TREE PROTECTION NEWS

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

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.....FROM THE DIRECTOR'S DESK.....

From the Tree Protection standpoint, we are rapidly moving towards the end of another incredibly busy and productive year. There have been so many successes, and of course in dealing with some quite complicated disease and pest problems, a good number of frustrations too. The scientific enterprise underpinning the Tree Protection Co-operative Programme (TPCP) has continued to flourish and grow. Key research questions are continuously being answered and our knowledge relating to the diseases and insect pests that threaten South African forestry has grown progressively. New students are entering the programme and others are completing their studies and moving on to new ventures. The fact that the TPCP is based in a University environment demands continued progress in the educational component of the programme. Happily our record here is one to be most proud of. Field extension and diagnostic services in the interests of the forestry industry are also key components of the TPCP, and in many ways form the basis of the programme. They enable us to resolve short-term problems for member companies, but also ensure that new problems are rapidly identified and included in our research planning process.

There are many pest and disease problems that threaten the productivity of forestry in South Africa. Yet, on a recent visit to Australia to evaluate pests and pathogens in native and plantation *Eucalyptus grandis*, I was vividly reminded of the huge number of problems that occur in the native environment - and that we do not have to deal with in South Africa. To me, there is no question that there are immense complications in growing plantation trees in an environment where those same trees (or their close relatives) are native. We prosper from the advantages of "enemy escape" and we must hope that this situation will continue for the longest possible period. Will it be possible to succeed in producing productive and economically viable plantations of *Eucalyptus* in Australia?

The jury is out on this issue - but it will surely not be a simple enterprise. There are always opportunities to challenge the impact of pests and diseases - genetic modification, hybridization, etc. - and perhaps harnessing these technologies will allow success. But they will involve great cost and raise many new complications.

In terms of South African plantation forestry health, there have been two major negative forces challenging productivity during the last few years. These are the rapid and unexpected movement of *Sirex noctilio,* better known to us as the Sirex wood wasp (see more in this newsletter) and the impact of the pitch canker fungus in nurseries and in plantation establishment. Ironically, these problem s both include insects and fungal pathogens. The Sirex wood wasp lives in an obligate symbiosis with a fungus (*Amylostereum areolatum*) and the impact of the pitch canker fungus appears to be closely related to the feeding activities of a wide range of insects. These are just two examples of the overlapping nature of entomology and pathology in forestry. This strongly illustrates the logic of the Industry decision to integrate entomology and pathology services and research in the TPCP.

The strategy to reduce the impact of the Sirex wood wasp is now well established. Both the Steering Committee and the Technical Committee are functioning effectively. Surveys are being undertaken and Brett Hurley and his team are working actively towards the first phase of the new biological control initiative. Negotiations have been on-going with the CSIRO in Australia to obtain a license to use the parasitic nematode *Beddingia siricidicola* throughout South Africa (including Swaziland) and hopefully the payment of AUS$ 105 000 will be made well before the end of 2003. This is essential to allow for the first deployment of trap trees in Sirex Hot Spots.

Much activity has also surrounded dealing with the pitch canker fungus in nurseries and in establishment. Certainly this fungus is the source of the highest level of pressure on the TPCP Diagnostic Clinic. Field days have been held, fundamental research questions pertaining to the fungus and its biology have been investigated and the process of large-scale screening is being established. There is no question that the pitch canker fungus poses a huge threat to pine plantation forestry in South Africa. The only practical solution to this problem will lie in identifying disease tolerant planting stock. Ultimately, and this is true of all serious disease and pest problems, success will lie in maintaining one step ahead in the race between our trees and their enemies. The TPCP and particularly Jolanda Roux and Teresa Coutinho have expended great effort to establish effective pitch canker screening protocols. Early in 2004, we will begin with large scale screening of seedlings for TPCP member companies. This will be a highly intensive programme and one that is likely to grow in coming years. This will require specialised greenhouse facilities in Pretoria and personnel to maintain close supervision of the plants.

