will be published in a UK based journal. It is interesting and educational for those of us who work in the TPCP team to be able to "see ourselves" through the eyes of others.

This issue of Tree Protection News is the last for the year. It is one of four reports, two longer and two shorter that we share with our forestry colleagues each year. Putting together such reports requires a substantial effort, particularly in a relatively small programme that is not able to sustain a media officer. You might be interested to know that the reports are coordinated and compiled by Dr. Jolanda Roux, who is also responsible for the incredibly important task of maintaining our Field Activities. It is no secret within the walls of our laboratories that putting together the TPCP Newsletters is one of Jolanda's least favourite activities, but the product is always great and we are grateful for her efforts to help us share our activities with TPCP members.

Life in the TPCP is never dull. The group is continuously involved in educational activities, both in South Africa and around the world. While South African students remain the foundation of the TPCP, we are privileged to have students from many parts of the world working with us. This brings a great body of knowledge and experience to us and helps us to better understand the movement of pests and pathogens between countries. Having projects supported through bilateral agreements between the South African government and governments of other countries has significantly extended our international reach. Thus, projects with the governments of Australia, Belgium, Sweden, Norway and China have contributed enormously to the TPCP. This and past newsletters have included features on these international projects.

New pests and diseases continue to threaten our forestry industry. Earlier this year, at the time of our annual meeting, I made the point that the past year was one in a very long time, where I was not able to note a serious new pest or pathogen. That certainly should be viewed as positive. But this positive news was not to last long. Just a short while later, very serious infestations of *Euclayptus* trees was noted at Lothair. The damage was to the wood on mature living trees. The causal agent is a cossid moth that is currently being identified. This newsletter includes a report on the worrying problem. Certainly, continuous survey and study will be essential, if we are going to deal with the impact of pests and pathogens in the future.

One of the most exciting developments during the last few months was the news that one of the six newly established National Research Foundation/ Department of Science and Technology Centres of Excellence, will reside alongside the TPCP. Winning the competition for a CoE was hardly expected, there were more than 70 initial proposals and a process of rigorous national and international review was used. Yet we have again shown that the TPCP is a remarkable and internationally recognized programme, that will now benefit from the CoE. The CoE is currently being constituted and its research programme defined. More news on this will follow in future newsletters, but it is now clear that the focus of the work will be on the health of native South African trees. This might be surprising to some readers of TPCP News. Suffice to say at this point that pests and diseases on native trees have a huge impact on plantation forestry in this country and the activities of the CoE will enable us to understand associated threats, better.

Typically the last issue of Tree Protection News appears late in the year. This is generally a time for vacation and for reflecting on activities of the year gone by. Perhaps for us, more important is to thank all of the readers of this newsletter, and also all members of the TPCP for their support of the programme. Our many friends in the plantations that assist us and guide us form a crucially important component of the TPCP. We thank you all for another great year of support and happy interaction. For those of you that celebrate Christmas, we wish you a very happy festive season and to all others a wonderful holiday season. We also wish you a healthy, happy and prosperous 2005 – the halfway point of the first decade of the new Century that dawned just the other day. We look forward to working with you in the coming year and to seeing many of you in South African forestry plantations, forestry research facilities and board rooms. Also at the next annual meeting of the TPCP that will be held in Pretoria on the Tuesday 19th and Wednesday 20th April 2005.

TPCP ANNUAL MEETING 19 & 20 APRIL 2004

The annual meeting of the TPCP will take place in April next year. Anyone who wishes to attend should co-ordinate with his/her company research manager or director. You are also welcome to contact us directly at Mike.Wingfield@fabi.up.ac.za for further information

ICFR	Prof. Colin Dyer
Mondi	Bruce Hulett
NCT	Patrick Kime
SQF	Doggy Kewley
CTC	Edwin Schramm
Sappi	Andrew Morris
TWK	Siggie van Fintel
Komatiland	Jan van der Sijde
GFP	Lorraine Macnamara
DWAF	Themba Simelane

CONGRATULATIONS

MSc.:

Marelize van Wyk (Cum Laude): Taxonomy and population biology of selected *Ceratocystis* spp. with hat-shaped ascospores.

Lorenzo Lombard: - Fungal diseases in *Eucalyptus* and *Acacia* nurseries in South Africa.

DIAGNOSTIC CLINIC (JANUARY TO SEPTEMBER 2004)

For the period January to September the Diagnostic clinic received a total of 399 samples. Most samples were received in the summer months [Fig. 1]. Of the samples sent, the majority were again from pine (78%) [Fig. 2] and more than 50% were research samples. The research samples involved determining the reason why seedlings/cuttings were dying in specific trials which, for example, included testing fungicides and biological control agents for efficacy against *Fusarium circinatum*. Only 13% of the samples received thus far have been from eucalypts, less than 1% from wattle, 1% insect samples and 3% were classified as other. The category "other" included seed, growth media and water samples.

