No 2

TREE PATHOLOGY NEWS

NEWSLETTER OF THE TREE PATHOLOGY COOPERATIVE PROGRAM
U.O.F.S.

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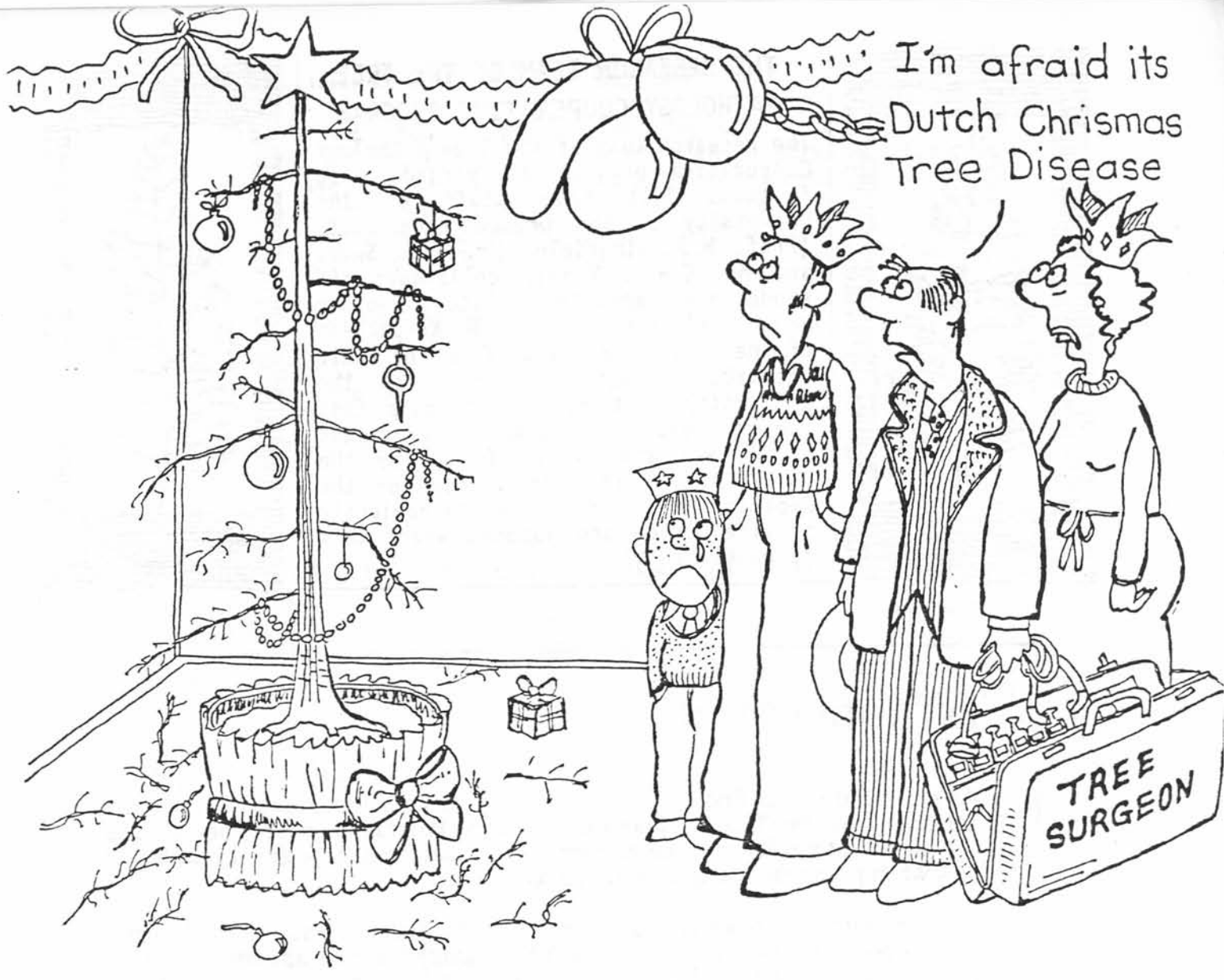
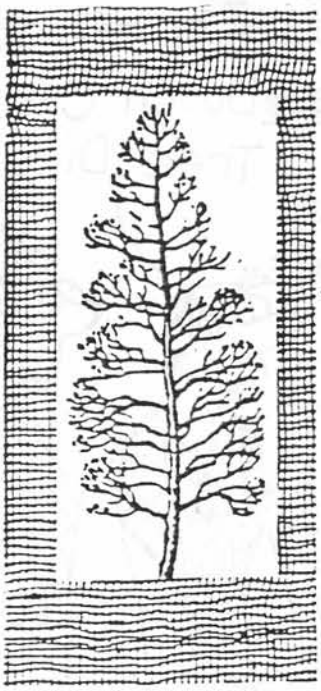