Growth of the TPCP and associated programmes during the past five years has demanded access to expanded facilities. After a two-year process of discussion and negotiation with the University of Pretoria, we were fortunate to be allocated approximately R18 million to expand FABI. The new building - now known as FABI SQUARE is almost complete and will be ready for occupation on the 1st October this year. This includes some wonderful facilities including a new DNA sequencing unit (including R3 million of new equipment not part of the budget for the building), South Africa's most modern plant quarantine greenhouses, specialised facilities for working with genetically modified plants and plants in tissue culture, additional laboratories and more. The building also houses the University of Pretoria's new and impressive Bioinformatics Centre, which will also be crucially important to TPCP growth and progress in the coming years. W e look forward to showing these new facilities to our members at the time of the TPCP annual meeting next year (see details elsewhere in this newsletter).

The TPCP owes its success to an amazing team effort including students and researchers connected to the programme (most but certainly not all at the University of Pretoria), forestry managers, forestry researchers and field foresters. The success of the program me is widely recognised nationally and internationally and it is not uncommon to hear colleagues from other countries ask how they might acquire

"their own TPCP"!! I write sim ilar words in newsletters each year and they remain equally important and true. I am personally hugely grateful to all of the very large assembly of people that participate in TPCP activities. Further, the TPCP team extends its thanks to all members and their staff for the great support that we have again enjoyed during 2003. W e very much look forward to working with you in the coming year and to seeing many of you at our Annual Meeting in May 2004. We also take this opportunity to wish you, your families and your friends a blessed Christmas and healthy, happy and prosperous 2004.

Mike Wingfield

The 14th Congress of the Entomological Society of Southern Africa (ESSA)

The 14th Congress of the Entomological Society of Southern Africa was held at the University of Pretoria from 6-9 July 2003. Because of the very wide range of entomological activities in Southern Africa, no specific theme was prescribed for the congress. Among the subjects of posters and oral presentations were Agricultural, Ecological, Environmental, Forestry, Forensic, Insect Conservation Biology and Systematics in entomology. A total of 306 delegates from 19 countries participated in the congress. There were 185 oral presentations and 110 posters. Lively debates and discussions followed each oral presentation.

Special sessions consisting of 3 workshops and one symposium were held, with specific themes for each of the sessions. The themes of the workshops were:

1. Does augmentation of natural enemies make any difference at all?

2. Invertebrate conservation in Gauteng: exploring the why and the how.

3. Entomopathogenic fungi: potential pitfalls and practical biocontrol.

Contributions were made by 4-6 researchers in each one of the themes, followed by group discussions, debates and recommendations for the way forward. The 4 th Congress of the Southern African Society for Systematic Biology (SASSB IV) held a joint session on arthropod biosystematics on 9 July 2003. There were 11 oral presentations under the auspices of the 4th SASSB.

The Forestry and Agricultural Biotechnology Institute (FABI) and the Tree Protection Co-operative Programme (TPCP) were well represented at the congress with contributions coming from postgraduate students, postdoctoral fellows, and staff. Various topics of research at FABI and TPCP were presented. These included one poster and 5 oral presentations.

The Entomological Congress was most successful, and it provided a great opportunity for exchange of experiences and for making contacts. Entomology is clearly thriving in South Africa and FOREST ENTOMOLOGY is GROWING.

TPCP ANNUAL MEETING AND INAUGURATION OF FABI SQUARE

The TPCP annual meeting will be held on Tuesday 25 and Wednesday 26 May 2004 and it will take a slightly different form to meetings during the past few years. Because the TPCP is such an integral part of FABI and so many TPCP members will wish to participate in the inauguration of the new facilities, we will hold the TPCP annual meeting in close association

with the Inauguration of FABI SQUARE. In order to accommodate the Inauguration, the TPCP meeting will span a single day, but many presentations that would have been part of the TPCP meeting will be seamlessly integrated into the Inauguration Day.

