



Forestry Department

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OVERVIEW OF FOREST PESTS

SOUTH AFRICA

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**Forest Resources Development Service
Forest Management Division
Forestry Department**

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DISCLAIMER

The aim of this document is to give an overview of the forest pest¹ situation in South Africa. It is not intended to be a comprehensive review.

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¹ Pest: Any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products (FAO, 2004).

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Background

This paper is one of a series of FAO documents on forest-related health and biosecurity issues. The purpose of these papers is to provide early information on on-going activities and programmes, and to stimulate discussion.

In an attempt to quantify the impacts of the many factors that affect the health and vitality of a forest, the Global Forest Resources Assessment 2005 (FRA 2005) asked countries to report on the area of forest affected by disturbances, including forest fires, insects, diseases and other disturbances such as weather-related damage. However, most countries were not able to provide reliable information because they do not systematically monitor these variables.

In order to obtain a more complete picture of forest health, FAO continues to work on several follow-up studies. A review of forest pests in both naturally regenerating forests and planted forests was carried out in 25 countries representing all regions of the world. This *Overview of forest pests* represents one paper resulting from this review. Countries in this present series include Argentina, Belize, Brazil, Chile, China, Cyprus, Colombia, Ghana, Honduras, India, Indonesia, Kenya, Kyrgyz Republic, Malawi, Mauritius, Mexico, Moldova, Mongolia, Morocco, South Africa, Sudan, Thailand, Romania, Russian Federation, Uruguay; this list will be continuously updated.

Comments and feedback are welcome. For further information or if you are interested in participating in this process and providing information on insect pests, diseases and mammals affecting forests and the forest sector in your country, please contact:

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SOUTH AFRICA

Introduction

South Africa is reported to have approximately 9.2 million hectares of forests representing 7.6 percent of the total land area and a further 21.4 million hectares of other wooded lands (FAO, 2006). Most of the forest occurs in the humid areas of the country, but in arid regions some forests are found on the banks of rivers or within protected sites. Planted forests cover about 1.4 million hectares, approximately 1.2 percent of the total land area and 15.5 percent of the total forest area (FAO, 2006). Planted forests are mostly comprised of *Pinus patula*, *P. elliottii*, *P. taeda* and *Eucalyptus grandis*. In colder areas *Eucalyptus nitens*, *E. dunnii*, and *E. smithii* are planted, while *Acacia mearnsii* is also planted widely in KwaZulu-Natal and Southern Mpumalanga. *Pinus* spp. are used for pulp and crates with older trees (20-30 year old) being used for construction and furniture veneers. *Eucalyptus* spp. are used for pulp, mining timber, transmission poles and furniture. *Acacia* spp. are used for pulp, tannins, and fuel. *Acacia* chips are also exported and used in the manufacture of higher quality papers.

Fire, weeds, insects and disease cause significant problems in production areas. The area of plantations seriously damaged by weather, diseases, insects, animals and rodents was estimated at 919 ha (FAO, 2005). Weeds include *Solanum mauritianum*, *Rubus cuneifolius*, *Lantana camara*, *Setaria megaphylla* and *Acacia mearnsii*. Significant amounts of resources are involved in weed control. Of special note is that although *A. mearnsii*, like some pine species, is classified as an invasive weed in South Africa, it is also one of the major components of the commercial forest industry and thus very important to this sector.

Forest pests

Naturally regenerating forests

Insects

Indigenous insects

No information was available on indigenous insects in South Africa's naturally regenerating forests.

Introduced insects

No information was available on introduced insects impacting the naturally regenerating forests of South Africa.

Diseases

Indigenous diseases

Armillaria fuscipes Petch (1909)

Other scientific names:

Basidiomycota: Marasmiaceae

Common names: Armillaria root rot

Host type: broadleaf and conifer

Hosts: *Eucalyptus* spp.; *Pinus* spp.

The genus *Armillaria* causes root rot and death to woody plants in both natural and planted forests in boreal, temperate and tropical regions of the world. Armillaria root rot has been described from various parts of Africa on many different hosts. In South Africa, Armillaria root rot has been reported on economically important *Pinus* and *Eucalyptus* species grown in plantations since the early 1900s (Coetzee *et al.*, 2000).