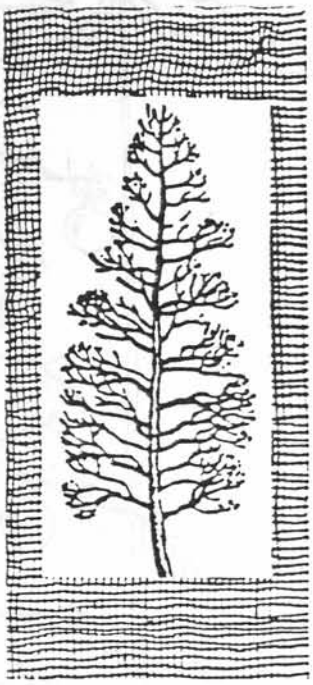
A CHRISTMAS MESSAGE

In maintaining a tree pathology research program in South Africa, it is obviously necessary for us to travel extensively in forestry areas as well as to conduct extensive discussions with many of you over the telephone. Through these contacts we have made many friends in distant parts of the country and many times we wished that it could have been possible to meet more regularly. We would however like to wish all our friends and members of the TPCP a VERY JOYOUS CHRISTMAS AND HAPPY 1991. We would also like to take this opportunity to thank our many colleagues, particularly on forest plantations and at nurseries, for their patience and assistance in helping us to ensure that our forests remain healthy.



THE RESEARCH TEAM OF THE TREE PATHOLOGY COOPERATIVE PROGRAM

The research team of the Tree Pathology Cooperative program is varied. It includes full time staff of the University of the Orange Free State (Prof. M.J. Wingfield, Mr. W.J. Swart and Mr. G.H.J. Kemp), colleagues and students attached to other organisations such as Ms. N. Knipscheer of the ICFR and Mr. P.W. Crous of PPRI, technical assistants funded by the University or through membership fees and post graduate students (at present seven) who are mainly funded by the CSIR/FRD. Staff from various of the Departments in the University obviously provide advice and support where this is required.



INTRODUCTION

As explained in our first issue, the aim of Tree Pathology News is to provide feedback from the Tree Pathology Cooperative Program to our members. The very nature of this informal newsletter implies that it will appear irregularly and only when pertinent new information is available.

The tree pathology research team centered at Bloemfontein but with colleagues such as Nicky Knipscheer at the ICFR has continued to grow and establish itself in this first year of formal constitution. As mentioned previously, our primary research endeavour concerns Cryphonectria canker of *Eucalyptus*. On the other hand, there are a multiplicity of diseases of concern to our industry and we are attempting to also give the most important of these our attention. For this reason it was decided to list some of our projects and briefly note some aspects of the diseases that are being studied.

Cryphonectria canker

Our priority is screening clones of E. grandis in this project. However, we are also considering a number of additional questions. These include the feasibility of using cuttings to provide a rapid screening from tolerance to the disease, developing a selective medium to enhance our ability to isolate the pathogen, attempting to establish the origin of the disease in South Africa and evaluating the potential threat of the disease to our forestry industry.

Sphaeropsis diseases of pines

Various members of our team have a long standing interest in this pathogen. Many significant studies have been completed on this subject over the last few years and these have enhanced our understanding of the pathogen considerably. At this stage, primary questions concern variability in the pathogen which is evidently leading to differences in symptom expression in the field.

Root disease of Eucalyptus

As discussed in our last newsletter, root disease of Eucalyptus is a complex situation in many cases including infection by Pythiaceous fungi such as Phytophthora and Pythium. Initially our aim in this project is to determine the cause of this disease more accurately . Ultimately it is likely that we will have to avoid planting certain species on particular sites.

Coniothyrium canker of Eucalyptus

This is a new disease to South Africa and at this stage appears to be restricted to the Natal coast. It appears to be serious and ultimately results in the failure of certain clones. We have spent the last year attempting to identify the associated fungus and prove pathogenicity. We will now embark upon a program to develop techniques to screen clones for susceptibility to this disease. Studies on the biology of the pathogen will also be undertaken.

Botryosphaeria canker of Eucalyptus

Species of Botryosphaeria are opportunistic pathogens. Until recently, we have not recognised these fungi as being significant forest pathogens in this country. A number of serious outbreaks of Botryosphaeria canker have however been encountered recently and we have now embarked upon a thorough study of this disease

Diseases of trees associated with Ophiostoma spp.

The best known disease of trees associated with an Ophiostoma sp. is Dutch Elm disease that has decimated both European and American Elms. There are however numerous other Ophiostoma spp. associated with both conifers and eucalypts and we maintain an active interest in these fungi particularly in their role as tree pathogens.