Figure 1

Diagnostic Clinic (Jan - Sept 2004)

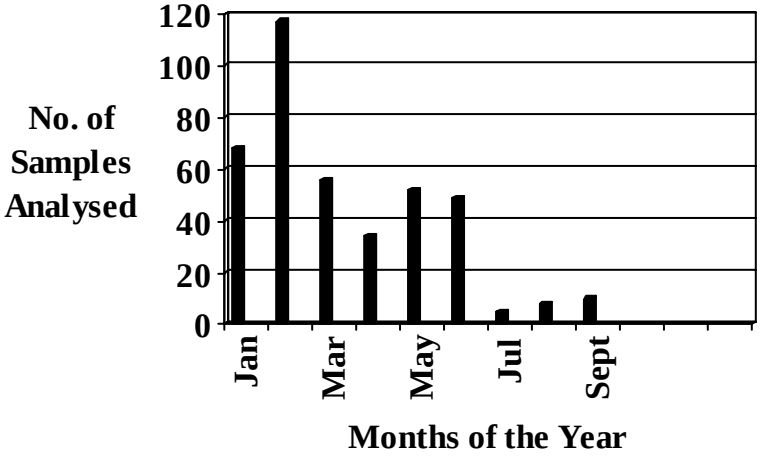
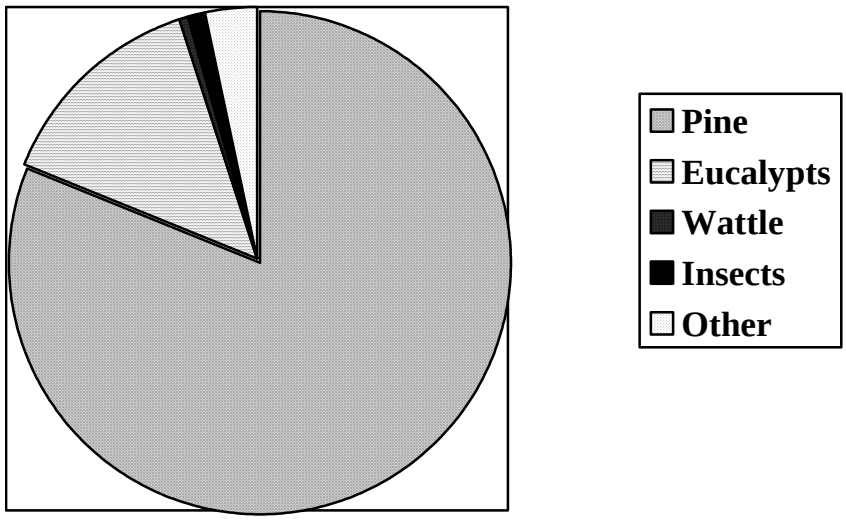


Figure 2

Number of samples received from their respective hosts



Fun with science:

UP with Science day – 30 June 2004

The UP with Science programme is a science enrichment programme for secondary school learners who show an interest in science as a career. Selection of the learners to participate in this programme is fairly competitive. Each secondary school in the Pretoria region may nominate two learners based on their academic potential and interest in science. From these nominations 50 learners are selected each year to participate in the programme.

The UP with Science programme is designed to run over a period of 6 years. The first 3 years are completed in Grade 10-12 and consists of monthly classes on Saturdays and a winter school during the June-July holidays. Upon successful completion of this phase the learners can enroll in a course of their choice in the Faculty and Natural and Agricultural Sciences. The University of Pretoria covers the tuition fees of these students.

Staff and students of FABI and the TPCP have always actively participated in this event. On 30 June 2004, we hosted the Grade 10 learners for, in some cases, their first exposure to Genetics and Mycology. Forty-eight learners from a number of schools in the greater Pretoria region arrived at FABI at 9h00 in the morning. While loads of fun, the activities were designed to give learners an idea of what "real scientists" do in FABI. These included DNA extractions, Mendelian genetics, mushroom tasting and fungus watching.

Renate and Sabine presented a hands-on DNA extraction using house-hold chemicals. Every learner was given a lab coat and had to extract DNA from wheat germ using common household chemicals. This proved to be a huge success with the learners and everybody enjoyed it. After completion of the experiment, everybody could take an eppendorf tube with DNA home. Learners were also taken on a tour of the state of the art sequencing facility at the University of Pretoria.

The second activity was an explanation of Mendelian genetics in which learners were taught how inheritance works. Prof. Brenda Wingfield presented this in a fun and practical way. Each learner had to draw a "smiley" face based on a number of given characters. These characters were determined by flipping a coin to determine if the given character for the parents are dominant or recessive. Learners were impressed by the number of different options that can result from a single set of parents.