Most reports of Armillaria root rot in South Africa suggest that *A. mellea* is the causal agent. However, it has recently been suggested that the causal species in South Africa is actually *Armillaria fuscipes* (Coetzee *et al.*, 2000; Coetzee *et al.*, 2005).

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=145388>

***Ceratocystis albifundus* M.J. Wingf., De Beer & M.J. Morris (1996)**

Other scientific names:

Ascomycota: Ceratocystidaceae

Common names: Ceratocystis wilt

Host type: broadleaf

Hosts: *Acacia mearnsii*; *A. decurrens*; *A. caffra*; *Burkea africana*; *Combretum molle*; *C. apiculatum*; *C. zeyherii*; *Faurea saligna*; *Ochna pulchra*; *Ozoroa paniculata*; *Protea* spp.; *P. gagedii*; *Terminalia sericea*

Ceratocystis albifundus causes a serious wilt disease of Australian *Acacia mearnsii* trees in South Africa. It has also been reported infesting *A. mearnsii* trees in Uganda and Kenya (Roux *et al.*, 2001). In addition to exotic tree species, *C. albifundus* has also been reported on native South African trees including *Protea gagedii*, *Burkea africana*, *Combretum molle*, *C. apiculatum* and *C. zeyherii*, *Terminalia sericea*, *Ochna pulchra*, *Ozoroa paniculata*, *Acacia caffra* and *Faurea saligna* (Roux *et al.*, 2004).

C. albifundus causes considerable damage in plantings of *Acacia mearnsii* and is considered the most important pathogen of these trees in South Africa (Roux and Wingfield, 1997). The disease causes swellings, blisters and lesions on stems, as well as discolouration of the wood, and has been known to kill one year old trees within six weeks after inoculation (Roux *et al.*, 1999). Trees of all ages are affected however, with infection most commonly resulting in rapid wilt and death. The fungus needs wounds to be able to initiate an infection and thus often causes disease after hail wounds, weeding damage and corrective pruning practices. An insect association, although not yet proven, is very likely, as this has been proven for other species in the genus *Ceratocystis*.

It has previously been suggested that *C. albifundus* is native to Southern Africa. This hypothesis was based on the fact that the fungus has been reported only from Africa and that herbarium specimens from a native South African *Protea* sp. contain a fungus resembling *C. albifundus*. Various population diversity studies have supported the hypothesis that *C. albifundus* is native to South Africa (Roux *et al.*, 2001; Roux *et al.*, 2004; Barnes *et al.*, 2005).

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/ceratocystis.pdf>
<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=437121>

***Chrysosporthe austroafricana* Gryzenhout & M.J. Wingf. sp. nov. (2004)**

Other scientific names:

Ascomycota: Chryphonectriaceae

Common names: Chrysosporthe canker

Host type: broadleaf

Hosts: Myrtaceae; *Eucalyptus* spp.; *Tibouchina* spp.; *Syzygium cordatum*; *S. guineense*

Chrysosporthe canker is one of the most important diseases of *Eucalyptus* spp. planted in tropical and subtropical regions worldwide. For many years, the disease was reported to be caused by the fungal pathogen *Cryphonectria cubensis* however recent studies have shown that the fungus in South Africa is not conspecific with *C. cubensis* and it was recently described as a new genus and species, *Chrysosporthe austroafricana* (Gryzenhout *et al.*, 2004).

C. austroafricana is known only from Africa, where it causes severe cankers on *Eucalyptus* spp. and on ornamental *Tibouchina* trees, both of which have been introduced into South Africa (Wingfield, Swart and Abear, 1989; Conradie, Swart and Wingfield, 1990; Myburg *et al.*, 2002; Wingfield, 2003; Roux *et al.*, 2005; Nakabonge *et al.*, 2006). The origin of *Chr. austroafricana* is unknown, but it is possible that it expanded its host range from native trees related to *Eucalyptus* and *Tibouchina* spp. to these exotic hosts. Subsequent surveys of some indigenous South African Myrtales led to the discovery of *C. austroafricana* on native *Syzygium cordatum* and *S. guineense* (Heath *et al.*, 2006). Pathogenicity trials showed that *C. austroafricana* is more virulent on exotic *Eucalyptus* spp. than on native *S. cordatum*.