On Tuesday 25, we will have a suite of lectures presented by TPCP and FABI scientists as well as by a number of overseas guests including widely recognised forest pathologists and entomologists. These lectures will fill the morning programme. After lunch, guests will have the opportunity to visit the new facilities and to meet FABI scientists. Later in the afternoon, there will be a formal inauguration, which will include presentations by high profile representatives of Government, Industry and Science in South Africa. The highly acclaimed proponent of genetic modification, Dr Charlie Arntzen from the USA will speak during this session. This will be followed by a dinner celebration with Prof. Johan van Zyl, CEO of SANLAM and past Vice Chancellor of UP, as guest speaker.

On Wednesday 26, the main body of the TPCP meeting will be presented. There will again be guest speakers from various parts of the world and selected TPCP students will present their research. Our annual TPCP dinner will be held at the Boston Barbecue on this night. Associated meetings including the annual meeting of the Board of the TPCP will be held on the morning of Thursday 27 May.

It is our intention to ensure that the annual TPCP meeting and the associated Inauguration of FABI SQUARE will be one of the highlights of science and technology in South Africa in 2004. Certainly the first day will be attended by a large number of key role players linked to Science and Technology in South Africa. This will give TPCP members the opportunity to meet a rather broader group of people than is usual at our meetings. Our members will also be exposed to many new ideas relating to science and science policy in South Africa and elsewhere in the world.

Accommodation close to FABI will certainly be very full during the time of our meeting. If you are going to be joining us, please make early arrangements and let us know if we can assist you in doing so. We will be sending out notifications regarding the meeting towards the end of 2003 and formal invitations will be sent out in late February 2004. **If you have any questions pertaining to this meeting, please do not hesitate to contact us and if you would like to ensure that you receive a formal invitation, drop a note to Rose Visser at**

rose.visser@fabi.up.ac.za

CONGRATULATIONS!!!!!

PhD

Alemu Gezahgne: **Diseases of exotic plantation forestry trees in Ethiopia.**

Cassi Myburg: **Molecular phylogenetic studies on species of *Cryphonectria* and related fungi.**

Bernard Slippers: **The genus *Botryosphaeria* with special reference to its role as a *Eucalyptus* pathogen.**

MSc

Raksha Bhoora: **Characterisation of PGIP from *Eucalyptus grandis*.**

Carlos Rhodas: **Diseases of *Eucalyptus* in Colombia.**

Sirex:
The battle continues ...

Survey activities this year have revealed that the Sirex woodwasp, *Sirex noctilio*, has spread as far as the Umgeni River. Currently, there are no confirmed reports of Sirex north of the Umgeni River. This is likely to change next year, as Sirex continues its spread into South Africa's pine forests.

The first inoculations of the biological control agent, *Beddingia siricidicola*, are planned for the first half of next year. *Beddingia siricidicola* is a nematode that sterilizes the female Sirex wasp. This nematode has been successfully used for the control of Sirex in various countries where Sirex has become a pest, including Australia and New Zealand. The nematodes are mass reared on a white rot fungus, *Amylostereum areolatum*, which is also the obligate fungal symbiont of Sirex. *Amylostereum areolatum* is the alternative food source of the nematode, other than the Sirex woodwasp and larvae, and provides an ideal environment to mass rear the nematodes. Ironically, this is the same fungus that the female Sirex woodwasp introduces into pine trees and which, together with the mucous of the wasp, results in the wilting and eventual death of trees.

