MANAGEMENT STRATEGIES

In the past, there have been various attempts to limit the expansion of infection centres where they occur. Trenching, to isolate diseased trees, has been largely unsuccessful. It has been found that infection centres apparently disappear after a number of pine rotations. This is due to the soft and non-persistent nature of pine wood and thus, a reduced food base for the fungus. Careful consideration must be given to the species selected for replanting on sites with *Armillaria* root rot. If hardwood species such as eucalypts are planted these may become infected although this has never been shown. The inoculum in the hard eucalypts could then be difficult to remove in future rotations. Control through selection for resistance in species is a strategy that has been considered. The extremely wide host range of the pathogen suggests that this approach would hold little promise, although it is currently under investigation in South Africa.



Shoe string like rhizomorphs of *Armillaria* sp. not seen in South Africa



Armillaria root rot centre in a pine plantation

PLEASE REPORT OCCURRENCES OF THIS DISEASE TO:

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The Tree Pathology Co-operative Programme represents a collaborative venture between the University of Pretoria and the major players in the South African Forestry Industry to reduce the impact of diseases and promote forest biotechnology. Members include: Mondi Ltd., SAFCOL, Sappi Ltd., CTC, The Dept. of Water Affairs and Forestry and the ICFR.

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Mondi Ltd.

ARMILLARIA ROOT ROT



TREE PATHOLOGY CO-OPERATIVE PROGRAMME



White mycelial mat under the bark of a dead tree

INTRODUCTION

A sometimes devastating root rot fungus, *Armillaria*, has been reported from many parts of the world and on a wide variety of hosts. *Armillaria* spp. are capable of killing healthy trees, attacking stressed trees and can be saprophytic decayers of dead trees. *Armillaria* root rot usually becomes apparent when indigenous forests are cleared for afforestation. The fungus colonises the remaining tree stumps and these serve as an inoculum base for the pathogen, that can then infect plantation species. In South Africa, this fungus is relatively uncommon. This is probably due to the fact that indigenous forests are uncommon and few plantations have been established on stands where large indigenous trees have been clear-felled.

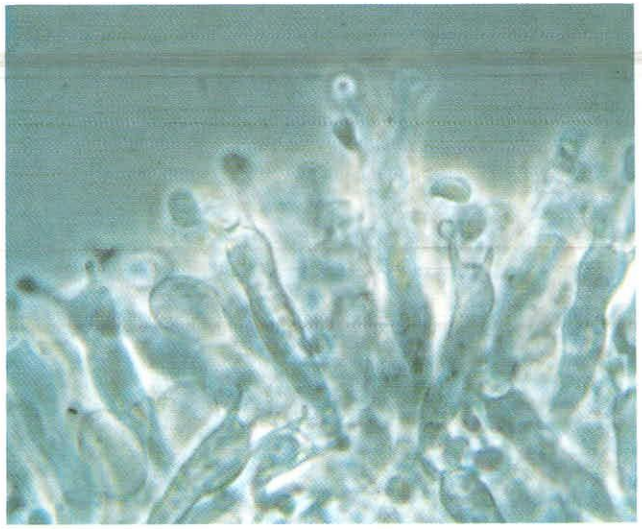
HOST RANGE

Armillaria spp. can have a very wide host range including eucalypts, pine, apples, peaches, citrus, litchis and many indigenous forest tree species. This fungus is, therefore, economically important to a number of industries. Very little is known concerning the identity of *Armillaria* spp. in South Africa. The species *A. heimii* is believed to be present although this must be confirmed. Other species with defined host ranges might also be present.

In forestry situations, Armillaria root rot has been recorded on both pines and eucalypts although there is some doubt as to whether the disease is serious in eucalypts. There is some evidence to suggest that where, eucalypts are planted in pine infection centres, the eucalypts will not be affected by this disease. This might imply that at least one of the species of *Armillaria* present, displays some level of host specificity. This aspect of the biology of *Armillaria* in South Africa deserves further consideration.



Mushroom like fruiting structures of *Armillaria* sp. thought to be *A. heimii*



Basidia and basidiospores of *Armillaria* sp. in South Africa

SYMPTOMS

Trees affected by Armillaria root rot are usually found in distinct infection centres resulting from a single infected tree. These centres develop due to the capacity of the pathogen to move from tree to tree via root contact or by root-like fungal structures, called rhizomorphs. Dying trees are, therefore, usually found in the periphery of the infection centres. In cases where trees are dying of other causes and are attacked by *Armillaria*, they are usually found scattered in the plantation.

Trees suffering from *Armillaria* root rot usually have yellow needles and leaves, a reduction of shoot growth and crown die-back. These symptoms are more noticeable after the dry season. A flush of new cones are often produced on dying conifers. Gum or resin is also usually found on roots or root collars of infected trees. *Armillaria* root rot is recognised by certain signs of the fungus. This includes a thick mat of white mycelium under the bark of roots or root collars of dead and dying trees, appearance of black "shoe-lace-like" rhizomorphs (not seen in South Africa) and/or the production of mushrooms near the base of infected trees. The mushroom fruiting structures of the pathogen are seldom seen.