<http://fabinet.up.ac.za/tpcp/pamphlets>

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=500035>

Introduced diseases

***Phanerochaete salmonicolor* (Berk. & Broome) Jülich**

Other scientific names: *Botryobasidium salmonicolor* (Berk. & Broome) Venkatar.;

Corticium salmonicolor Berk. & Broome; *Erythricium salmonicolor* (Berk. & Broome)

Burds.; *Pellicularia salmonicolor* (Berk. & Broome) Dastur; *Terana salmonicolor* (Berk. & Broome) Kuntze

Basidiomycota: Phanerochaetaceae

Common names: pink disease

Host type: broadleaf

Hosts: *Acacia mearnsii*; *Dais cotonifolia*; *Ekebergia capensis*; *Eucalyptus* spp.; *Maesa lanceolata*; *Podocarpus henkellii*; *P. latifolius*

Phanerochaete salmonicolor causes a canker and dieback disease, commonly known as pink disease, on many tree species. It is widely distributed in the tropics where it causes branch and stem cankers on a wide variety of woody hosts, primarily hardwoods. Pink disease is potentially important in South Africa because it affects a wide range of native

and exotic tree species. The fungus is able to penetrate intact bark usually through lenticels where it may then kill the cambium or, the cambium may be infected directly through wounds. Small branches or stems may be quickly girdled and distal portions are killed. Epicormic branches may be formed below girdling cankers and keep the tree alive. However, these may be infected and killed in future infection cycles, resulting in eventual death of the tree.

During an investigation of diseases of *Podocarpus henkellii* and *P. latifolius* in the Mpumalanga Province of South Africa, typical symptoms of pink disease were observed on the branches of these trees (Roux and Coetzee, 2005). Stem and branch cankers covered with cracked bark and abundant pink mycelial growth were common on the affected trees. In subsequent surveys, the disease was also found on native *Dais cotonifolia* in the same area, and on native *Ekebergia capensis* and *Maesa lanceolata* in the KwaZulu-Natal Midlands. It has also been recorded from exotic *Eucalyptus* sp. and *Acacia mearnsii* (Nicol, Kemp and Wingfield, 1993; Crous, Phillips and Baxter, 2000; Roux and Coetzee, 2005).

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=51&langdisplay=english>
<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=319725>

***Phytophthora cinnamomi* Rands**

Other scientific names:

Oomycota: Pythiaceae

Common names: Phytophthora rot

Host type: broadleaf and conifer

Hosts: Myrtaceae; Proteaceae; *Eucalyptus* spp.; *Pinus* spp.; *Pinus radiata* ss *radiata*

Phytophthora cinnamomi causes root and collar rot in a broad range of plants including monocots and dicots such as chestnuts, avocados, eucalypts and pines. Myrtaceae and Proteaceae are particularly susceptible to this fungus. *P. cinnamomi* has been reported from 130 hosts in South Africa, mostly indigenous plants from nurseries, cultivated areas or natural vegetation (Von Broembsen, 1984). The disease causes the roots or collar to rot. If the disease does not kill the trees, then weakened trees frequently lodge. It is usually associated with humid conditions and poorly drained soils. This fungus overwinters as spores or mycelia in the roots or soil and germinates when conditions become favourable.

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=260884>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/phytophthora.pdf>

Other pests

Indigenous other pests

No information was available on indigenous other pests (i.e. nematodes, mites, mammals, etc.) impacting the naturally regenerating forests of South Africa.

Introduced other pests

No information was available on introduced other pests (i.e. nematodes, mites, mammals, etc.) impacting the naturally regenerating forests of South Africa.

Diebacks and other conditions

No records were available for diebacks and other conditions affecting South Africa's naturally regenerating forests.

Planted forests

Insects

Indigenous insects

In addition to the pests described below, South Africa's planted forests are also subject to other indigenous pests of establishment such as white grubs (Coleoptera: Scarabaeidae), cutworms (Lepidoptera: Noctuidae) and *Macrotermes* termites (Isoptera: Macrotermitidae).

Coryphodema tristis

Other scientific names:

Lepidoptera: Cossidae

Common names: cossid moth; goat moth

Host type: broadleaf

Hosts: *Eucalyptus nitens*; Combretaceae; Malvaceae; Myoporaceae; Myrtaceae; Rosaceae; Scrophulariaceae; Ulmaceae; Vitaceae

Coryphodema tristis is native to South Africa and is a well known pest of fruit trees, vines and some native trees. It is a wood-boring insect with a wide host range including species in the Combretaceae, Malvaceae, Myoporaceae, Rosaceae, Scrophulariaceae, Ulmaceae and Vitaceae.