In preparation for the nematode inoculations, trap tree plots will be established in the early summer of 2003. These plots will consist of trees that are artificially stressed with herbicides and so become attractive for emerging Sirex wasps. This will provide us with groups of Sirex infested trees that can be used for nematode inoculation. The nematodes will be injected into these trees in a gel-like solution. The nematodes will then move within the tree and upon locating Sirex larvae, enter into their bodies. The nematodes will remain inside the Sirex larvae, without harming them, until the larvae pupate to form the adult wasps. At this stage the nematodes will move to the reproductive organs of the infected wasps. This results in eggs of female wasps that are sterile. These sterile eggs - full of nematodes - are then transported by the female wasp and deposited into other pine trees. The nematodes will search for and infect non-parasitised Sirex larvae that are in the same tree.

The establishment of trap tree plots and the inoculation of nematodes will form part of the strategy to control the Sirex woodwasp in South Africa. This strategy is being implemented as a combined effort of the major players making up South Africa's pine growing industry.

For more information contact Brett Hurley
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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 B Wingfield, Prof TA Coutinho, Dr J Roux, Dr P Govender, Brett Hurley, Rosemarie Visser, Sonja de Beer, Elizabeth Attinger, Eva Muller, Hardus Hatting, Helen Doman, Valentine Nkosi, and Martie van Zyl, 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 provide advice and support where this is required.

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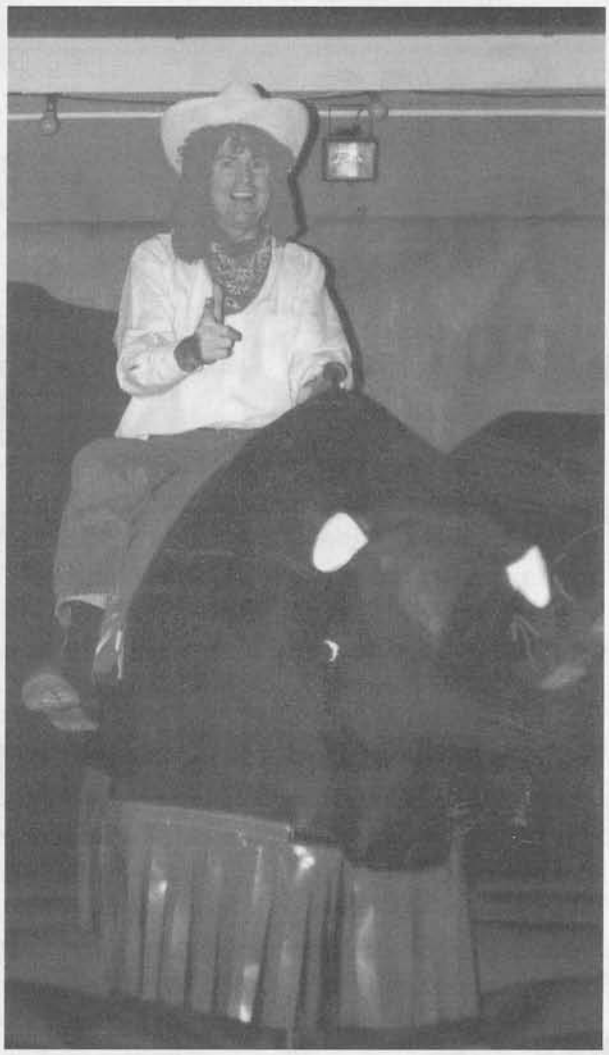
SPOOF

SOCIETY FOR THE PRESENTATION OF OUTRAGEOUS FINDINGS (SPOOF) 2003

SPOOF ANTHEM

We work our fingers to the bone,
All through the day and night
To produce data that we will
Share with our friends
Forthright

So hoist a beer and give a cheer
And join in this good fun
At SPOOF we honour all
Research that is published,
For it is done



The Society for the Presentation of Outrageous Findings (SPOOF) holds annual meetings at the Forestry and Agricultural Biotechnology Institute (FABI). The last meeting of the Society took place on Friday the fourth of July 2003. The meeting was attended by approximately 100 people; these included both Fabians and their significant others.