Nursery diseases

We maintain a continued interest in diseases both in seedling and cutting nurseries. Our research in cutting nurseries is of a routine nature whereas we are conducting a detailed study of pathogens in pine seedling nurseries. The major pathogens of interest in the latter case are various species of Fusarium.

Leaf diseases of Eucalyptus

Research on leaf diseases is largely through contact with Nicky Knipscheer of the ICFR who is conducting a detailed study of Phaeoseptoria eucalypti and with Mr P. Crous of the PPRI who has made significant inroads into our understanding of fungi on Eucalypt leaves in this country. In addition we conduct regular surveys of plantations to determine the occurrence of the better known leaf pathogens.

RECENT PUBLICATIONS OF INTEREST TO THE COOPERATIVE

Crous, P.W., M.J. Wingfield, W.F.O. Marasas, and B.C. Sutton. 1989. *Pseudocercospora eucalyptorum* sp. nov. on *Eucalyptus*. Mycological Research 93: 349-398.

Wingfield, M.J., W.J. Swart, and B. Abear. 1989. First Record of Cryphonectria canker of *Eucalyptus* in South Africa. Phytophylactica 21: 311-313.

Conradie, E., W.J. Swart and M.J. Wingfield. 1990. Cryphonectria canker of *Eucalyptus*. An important disease of plantation forestry in South Africa. South African Forestry Journal 152: 43-59.

Swart, W.J., and M.J. Wingfield. 1989. First record of *Discula platani* on plane trees in South Africa. Phytophylactica 22 : 143-144.

Wingfield, M.J. 1990. The current status and future prospects of forest pathology in South Africa. South African Journal of Science 86 : 60-62.

RESEARCH ON CRYPHONECTRIA CANKER - RECENT DEVELOPMENTS

In the past three years, research conducted on Cryphonectria canker in South Africa has elucidated many previously unknown facts on the biology of the causal agent, Cryphonectria cubensis.

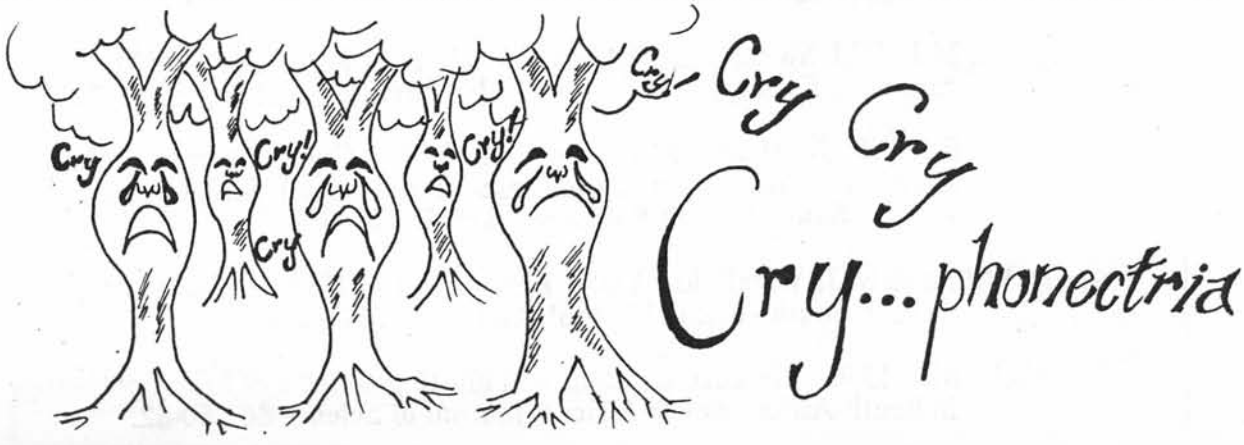
Studies have thus far shown that there are significant differences in the susceptibility of various Eucalyptus clones to C. cubensis following screening in the glasshouse and forest. Should it become apparent that results in the glasshouse correlate with those of larger trees in the forest, then forest trials may be stopped in favour of glasshouse trials. Until such time, however, the cooperation of field managers in laying out forest trials and supplying young plants in sufficient quantities for glasshouse trials, is very important.

Our research has shown for the first time that guava trees (Psidium guajava) and water-berry trees (Syzigium cordatum) are potential hosts for C. cubensis. These two species belong to the family Myrtaceae and are, therefore, related to Eucalyptus spp. The implications of these findings are threefold. Firstly, the cultivation of guavas in South Africa might be confronted with a potentially severe disease problem in the near future; secondly, they fuel speculation that the pathogen in South Africa could have originated from indigenous Myrtaceae, and finally, indigenous Myrtaceae may serve as secondary hosts for C. cubensis from where it can spread to both Eucalyptus and P. guajava plantings. A survey to determine the geographical and ecological distribution patterns of C. cubensis in South Africa so as to evaluate its potential impact should, therefore, be given top priority.