This species has recently been found feeding on *Eucalyptus nitens* trees in plantations growing in the Lothair/Carolina area in South Africa where it has caused extensive damage (Gebeyehu, Hurley and Wingfield, 2005). This is the first report of the cossid moth feeding on *Eucalyptus* spp. or any other member of the family Myrtaceae. This is of significant concern since intensively managed *Eucalyptus* plantations form an important component of the forest sector. Infestations range from less than 1 percent to nearly 80 percent of stands. The extent of its distribution and whether or not it attacks other eucalypt species is currently unknown.

<http://www.fao.org/forestry/foris/webview/common/media.jsp?mediaId=8388&langId=1>

***Ellimenistes laesicollis* Fåhraeus, 1871**

Other scientific names:

Coleoptera: Curculionidae

Common names: grey weevil

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Ellimenistes laesicollis feeds on a variety of indigenous plants and eucalypts but mainly feeds on newly planted eucalypts, where the adults feed on the root collar and branches. This species is especially a problem in previous sugarcane areas that have been replanted with eucalypts.

***Euproctis terminalis* Walker**

Other scientific names:

Lepidoptera: Lymantriidae

Common names: pine brown tail moth

Host type: conifer

Hosts: *Pinus* spp.

Euproctis terminalis is an indigenous species of moth that has been able to move onto introduced host plants. This species causes defoliation of *Pinus* spp. which sometimes causes economic damage or tree mortality (Govender, 1998). The hairs of the larvae can cause intense irritation to human skin and can therefore be dangerous to the health of forestry workers (Kirsten *et al.*, 2000).

***Imbrasia cytherea* (Fabricius, 1775)**

Other scientific names:

Lepidoptera: Saturniidae

Common names: pine emperor moth

Host type: conifer

Hosts: *Pinus* spp.; *Watsonia* spp.

This native emperor moth is an indigenous species that has become a pest of exotic pine species. The larvae feed on pine needles, at times causing sufficiently high defoliation such that die back and tree mortality occur. Native hosts include *Watsonia* spp.

<http://www.museums.org.za/bio/insects/lepidoptera/saturniidae/>

***Kotochalia junodi* (Heylaerts)**

Other scientific names: *Chaliopsis junodi*

Lepidoptera: Psychidae

Common names: wattle bagworm

Host type: broadleaf

Hosts: *Acacia* spp.; *A. mearnsii*

This bagworm is a significant pest of acacias – both native and planted in South Africa. It has a single generation in a year; however in some areas the population levels can be sufficiently high that whole trees are defoliated. This affects the rate of growth and productivity of the trees in timber and bark production. Outbreaks of these caterpillars is usually periodical over five to seven years depending on nutrition, climatic conditions etc. The population levels of this species generally tend to be controlled by a large range of natural enemies (parasites and predators) and diseases.

<http://www.worldagroforestry.org/sea/Products/AFDbases/af/asp/SpeciesInfo.asp?SpID=58>

<http://www.rirdc.gov.au/reports/AFT/csf-52a.doc>

***Lygidolon laevigatum* Reuter, 1907**

Other scientific names:

Hemiptera: Miridae

Common names: brown wattle mirid

Host type: broadleaf

Hosts: *Acacia* spp.; *Acacia mearnsii*

This sap-sucking bug feeds on the tips of acacias. It affects the growth rate and productivity of the trees. When the tips of trees are killed, the replacement growth results in a 'witches broom' effect with many small, short branches formed. These bugs have a more significant affect on stressed trees than healthy trees; and have a tendency to feed on younger plants. This bug has a short life cycle of 4-6 weeks, and thus has the potential for rapid build up of populations.

<http://www.rirdc.gov.au/reports/AFT/csf-52a.doc>

***Pachypasa capensis* (Linnaeus, 1767)**

Other scientific names:

Lepidoptera: Lasiocampidae

Common names: brown lappet moth

Host type: broadleaf and conifer

Hosts: *Pinus* spp.; *P. patula*; *Acacia* spp.; *Chrysanthemoides monilifera*

The brown lappet moth is an indigenous species of moth that feeds on introduced conifers. Native hosts of this moth include broadleaf plants such as Bitou bush (*Chrysanthemoides monilifera*) and *Acacia* spp. They are defoliators of *Pinus* spp., with its main host being *P. patula* (Kirsten *et al.*, 2000). The damage caused can be sufficient at times for them to be considered pests. They form clusters of fairly large numbers at times.