The Society for the Presentation of Outrageous Findings (SPOOF) has a long history. The society was founded in America where several scientists came together and formed a society where people could present science in a more light-hearted fashion. The initial SPOOF group then expanded and several other "chapters" were established. These affiliated "chapters", have a wide distribution and occur in several countries worldwide where they hold regular meetings.

FABI is one of the more recently established chapters of SPOOF, namely the Epsilon chapter that has been meeting once a year for approximately six years.

During the most recent SPOOF meeting, several fictional or non-fictional seminars were presented. There was no shortage of seminars this year, with a total of six presentations complete with abstracts and believable, sometimes strange titles. Some interesting seminar titles included "Taxonomy, Ecology and Biology of the West Vietnamese Fighter Fly", "The migration patterns and taxonomy of *Paperclippus* spp." and "Discovery of a new family of trees in Airoterp". Presentation of the seminars resulted in many laughs from the audience with a new appreciation of science and the scientists who conduct their research.

Each SPOOF meeting at FABI is characterised by a specific theme. The theme of this year's

SPOOF was "Cowboys and Indians". This saw many Fabians raiding their closets and costume stores to pull out old cowboy boots, cap guns, tomahawks and bows and arrows. The FABI courtyard was transformed into a real wild west setting with an original mechanical Rodeo bull, Saloon and an Indian tee-pee. This was all complemented by several bon-fires, good music and a starlit evening with everybody partying late into the night.

The 2003 SPOOF meeting was a great success and this is due not only to all the great Fabians that participated, but, also the amazing organizing committee. This included Marelize Van Wyk, Lorenzo Lombard, Ronald Heath, Lawrie Wright, Izette Greyling, Bernice Porter, Elsie De Meyer and Therese Lotter. The organizing committee arranged all the props for the evening, the catering and the seminars and abstract book. All of this led to a very successful SPOOF for 2003 that was enjoyed by all.

The deodar weevil, Pissodes nemorensis in South African pines

The deodar weevil, *Pissodes nemorensis* is an insect in the Order Coleoptera and family Curculionidae. It is a typical weevil with a prominent snout sticking from its head and a reddish brown body with two whitish creamy spots on the back of the wings.

Adult *Pissodes nemorensis*

Adult size ranges between 6-8 mm. It is native to North America, and it was first detected in South Africa in the western Cape in 1942. Currently it is distributed in all pine growing areas of South Africa. Damage due to the deodar weevil is mainly by killing the growing shoots of young trees, resulting in excessive branching and stunted growth.

Solomon Gebeyehu collecting *Pissodes nemorensis*

Although *P. nemorensis* is known to cause primary damage, it is more readily found on trees stressed by other factors such as hail damage or trees grown on poor sites. Our surveys have revealed that death of young pine trees associated with *P. nemorensis* can reach up to 40 %, especially in situations where attack by the insect follows tree stress due to hail damage. Forking or branching of young pines and subsequent loss of wood quality and harvestable volume due to stunted growth, was evident in many compartments surveyed. Although such losses are difficult to quantify, it is clear that *P. nemorensis* is causing significant damage to pines in South Africa.

In its native range, *P. nemorensis* is also known to vector the pitch canker fungus *Fusarium circinatum*. The pitch canker fungus causes an important disease of established trees in North America and a substantial amount of money is spent every year for research and management of the disease.

Although *P. nemorensis* is known to impart serious damage on pines in South Africa, it has not been given serious attention. Hence its biology, host range and damage levels have remained largely unknown. However, starting from January 2002, Solomon Gebeyehu joined the TPCP as a Postdoctoral fellow of the University of Pretoria to undertake research on *P. nemorensis*. The general objective of Solomon's research was to generate data regarding various aspects of *P. nemorensis* that would lead to further research in future. Specific objectives include:

1. To understand the extent of damage, distribution and host range of *P. nemorensis* in South Africa.
2. To study the biology, phenology and population dynamics of *P. nemorensis* in South Africa.
3. To investigate the possible interaction between *P. nemorensis* and *F. circinatum*.
4. To investigate possible control options for the management of *P. nemorensis* in the context of South African forestry practices.