The possibility that new eucalypt plantings can become infected by the pathogen from the stumps of diseased eucalypt trees and surrounding soil on old sites, is in need of investigation. Isolation of C. cubensis from soil and diseased wood on traditional culture media are, however, severely hampered by the presence of fast growing fungi and bacteria. A selective medium has, therefore, been developed which, in addition to its use for routine isolations, is a potentially valuable tool for ecological studies of C.cubensis.

The occurence of Cryphonectria canker in South Africa appears to be limited to the warmer parts of the country that have relatively high rainfall. The effect that drought might have on the ability of C. cubensis to infect and colonize host tissue was, therefore, investigated in the glasshouse. Results indicate that drought-stressed Eucalyptus plants inhibit colonization by C. cubensis following artificial inoculations in the glasshouse. These finding are, therefore, consistent with the distribution pattern of C. cubensis in South Africa.

Research on C. cubensis will remain a primary objective of the Tree Pathology Cooperative Program. Information gleaned thus far has stimulated new questions as to the biology of the pathogen in South Africa. It will also serve as a valuable foundation for the formulation of future strategies to reduce the impact of the pathogen in this country.



CRYPHONECTRIA CUBENSIS MORE WIDESPREAD IN SOUTH AFRICA THAN PREVIOUSLY THOUGHT

Cryphonectria cubensis is a notorious canker pathogen of *Eucalyptus* trees in tropical areas of the world, and has caused considerable financial losses in Brazil.

Cankers are formed when the pathogen kills the cambium under the bark. This causes sunken areas to develop on the bark and bark splitting results around the infected areas. Gummosis is generally observed on older cankers and this makes the cankers very distinctive. During the rainy season pycnidia of *Endothiella*, the asexual stage of *C. cubensis*, can easily be observed as small black dots surrounding the canker. Cankers form at the base of the tree, higher up against the trunk, or multiple cankers develop on trunks, forming long confluent cankerous areas. The tree is finally girdled by *C. cubensis* as the canker spreads around the tree, killing it.

In 1989 *C. cubensis* was reported for the first time in South Africa from the Kwambonambi region in northern Natal. Since then, it has been found in several parts of Transvaal and Natal and occurs commonly in the Louis Trichardt, Tzaneen, White River and Kwambonambi areas.

Ideal conditions for the pathogen elsewhere in the world include high temperatures (average of 23 ^{0}C or higher) and high humidity throughout the year. These climatic conditions represent some of the most important factors that determine the distribution of *C. cubensis.* Greater losses are expected to occur in the warmer humid areas.We also have preliminary data indicating that significant variation exists in isolates of the pathogen. Some of these isolates appear to be favoured by lower temperatures. On the basis of this observations we might expect a more widespread distribution of Cryphonectria canker in South Africa in the future.

'n ONDERSOEK NA DENNEBAS MEDIUM AS DRAER VAN PATOGENE FUNGI

Gemaalde en gekomposteerde bas word algemeen as 'n groeimedium in Suid-Afrikaanse bosboukwekerye gebruik. Onlangs het daar heelwat verliese van *Pinus patula* saailinge wat in hierdie medium geplant was, in 'n kwekery voorgekom. Hoewel Fusarium wortelvrot 'n bekende Pinus saailing siekte is, kom dit hoofsaaklik in kwekerye met oop wortelsisteme voor, en is redelik onbekend in saailinge wat in houers geplant word. Nadat isolasies vanaf die siek saailinge gemaak is, is die belangrikste spesies as *Fusarium oxysporum* en *F. semitectum* geïdentifiseer. Aangesien beide wortelinfekteerders is, is daar besluit om die basmedium as moontlike bron van *Fusarium* te ondersoek.

Gemaalde bas van bashope wat wissel in graad van kompostering is in die ondersoek gebruik. Monsters is vanaf verskeie punte vanuit die bashope getrek vir ontleding. 'n Wye verskeidenheid van fungi is geïsoleer waarvan slegs een isolaat 'n *Fusarium* spp. was. Dit dui daarop dat die bas redelik suiwer van *Fusarium* was, en dat dit beslis nie die bron van besmetting is nie. Geen ander patogene fungi is gevind nie. Die mikoflora van die bas het hoofsaaklik uit saprofiete fungi bestaan. Mikoparasiete soos *Trichoderma* en *Gliocladium* is ook vanaf die meeste versamelingspunte geïsoleer. Hierdie mikoparasiete word algemeen in die biologiese beheer van patogene fungi gebruik.

Hierdie resultate bevestig die geskiktheid van dennebasmedium, aangesien dit mikoparasiete bevoordeel en 'n onwaarskynlike bron van patogene is.