The mycology section was presented by Dr. Karin Jacobs. Most of the learners only had exposure to the world of fungi through their contact with bread mold. The mycology course started with a short talk on edible and harmful fungi, followed by a film on the dispersal methods and ecology of fungi. Most learners enjoyed this as it opened up a new microscopic world to them that they did not know existed. A number of common molds were shown to them under the microscopes. The activity was ended with a mushroom tasting event. A number of edible mushrooms are available in South Africa, although very few people are aware of this and fewer have tried these. A team of "chefs" which included Karen Muller, Rosie, Thia, Thuto, Melissa and Dr. Jacobs prepared some dishes with the mushrooms the previous evening. These included Portabello mushrooms with Feta, Porcini

Mohammed Abdo (middle) explaining DNA extraction protocol to the learners.

soup, Enoki salad, Shiitake potatoes, pasta with Oyster mushrooms, a stir-fry with wood ears, button mushrooms in rice and even a desert with white mushrooms and fruit. This was received with mixed reactions ranging from disgust to a number of people coming back for second and third helpings.

The learners were asked to rate the different activities on a scale from 1-10 with 10 being good. Scores ranged from 7-9, with students being especially interested in DNA and DNA technologies, including genetics. The mushroom tasting got a 7 average rating, which most of us mycologists found a little surprising. It is clear that many people in South Africa do not know much about fungi and even less about their edibility and nutritional value. There were a few comments about the "stuff being horrible". One or two people said that they would make use of the recipes. Most learners wanted to see even more practical exercises.

The day, although exhausting, seemed to have been an enormous success, mostly because of the great team of FABIANs that participated. We also accomplished our goal of showing the learners that science is interesting as well as fun. There were a number of comments on the general enthusiasm and passion of the FABI people which made this day so much more enjoyable. We are looking forward to next year and making it an even better day. **My favourite comment from the feedback has to be as follows: "Genetics: very fun! This profession = no stress". We wish…..**

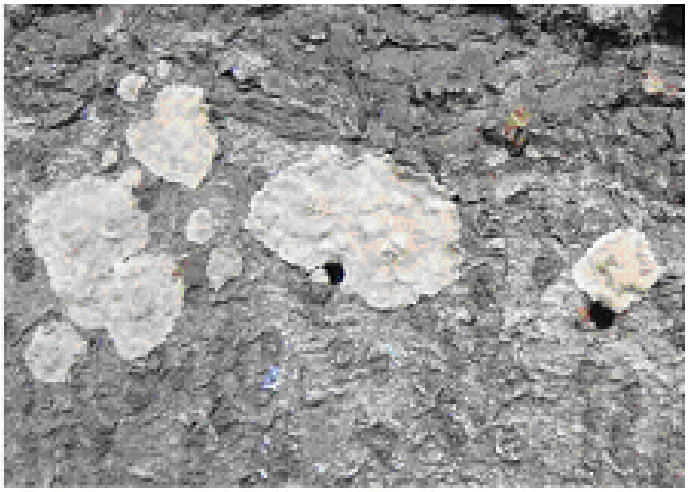
Meeting fungi close-up

Where did *Sirex noctilio* come from? Collecting Siricid wood wasps and their fungi in native environments

On Friday, 17 September, Rimvis Vasiliauskas, a Swedish colleague, and Dr Bernard Slippers (ex- TPCP student) returned from a visit to native Pine and Fir forests in Greece. The trip was intended to co-inside with the recorded emergence time of *Sirex noctilio* in the Mediterranean region. It was a successful outing during which they collected around twenty samples of different wasps. These include samples of *S. noctilio*, an *Urocerus* sp. (a wood wasp genus related to *Sirex* and that also attacks softwoods) and other (possibly parasitic) wasps. They also collected more than 50 wood samples from which they are attempting to isolate the different *Amylostereum* species that are associated with these wasps.

The collections in Greece form part of a larger effort to collect the various wood wasp species (or Siricid wasps), their symbiotic fungi and where possible their parasites, from across their native range. Extensive collections of the fungi from northern Europe, and to some extent Britain, exist at the Swedish University of Agricultural Sciences, where Bernard is currently working as part of his post-

doctoral experience. Collaborators are also giving him access to earlier collections of wasps or fungi from central Europe, a few isolations from across North America and potentially Russia. In areas not covered by these collections they are making an effort to collect the organisms themselves with the help of various collaborators.



Looking for Siricid wood wasps and *Amylostereum* fungi can be like looking for the proverbial needle-in-a-haystack. They have thus had to learn fast in the past European summer how to do this most effectively. Collections now typically focus on three different areas to increase the chances of finding the wasps and fungi. Firstly, traps with attractants are put out and monitored over time. These traps were used earlier in the season in Sweden and are still out in the field in Greece and Italy. Secondly, they visit sites where logging or thinning is taking place. It is amazing to see with what efficiency the Siricid wasps find the freshly cut wood to lay their eggs. (It also shows why these wasps are moved around the world so easily in raw wood products). Once a female wasp starts laying eggs it seems to ignore all else, and are thus easy to catch; or most of the time. Thirdly, thinning sites of three years and older are good sources of stumps or logs bearing fruiting bodies of *Amylostereum* or exit holes of the wasps. From these they can collect wood samples for fungal isolation.