From surveys conducted in large areas of the pine growing areas in the country, it is now well established that *P. nemorensis* is more widely distributed than was previously thought. It is now known that the pest attacks all commercially grown pine species, although there is some variation in susceptibility between the species. For example, *P. radiata* and *P. patula* are more susceptible to attack than *P. elliottii*.

Data now exists regarding the biology, phenology and population dynamics of *P.*

nemorensis in various regions with different weather patterns. The biology and phenology of *P. nemorensis* varies in different pine growing provinces of South Africa. In the Cape and KwaZulu-Natal, for example, adult stages of *P. nemorensis* are found only in winter months whereas in Mpumalanga and the Northern Province, adults can be found starting from March through to the winter months. Such information is crucial for future research and management of this pest.

The potential interaction between *P. nemorensis* and *F. circinatum* has been investigated experimentally. The results of these investigations showed that *P. nemorensis* can be a wounding agent and a vector for the pitch canker fungus. The implications of this finding are huge for the future status of the pitch canker problem in South African pine plantations. The fact that *P. nemorensis* can vector the pitch canker fungus to trees also highlights the importance of the combined effects of pathogens and pests in South African plantations.

Research is underway to establish the basis for the difference in susceptibility between pine species to *P. nemorensis* attack. Such studies will aid in the inclusion of resistant materials to already existing tree breeding programs. Also, the association between *P. nemorensis* and *F. circinatum* is being investigated more closely, using a series of detailed experiments. Following the interesting discovery of two groups of native insect parasites causing mortality to *P. nemorensis* in the field, it is envisaged that research will continue to focus on the potential of these biocontrol agents for the management of *P. nemorensis* in South Africa.

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Bhutan, Austria and South Africa work together to determine the causal agent of the dying conifer trees in Bhutan.

The Kingdom of Bhutan is renowned for its pristine forest resources, which are of immense socio-economic and ecological importance to this Himalayan country. Forests cover 64 % of the Bhutan landscape. The forest trees most commonly found are conifers such as the Eastern Himalayan spruce (*Picea spinulosa*) and Himalayan blue pine (*Pinus wallichiana*) especially at elevations above 1800m.

As part of CORET (Conifer Research and Training Programme), a partnership between the governments of Austria and Bhutan to improve the quality and quantity of their forest trees, an investigation was launched to determine the causal agent of dying conifers. D. B. Chhetri who is a forest scientist in Bhutan and Dr. Thomas Kirisits from BOKU in Austria were the initial investigators with Mike Wingfield joining the team for a limited period of time.

A bark beetle, the Eastern Himalayan spruce bark beetle (*Ips schmutzenhoferi*) was found associated with most dying trees. The Eastern Himalayan spruce bark beetle is a serious pest in conifer forests in Bhutan at elevations between 2500 and 3800 m a.s.l. This scolytid mainly attacks living trees and logs of Eastern Himalayan spruce and Himalayan blue pine, but logs of Himalayan larch (*Larix griffithiana*) are occasionally also infested. During the 1980s, this insect caused a destructive outbreak in Western and Central Bhutan, during which 3000 hectares of forest were affected and about 2 million m^3 of timber were infested. Bark beetles (Coleoptera: Scolytidae) are amongst the most damaging agents affecting conifer forests, worldwide. Some of the most aggressive of these insects are species in the genus *Ips*. The best known of these is the eight-spined European spruce bark beetle *I. typographus*, which can cause extensive mortality of Norway spruce (*Picea abies*) in Europe.