Introduced insects

***Cinara cronartii* Tissot & Pepper, 1967**

Other scientific names:

Hemiptera: Aphididae

Common names: black pine aphid

Host type: conifer

Hosts: *Pinus* spp.; *P. teada*; *P. patula*; *P. elliottii*

The black pine aphid, *Cinara cronartii* was discovered damaging plantations of *Pinus teada*, *P. patula* and *P. elliottii* in South Africa during the 1970s. The hosts of this aphid are *Pinus* spp. In South Africa it feeds on stems and roots however in its native range, the southeastern USA, it feeds on bark lesions or cankers caused by the fusiform rust *Cronartium quercuum* (Kfir, Kirsten and van Rensburg, 1985; Mills, 1990). The black pine aphid causes significant damage to plantation of pines, particularly when trees are stressed such as during drought. It causes yellowing of crowns, dieback and at times tree mortality. A second problem caused by aphids is the production of honey dew, on which sooty moulds grow. In South Africa a parasitic wasp (*Pauesia* sp.) has been introduced for biological control of this aphid.

<http://www.easternarc.org/html/99-201.html>
<http://www.ipgri.cgiar.org/publications/pdf/828.pdf>

***Gonipterus scutellatus* Gyllenhal, 1833**

Other scientific names:

Coleoptera: Curculionidae

Common names: eucalyptus weevil; eucalyptus snout beetle; gum tree weevil

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Gonipterus scutellatus is a leaf-feeding beetle that is a major defoliator of *Eucalyptus* spp. It is indigenous to Australia but occurs in many countries throughout the world where eucalypts are grown. Infestations of this beetle are known to cause serious damage, both in Australia and where it has been introduced. Attack by this beetle can cause tree mortality, reduction in growth, coppicing, and stunting of trees. Some *Eucalyptus* spp. are more susceptible to damage than others.

The females lay eggs in batches on both surfaces of new leaves; the eggs are covered by excrement to form a capsule. The larvae emerge and feed on fresh foliage and pupate in the soil. Adults also feed on leaves and growing shoots. There is usually more than one generation per year, with females living for about three months and larval development taking between 30 and 80 days. In some places there are continuous generations. Dispersal is by adult flight, adults hitch-hiking on non-plant material, and movement of infested plant material or soil.

http://www.eppo.org/QUARANTINE/insects/Gonipterus_gibberus/DSGONPSP.pdf

http://acwm.co.la.ca.us/pdf/Eucalyptusweevileng_pdf.pdf

[http://webs.uvigo.es/adolfo.cordero/PDF/Forestry_vol_73_pp_21-29_\(2000\).pdf](http://webs.uvigo.es/adolfo.cordero/PDF/Forestry_vol_73_pp_21-29_(2000).pdf)

<http://www.ajol.info/viewarticle.php?id=20100&jid=23&layout=abstract>

http://www.forestry.sa.gov.au/privateforestry/insect_fact_sheets/Fact_Sheet_html/FHS%2007%20Eucalyptus%20Weevil.htm

<http://fabinet.up.ac.za/biennialreport/docs/report1.pdf>

***Hylastes angustatus* (Herbst)**

Other scientific names:

Coleoptera: Curculionidae

Common names: pine bark beetle; pine root-infesting bark beetle

Host type: conifer

Hosts: *Pinus* spp.

Hylastes angustatus is native to Europe and Russia. The beetles feed on the green bark of the roots and root collars of seedlings, killing the seedlings by ring barking. More information on this pest in South Africa can be found in Kirsten *et al.* (2000).

<http://www.forestryimages.org/browse/subimages.cfm?SUB=4132>

<http://www.padil.gov.au/viewPestDiagnosticImages.aspx?id=515>

***Hylurgus ligniperda* (Fabricius, 1787)**

Other scientific names: *Hylesinus ligniperda*; *Hylurgus elongatus*; *Hylurgus flavipes*

Coleoptera: Curculionidae

Common names: bark beetle; golden haired beetle; red haired pine bark beetle

Host type: conifer

Hosts: *Pinus* spp.