The overall aim with the collections is to understand the amount and distribution of genetic diversity amongst the Siricid wasps, their fungi and parasites. These data will help us to understand the ecology of these organisms in their native environment. It will also help to identify how frequently and from where these wasps are spread across the world. We are, for example, hoping to find the European origin, or range of the potential origin, of the Southern Hemisphere populations of *S. noctilio* and *A. areolatum.* Such information will not only help to improve current attempts to control *S. noctilio*, but also prepare Southern Hemisphere countries for the introduction of other wasp species.

Above left: *Amylostereum chailletii* fruiting on *Abies alba* around wasp exit holes.
Left: Bernard taking core samples between exit holes and fungal infection sites.
Above *Urocerus* wasp ovipositing

Contributions in this Newsletter by Mike Wingfield, Teresa Coutinho, Jolanda Roux, Brett Hurley, Karin Jacobs, Solomon Gebeyehu, Bernard Slippers, Lieschen de Vos and Wilhelm de Beer

CONGRESS REPORTS

Mycological Society of America (MSA) meeting: 18-20 July 2004

Lieschen de Vos, a PhD student of the TPCP was fortunate to attend the MSA meeting which was held in Asheville, North Carolina. She was the only TPCP representative at this conference. Making it even more exciting was the fact that it was Lieshcen's first time to fly and leave the African continent. Although the theme of the congress was "Biodiversity of fungi in the Southern Appalachian Mountains" it was still a very interesting meeting, even for someone from South Africa, with lots to be learnt. This was also an apt theme for the congress as Asheville is situated at the foot of the Great Smokie Mountain National Park.

A number of mycological/fungus forays were conducted during the congress to identify the estimated 89% of fungal species not yet documented in that area. "As I am not a mycologist/ microbiologist by training it was quite an experience to be surrounded by people whose main focus it was," Lieschen told us on her return. Lieschen presented a poster entitled "AFLP genetic linkage maps of *Fusarium circinatum* (mating population H) and *Fusarium subglutinans* (mating population E)". Some other interesting topics that were discussed included comparisons of fungal genomes that have been sequenced as well as the generation of super trees in the phylo-informatics session.

American Phytopathology Society Meeting: July 31 – August 4

This year 3 TPCP members were fortunate enough to attend the annual meeting of the American plant pathology society which was held in Anaheim California. **Grace Nakabonge** (PhD student) and **Jolanda Roux** arrived early to attend the forest pathology field tour, while **Brenda Wingfield** had meetings with several colleagues of the TPCP. The field tour was especially of interest as it included stops to visit Monterey, one of the areas in California that has suffered the most from pitch canker (*Fusarium circinatum*). In California, *Pinus radiata* is especially susceptible and it was quite amazing to the see the extent of damage *F. circinatum* can create in mature, native stands of *P. radiata*. We also got a very good idea of why the disease is called pitch canker. A large part of the management focus now is to obtain disease tolerant planting stock through artificial inoculation of seedlings. We also looked at *Phytophthora ramorum* infection of several native tree species in the Montery area. This is yet another pathogen that was introduced into the United States. It was only discovered in the 1990's, but has already spread over a considerable area, affecting many oak and other tree species. These two disease examples clearly re-enforced the importance of strict quarantine measures, also within a country.

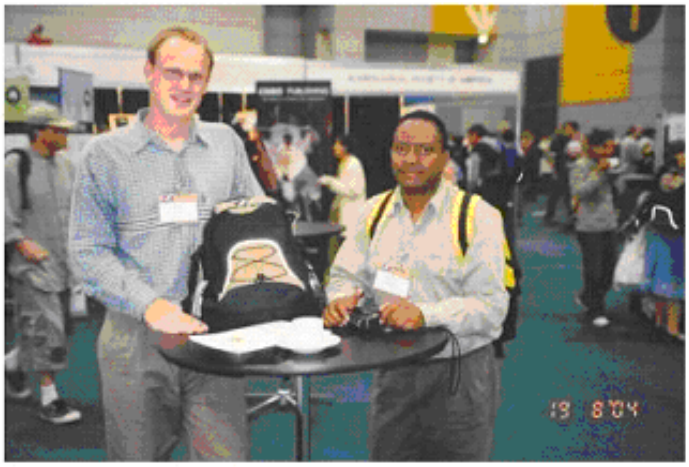
At the congress itself, Brenda, Grace and Jolanda presented talks on their work, while the TPCP also had 3 posters on display. It was startlingly clear that if not for the work done by the TPCP, very little information regarding, in many cases, some of the most important tree pathogens would be available from Africa and the rest of the Southern Hemisphere. From a broader biodiversity and management perspective it was worrying to see how little information is available from continents other than the United States and Europe. This is of concern, as without a complete picture of pathogens, it is nearly impossible to manage disease problems caused by them. This lack of information also drastically influences the import/export potential of countries in the Southern Hemisphere, including South Africa.

We would like to thank the forestry industry for their support of research into tree diseases. The TPCP is of crucial importance to biology in the broader picture and without your support there would be a great information gap in the field of plant protection in the Southern Hemisphere.