Ophiostomatoid fungi (*Ceratoystis* and *Ophiostoma*) are commonly associated with bark beetles. Damage caused by these fungi is cosmetic rather than structural, as the fungi have

pigmented hyphae which penetrate the ray parenchyma cells and tracheids of the sapwood, causing the discoloration often referred to as blue stain or sap stain. The damage caused by sapstain results in substantial financial losses, because markets prefer non-stained wood. In some cases such as with Dutch elm disease, bark beetles carry highly pathogenic fungi that kill trees rapidly.

A small number of *Ceratocystis* spp. are associated with bark beetles and many of these have high levels of pathogenicity, when compared to *Ophiostoma* spp. from the same niche. For example, *C. polonica* is highly pathogenic to Norway spruce and contributes to tree death following attack by *I. typographus*. Likewise, *C. laricicola* is considered to play an important role in the death of *Larix* spp. infested by *I. cembrae*. *Ceratocystis rufipenni* is associated with the spruce bark beetle *Dendroctonus rufipennis* on *Picea sitchensis* and *Picea glauca* in Western North America and also contributes to tree death.

During the survey of ophiostomatoid fungi associated with *I. schmutzenhoferi* in Bhutan, a *Ceratocystis* species resembling *Ceratocystis moniliformis* was isolated. Despite its similarity with *C. moniliformis*, the association of the *Ceratocystis* sp. from Bhutan with a conifer bark beetle led Marelize van Wyk in FABI to suspect that it might be a new and undescribed species.

The study undertaken was to compare the *Ceratocystis* species from Bhutan with *C. moniliformis* and other species with similar morphologies and assesses their phylogenetic relationships based on rDNA operon, ?-tubulin and Elongation Factor 1-? gene sequences.

Based on morphology as well as phylogeny the *Ceratocystis* sp. isolated from *I. schmutzenhoferi*, in Bhutan has been shown to represent a well-defined and undescribed taxon. The species will be described as *Ceratocystis bhutanensis* prov. nom. in the near future. Its importance to the biology of the bark beetle will be a key component of a future study to be undertaken in Bhutan. This work has substantially expanded the experience of FABI scientists and has added to our understanding of the global spread of tree pathogens.

Ceratocystis polonica and *C. laricicola* carried by *I. typographus* and *I. cembrae*, respectively, are the most pathogenic fungi and the causal agents of sapstain, in association with these beetles. *Ceratocystis bhutanensis* is quite different to them as it has a close relationship with *I. schmutzenhoferi*, but appears not to contribute to bluestain. This m ight also imply that the fungus does not contribute to the tree killing process, and thus has an ecological role different to *C. polonica* and *C. laricicola*. Further studies include pathogenicity tests, to determine if the fungus is a pathogen of spruce

trees and geographical surveys have to be conducted to determine if *Ceratocystis bhutanensis* is restricted to Bhutan. The association between the fungus and the beetle also has to be investigated to determine if it is a rare association between them or a close association.

combating *fusarium*

International *Fusarium* Workshop

From the 14th of June until the 1st of July, Riana Jacobs (a PhD student in the programme working on *Fusarium circinatum*) and Teresa Coutinho visited Kansas State University (KSU), USA. The first week was devoted to helping this year's organisers set up the International *Fusarium* Workshop. This was no mean feat as it involved culturing hundreds of *Fusarium* spp. on different media and setting up the various techniques used to examine this group of fungi. This popular workshop is held each year and every alternate year it is held at KSU. In 2004, the TPCP will organise the same workshop at the University of Pretoria. This will be the first time the workshop will be held in Africa. As the workshop is hands-on, space is limited and the number of delegates is usually no more than 40. Participates at this year's workshop came from Africa, Europe, North and South America. The 2004 workshop will be strongly focussed on getting Africans to participate.