Grace Nakabonge with her poster at the APS

The XXII International Congress of Entomology

The XXII International Congress of Entomology was held from 15-21 August 2004 in Brisbane, Australia. The theme of the congress was "Entomology: Strength in Diversity." Over 3000 delegates from around the world gathered together for this grand event that takes place every four years. The TPCP was represented by 5 delegates who delivered 5 oral and 4 poster presentations.



Brett Hurley and Solomon Gebeyehu at the ICE

The congress program was packed with various topics that were divided into 20 concurrent sessions, including topics that ranged from Ecology and Population Dynamics, Biological Control, Insect Invasions, Insect-Pathogen Interactions, Biodiversity and Biogeography as well as Entomology and the Public. Lively discussions and debates followed oral presentations. The congress was attended by researchers and delegates representing a wide variety and experience. Notably, world-renowned scientists in their respective fields shared their recent research findings and insights on development policies that are related to Biological Sciences as well as indicated the way forward for entomologists as role players in the global arena of sustainable development and biodiversity conservation.

It is very exciting to note that the Entomological Society of Southern Africa (ESSA) won the bid to host the 2008 International Congress of Entomology (ICE 2008) which will be held in Durban. This is the first time the International Congress of Entomology is going to be held on the African continent. An impressive video clip was shown at the closing ceremony of the congress by the South African ICE 2008 bid committee, that depicted South Africa's cultural diversity, the city of Durban and the many parks, nature reserves and game reserves that will provide international scientists and delegates the opportunity to see Africa's rich fauna and flora. We take this opportunity to congratulate the South African bid committee of ICE 2008 for winning the bid to host this much coveted international event.

Tree Protection Co-operative Programme (TPCP) contributions to the ICE in Brisbane were large in number and quality. Certainly this represents the largest single presentation of Forest Entomology research ever at an international congress. The TPCP is clearly growing its forest entomology activities rapidly and beginning to draw international attention to its activities in this domain.

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New pest infects *Eucalyptus nitens*

Article taken from WoodSA

A new insect pest has been found infesting *Eucalyptus nitens* – and in very large numbers. Masses of squirming, cream and pink larvae were observed boring inside the trees, causing extensive damage and a rather repugnant smell. Entomologists Brett Hurley and Solomon Gebeyehu of the Tree Protection Cooperative Programme (TPCP) at the University of Pretoria identified the insects as the immature stages (larvae) of Cossid moths. This is the first record of Cossid moths infesting *Eucalyptus* or any Myrtaceae in South Africa.

Cossid moths are also known as 'goat moths' or 'carpenter moths'. The name goat moth is derived from the strong smell of larvae of certain species. Adults have gray or brown spotted to mottled wings. The larvae are cream or pinkish white, cylindrical and stout with broad brown dorsal patches behind the head. These moths are nocturnal fliers and they lay their eggs on the bark of trees, or in the tunnels from which they have emerged. The larvae are internal feeders, boring large galleries in the wood of forest, shade and fruit trees or in the pith of reeds, often causing serious damage. Unlike some of the beetle borers, Cossids do not tunnel in cut timber, selecting only growing trees or shrubs on which to feed.

Cossid moths are known to occur in the Southern African region, with well over a hundred species in several genera of two sub-families. Although Cossids have never before been recorded to infest *Eucalyptus* in South Africa, several

Above: Cossid moth larvae and tunnels.

Left: *E. nitens* stem showing extensive frass exudaton after cossid moth infestation.

species of Cossids do infest *Eucalyptus* in other parts of the world. In Australia, where *Eucalyptus* is native, certain Cossid species grow up to 150mm in length and 30mm in width while feeding inside *Eucalyptus* trees. These can cause huge damage to trees. Hosts of Cossids in South Africa include Vitaceae, Ulmaceae, Combretaceae, Rosaceae and others.

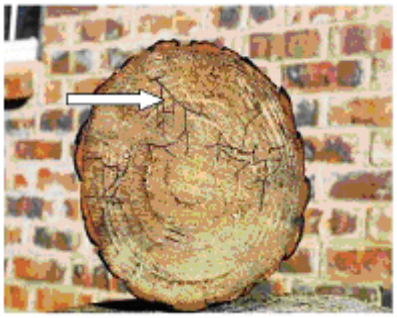
Little is known about this new pest of *Eucalyptus* in South Africa. Information is needed on the extent and the severity of the infestation. Information is also needed on aspects such as biology, natural enemies and host range. This will assist us to better understand the insect, the threat that it poses and the possibilities of management. The TPCP team is currently rearing adults from the large numbers of larvae in the damaged *Eucalyptus* stems. These will then be identified and the importance of this dramatic infestation, further evaluated.

Beetles attacking surviving pines in burnt plantations

During the past year damage due to fires in commercial plantations has been exceptionally high throughout the major forestry areas in South Africa. It is common knowledge that burnt trees, even if the bark is only scorched, are not acceptable to pulp mills. The salvaging of burnt pine logs to be used as sawn timber is, therefore, of utmost importance. There are, however, two important biological factors affecting the quality of this wood.

One of the factors affecting wood quality after trees have been damaged by fire is the infection of the dying burnt trees by bluestain fungi that discolour the wood. Apart from rendering the wood an unacceptable colour, these fungi usually do not affect the strength of the wood (see Tree Protection News, May 2002). These fungi are often introduced into the wood by bark beetles, infesting the dead trees or logs (see Tree Protection News, November 2002. August 2004). Bark beetles bore through the bark and construct breeding galleries in the cambium, between the bark and the sapwood, where they spend most of their life cycle. Three bark beetle species are known to infest pines in South Africa.

A second group of beetles, the so-called ambrosia beetles, have been particularly prevalent in burnt pine plantations. These beetles bore straight through the bark into the sapwood, and construct galleries up to 15 cm deep. They often also infest the cut ends of logs. On the black, scorched bark, the white frass (powder) coming from the



tiny holes is conspicuous. This is in contrast to brown frass that is produced by the common bark beetles. On cut ends of logs, long, worm-like strands of frass often protrude from the holes. What has been alarming in the cases of these infestations by ambrosia beetles, is that we observed the beetles attacking living trees. These trees had seemingly survived the fire and were growing well 6 to 12 months after being burnt.

The ambrosia beetles earn their name from the ambrosia fungi that they carry. These fungi grow in and around the galleries of the beetles. These insects specifically feed on the fungi, which is in contrast to bark beetles that feed on wood. At present we are not sure whether the fungi carried by these beetles might actually assist in killing the trees that possibly could have survived the fire damage. We are currently isolating and identifying the fungi associated with the ambrosia beetles and hope to resolve this question.

Another important consideration concerning the ambrosia beetles and their associated fungi is quarantine. The TPCP has had a request from Richards Bay harbour, where these beetles were observed on logs, to identify the insects. With a growing global awareness of risks associated with the importation of timber, importing countries and companies often require detailed accounts of living organisms that might be present on the timber. For this reason, we have made contacts with a British bark and ambrosia beetle expert living in Thailand, to identify the ambrosia beetles for us. A full report of the beetles and their associated fungi is currently being completed.

Report on Sirex control programme

2004 has been a big year for the Sirex Programme. During this year, the nematode *Beddingia siricidicola* was reared in South Africa for the first time, the same nematode was released in KwaZulu-Natal and the Eastern Cape for the first time, emergence depots were established in key areas, investment was made for the long term storage of *B. siricidicola*, and much more. All this has only been possible through the combined effort and participation of the forestry industry, DWAF, the ICFR and the TPCP.

When the Sirex Control Programme was established in 2003, it was decided that it would be less costly and more practical to rear the nematode *Beddingia siricidicola* – biological control agent for *Sirex* – at FABI, as opposed to having the nematodes continually sent from Australia. Less costly, because of high courier costs and that most of the facilities to rear the nematodes were already available at FABI. More practical, because of the extensive courier time from Australia, together with the limited lifespan of the nematodes in transit, and because rearing the nematodes at FABI enables us to ensure a constant availability of nematodes. Thus, the nematode *B. siricidicola* was mass reared for the first time in South Africa. Despite expected difficulties with contaminations, many millions of nematodes were reared at FABI and made available to the industry. A liquid nitrogen storage facility has been purchased to secure the availability of nematodes in the foreseeable future.

Altogether about 178 million nematodes were inoculated into 1763 *Sirex* infested pine trees nationwide. Although nematodes had been released previously in the Western Cape in 1995 - 1996, this was the first release of nematodes into the Eastern Cape and KwaZulu-Natal. This is particularly relevant for these provinces, as the *Sirex* population have increased dramatically since the pest was first detected in these provinces a couple of years ago and far exceeds that present in the Western Cape. These inoculations are the first step to manage the *Sirex* population. Inoculations now need to continue annually and we anticipate increasing the number of nematodes reared and released next year and the following years.

An essential component of the programme is an annual assessment of the nematodes' effectiveness in parasitising Sirex. To assist in these assessments, the industry has established emergence depots in key areas. The emergence depots allow the storage of inoculated and naturally infested logs and the capture of *Sirex* wasps emerging from these logs that are dissected to determine parasitism. Thus, the success of the inoculations and the natural spread of the nematode can be determined.

The Sirex Control Programme was initiated in February 2003 and now at the end of 2004 it has passed the initial step of formulating and initiating a strategy. However, the Sirex Control Programme is still very much in its infancy and much work is required in the forthcoming years to ensure the success of the programme. Further research to enhance our knowledge of the *Sirex* – *Amylostereum* complex and improvements and expansion of the current operations are needed. This will only be achieved by the continual and combined effort of the TPCP, the forestry industry, DWAF and the ICFR.

Erlenmeyer flasks with nematodes for control of *Sirex noctilio*.

Hardus Hatting, private farmer and staff surveying for *Sirex*.