The workshop involved lectures and practical sessions devoted to looking at the many species of *Fusarium* microscopically and using molecular tools in an attempt to identify them. The world's leading experts in *Fusarium* taxonomy/phylogeny present the lectures and this included Prof. John Leslie from KSU, Prof David Geiser from Penn. State University (USA), Prof. Brett Summerell from the National Botanical Gardens, Sydney, Australia and Prof. Wally Marasas from the MRC in Cape Town. Because the number of attendees is limited, one gains a tremendous amount from one-on-one training from these experts.

Both Riana and Teresa learnt a tremendous amount and now feel more confident about identifying the many *Fusarium* spp. which occur abundantly in nature. *F. circinatum* was one of the many species examined. Based solely on microscopic examination of the mycelium and fruiting bodies, it is still an extremely difficult fungus to separate from many other closely related species.

The Pine *Fusarium* Working Group

Since the beginning of 2003, the ICFR have taken up the reins of managing this working group which is now chaired by Paul Viero. The current activities of the working group are nursery certification and in-house research. The certification of nurseries will be enforced at the beginning of 2005. Curren tly, field days are being organised in the different pine growing regions of South Africa to inform private nurseries of the certification process. The certification of nurseries is being managed by the Seedling Growers Association of South Africa. Current research activities include developing protocols for fungicide/insecticide applications in nurseries and at planting and developing a protocol to monitor the potential spread of *F. circinatum*.

The working group's website is up and running and the address is:

http://www.icfrnet.unp.ac.za/fusarium/index.htm

Please go and have a look!!

ABSTRACTS FROM THE RECENT ENTOMOLOGICAL CONGRESS

Leptographium species: fungal associates of bark beetles and agents of blue-stain

Leptographium species are fungi that are predominately vectored by conifer infesting bark beetles (Coleoptera: Scolytidae). These fungi are best known as the causal agents of sap stain in timber that results in substantial losses to forestry industries, worldwide. Some species are important pathogens that either aid bark beetles in killing trees or are primary pathogens in their own right. *Leptographium species have a unique* association with bark beetles and their role in tree killing has been the subject of considerable debate. Som e *Leptographium* spp. associated with bark beetles are pathogens and may help their insect vectors to overcome the resistance of living trees. These fungi m ay also serve as a supplementary food source for the insects or protect the insect galleries from invasion by saprotrophic fungi. Another view is that most of these fungi are "weed" organisms that provide no benefit to their vectors. Most *Leptographium* spp. have quite specific vector associations and identification of these fungi is facilitated by knowledge of the bark beetles and their hosts. Several species in *Leptographium* have been introduced into South Africa together with bark beetles from Europe. Enhanced knowledge regarding the fungi associated with these insects will greatly aid in developing effective quarantine measures.

Interaction of fungus gnats (Sciaridae, Mycetophilidae: Diptera) with *Fusarium circinatum* in forestry nurseries of South Africa

Fungus gnats in the families Sciaridae and Mycetophilidae are suspected to transmit the pitch canker fungus, *Fusarium circinatum*, to pine seedlings in South African forestry nurseries. The aims of this study were to confirm the presence of and to identify fungus gnats in these nurseries. Furthermore, we determined whether these fungus gnats carried *F. circinatum*. Fungus gnats and other diptera were collected by means of a pooter, from four of the major forestry nurseries in South Africa. Dipteran families and species of fungus gnats were identified. Flies collected were placed on *Fusarium*-specific isolation medium to culture fungi present on the gnats and thus determine whether *F. circinatum* is present. Only one species of fungus gnat, *Bradysia difformis* (Sciaridae), was found in this study and it was present in all the nurseries sampled. Most other dipteran families collected were not potential pests, besides Ephydridae, which are known to transmit fungal pathogens. Three species of *Fusarium* were isolated from *B. difformis* and Chironomidae, but *F. circinatum* was never collected. Results of this study indicate that adult fungus gnats and other flies do not carry *F. circinatum* in the nurseries. It is, however, possible that other life stages such as the larvae of these insects are associated with the pathogen and that is currently being considered.

IMPORTANT: PLEASE READ THIS

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

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