Nematode Inoculations for 2004

Company	Nematode used (millions)	Number of trees inoculated
MTO & Steinhoff	7	80
Mondi Millenium Newsprint	58	565
Mondi NECF	12	116
NCT	16	160
Sappi	63	639
Singisi	22	203
TOTAL	**178**	**1763**

International *Fusarium* Workshop

Each year a hands-on international *Fusarium* laboratory workshop is held in a different location in the world. Six workshops have thus far taken place, mainly in the USA. The instructors are internationally recognised experts in the field of *Fusarium* taxonomy. The scope of the workshop includes morphological and molecular characterisation of many species in this important fungal genus. *Fusarium* species are not only pathogens of agricultural and forestry crops, but are also important in the medical field. Some species produce mycotoxins and when ingested by humans and animals can cause certain forms of cancer as well as other disease symptoms. Resource poor farmers are particularly badly affected as their grain is usually stored under less than optimum conditions. There have been many documented reports of mycotoxin-associated oesophageal and other cancers from people living in rural areas of South Africa, for example.

This year the Forestry and Agricultural Biotechnology Institute (FABI) hosted and organised the workshop. It ran from the 26th September to the 2nd of October. This was the first time the workshop was held in Africa. Due to a limitation in space and resources, the number of participants was limited to 42. The registered delegates came from seven African countries, Sweden, the Netherlands, Switzerland, Venezuela, Chile, Brazil, Venezuela, Argentina, USA, Canada and New Zealand.

The instructors included the following 5 eminent scientists:

David Geiser – Assistant Professor in the Department of Plant Pathology and Director of the *Fusarium* Research Center, Pennsylvania State University, USA. Experience with molecular evolution of fungi and fungal population genetics.

John F. Leslie – Professor in the Department of Plant Pathology at Kansas State University, USA. Over 20 years experience with *Fusarium* genetics and population analysis.

Walter F.O. Marasas – Director of the PROMEC Unit of the South African Medical Research Council. Has more than 30 years experience in the taxonomy of toxigenic *Fusarium* species, the mycotoxins produced by them, and their effects on human and animal health.

Brett Summerell – Senior Research Scientist at the Royal Botanic Gardens (Sydney, Australia). Has 15 years of experience in the taxonomy, identification and description of new species of *Fusarium* and has conducted research on *Fusarium* diseases of palms, ornamental plants, maize, wheat and vegetables, and co-authored two laboratory manuals on *Fusarium* identification.

Brenda Wingfield – Professor in the Department of Genetics and the Forestry and Agricultural Biotechnology Institute (FABI), University of Pretoria, South Africa. Has 15 years experience in molecular taxonomy and phylogenetics of *Fusarium* species particularly those occurring in the *Gibberella fujikuroi* complex.

Participants of the Fusarium workshop getting to grips with some morphological features of *Fusarium* spp.

THE RESEARCH TEAM OF THE TREE PROTECTION CO-OPERATIVE PROGRAMME

The research team of the Tree Protection Co-operative Programme is varied. It includes full time staff of the University of Pretoria (Prof MJ Wingfield, Director and Mondi Professor, Prof BD Wingfield, Prof TA Coutinho, Dr J Roux , Brett Hurley, Rosemarie Visser, Sonja de Beer, Eva Muller, Hardus Hatting, Helen Doman, Valentine Nkosi, Martie van Zyl, Pritty Khumalo, Lydia Twalo and Martha Mahlangu). Colleagues and students attached to other organizations such as the ICFR, technical assistants funded by the University or through membership fees and post graduate students who are mainly funded by the NRF. Staff from various Departments in the University provides advice and support where this is required.

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WOUND INFECTING FUNGI ON NORWEGIAN BROAD LEAVED TREES

Part of a South African-Norwegian Research Co-operative Research Project

The Tree Protection Co-operative Programme (TPCP) and the Norwegian Forestry Research Institute (SkogForsk) in Ås, Norway was granted a project funded by the South African – Norwegian Governments in 2002. This project aims to improve on knowledge pertaining to forestry pests and pathogens in Norway and South Africa. A particular focus of the project is bark beetles and their associated pathogens and an aim is to expand the experience of TPCP scientists in the field of forest entomology. The project, also includes studies on *Ceratocystis* and *Ophiostoma* species, which all have close associations with insects and include some of the most important tree pathogens. A well-know example in South Africa, is *Ceratocystis albifundus*, the cause of wattle wilt on *Acacia mearnsii*.

During the first part of the collaboration, Dr. Paal Krokene, from SkogForsk visited the TPCP in 2003.

Kayaking the fiord at Flåm

Taking a "banana" break during a mass inoculation experiment in Sweden.

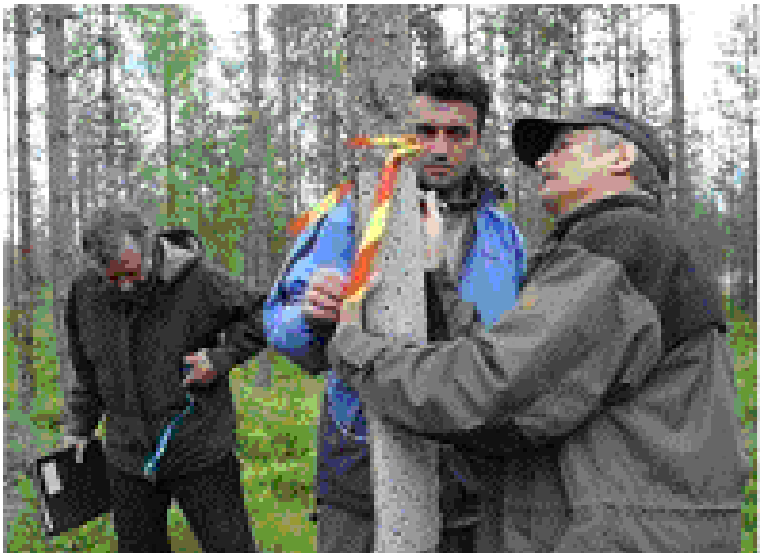
An important part of the project is the exchange of researchers and students between the two countries and the acquisition of new skills by these people. In June 2004, Dr. Jolanda Roux of the TPCP visited SkogForsk in Norway for a two-month research period.

During her visit to Norway Jolanda focused on broad leaved tree species in Norway and the *Ceratocystis* and *Ophiostoma* species that infect wounds on these trees. Although this topic has been well-studied on conifer hosts in Norway, particularly Spruce trees, very little attention has been given to broad leaved trees such as *Populus*, *Betula*, *Sorbus* and *Quercus* in Norway. Jolanda together with Prof. Halvor Solheim, a world renowned forest pathologist, therefore, visited several private hardwood sawmills in the South East of Norway. Artificial wounding trials were also established by Prof. Solheim before Jolanda arrived in an attempt to trap these fungi. Material was collected from off-cuts at the sawmills as well as from cut ends of logs, while in the artificial wounding trials, samples were collected from bark wounds created with an axe.

Apart from her main broad leaf project, Jolanda was also involved in artificial inoculation studies with pathogenic *Ceratocystis* spp. on spruce, as well as the collection of bark beetles for a study of the *Ophiostoma* and *Ceratocystis* spp. that are vectored by them. The Norwegians commonly use a "mass inoculation" technique to study the role of bark beetle associated *Ceratocystis* and *Ophiostoma* spp. on spruce trees. With this technique they attempt to imitate the mass attack of trees by bark beetles and thus multiple infections of trees by the associated fungi. This technique is very similar to the inoculation technique used

by the TPCP to screen trees for disease tolerance. The difference, however, is that many (~200-400 per tree, depending on the diameter of the tree) wounds are made, rather than a single wound on each stem. This is very labour intensive, but the results provide valuable insight into the impact of multiple fungal infections.

For the study of *Ceratocystis* and *Ophiostoma* spp. associated with bark beetles, Jolanda, Halvor and Darko, a student from Montenegro, collected three bark beetle species that have not been extensively studied from spruce stumps. That was the easy and fun part according to Jolanda. The next step, after sorting the beetles, was to rip them apart! Although Darko enjoyed this part of the work more, Jolanda found no pleasure in separating the heads from the bodies and wings of living bark beetles. That, after submerging them in water for a minute to wash them. At least fungi don't visibly kick and struggle when you torture and mutilate them.



ing the spots for mass lation.

Jolanda also found some time to do some sightseeing in Norway and to visit a Norwegian who had previously spent some time with the TPCP in Bloemfontein. Norway is a beautiful country, especially during summer when everything is green. An added bonus in summer is the fact that they have about 20 hours of daylight per day, giving one extra time for sightseeing, especially if you want to see Moose, Norway's largest animal and a popular source of meat. Norway is also famous for its fjords and for having some of the longest tunnels in the world. Because of all the mountains it has been easier to build tunnels through them, than to build mountain passes. The longest tunnel is about 22km in length. Rather intimidating, especially if you think of a certain movie in which Sylvester Stalone was trapped in the New York tunnel after it caved in, or if you don't like small confined spaces. The fjords are beautiful and well worth a kayak trip. If you are lucky, like Jolanda was, you might even meet up with some dugongs while out rowing. Don't be fooled by people trying to convince you that Norwegian summers are wonderful though, especially if they have never been to South Africa. If people get excited about summer day temperatures above 20°C, then you should know they don't know what summer should be like. Despite the cool summer and lots of rain, it was still better than a Pretoria winter, some of the time.

The visit to Norway was a great experience and highly successful. Jolanda is currently busy identifying all the *Ceratocystis* and *Ophiostoma* spp. she collected from the broad leaved trees and it seems there will be several new reports. In 2005, some lucky TPCP students will have the opportunity to visit Norway and experience different laboratory environments and cultures.

IMPORTANT : PLEASE READ THIS

In order for us to coordinate our services to you please help us by using the following contact address:

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