Hylurgus ligniperda infests freshly cut stumps, freshly cut branches, logs in contact with soil, and stressed or weakened trees. As well during maturation, adults are known to strip the bark of young seedlings. The females bore through the bark and form galleries under the bark where they lay eggs. Individual females can lay up to 500 eggs. There is usually more than one generation per year, with adults present throughout most of the year. The adults are strong fliers and capable of flying several kilometers to initiate attack on fresh hosts. The other main means of dispersal is the movement of infested material that has not been debarked and contains either immatures or adults.

Damage is caused directly by the beetles creating galleries in the timber as well as indirectly by the introduction of black stain root rot fungi. Hosts are *Pinus* spp. This bark beetle is a vector of several species of root disease fungi in the genus *Leptographium*. This beetle occurs in Africa, Europe Asia, North America, Australia, New Zealand, Uruguay, Brazil and Chile.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=59&langdisplay=english>

***Phoracantha recurva* Newman, 1840**

Other scientific names:

Coleoptera: Cerambycidae

Common names: longicorn beetle

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Native to Australia, *Phoracantha recurva* was reported from Tunisia in 1999 and has also been recorded in Argentina, Brazil, Chile, Greece, Malawi, New Zealand, South Africa, Spain, the United States, Uruguay and Zambia. This insect is a large black and yellow longicorn beetle that lay eggs under loose bark of *Eucalyptus* spp. It is primarily a pest of stressed trees, particularly water stressed trees or freshly felled timber; it rarely attacks healthy trees. The larvae tunnel under the bark and in the cambium layer and effectively ring barks the trees. The larval feeding can rapidly kill the trees or cause significant damage to the timber of affected trees. The adults live for several weeks and the larvae take 2 to 6 months to develop depending on moisture conditions in the logs.

Pathways of introduction include nursery stock, freshly cut timber, and timber and wood with high moisture content. It is suspected that *P. recurva* entered South Africa in freshly-cut railway sleepers imported from Australia. The adults are moderately long lived and are strong fliers that are thus capable of naturally dispersing a fair distance.

<http://www.metla.fi/iufro/iufro95abs/d2pap105.htm>

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7425.html>

<http://www.invasive.org/browse/subject.cfm?sub=394>

http://www.eppo.org/QUARANTINE/Alert_List/insects/phoracantha.htm

***Phoracantha semipunctata* (Fabricius, 1775)**

Other scientific names:

Coleoptera: Cerambycidae

Common names: common eucalypt longhorn; eucalypt longhorn; eucalyptus longhorned borer; longicorn beetle

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Native to Australia, *Phoracantha semipunctata* is a large black and yellow longicorn beetle that lays eggs under loose bark of *Eucalyptus* spp. This species tends to attack unhealthy or stressed trees (particularly drought stressed trees) or freshly felled timber. The larvae tunnel deep into the trees and form galleries. The larval feeding can girdle trees killing them. They cause significant damage to the timber of affected trees, hence affecting the quality of salvaged materials. The adults live for several weeks and larvae take 2 to 6 months to develop depending on moisture conditions in the logs.

The adults of this species are strong fliers, hence can disperse significant distances. However movement over greater distances occurs in infested timber. It is suspected that *P. semipunctata* entered South Africa in freshly-cut railway sleepers imported from Australia.

http://www.ento.csiro.au/aicn/system/c_616.htm

<http://www.metla.fi/iufro/iufro95abs/d2pap105.htm>

<http://www.ipm.ucdavis.edu/PMG/PESTNOTES/pn7425.html>

<http://www.invasive.org/browse/subject.cfm?sub=394>

http://www.eppo.org/QUARANTINE/Alert_List/insects/phoracantha.htm

***Pineus pini* (Gmelin, 1789)**

Other scientific names: *Pineus laevis* (Maskell, 1885) Börner, 1907; *Aphis pini* Gmelin, 1790; *Kermes pini* Macquart, 1819; *Anisophleba pini* Koch, 1857; *Kermaphis pini* var. *laevis* Maskell, 1885; *Pineus pini* (Macquart, 1819) Börner, 1907; *Pineus sylvestris* Annand, 1928; *Pineus havrylenkoi* Blanchard, 1944; *Pineus simmondsi* Yaseen & Ghani, 1971; *Pineus boernerii* Annand, 1928

Hemiptera: Adelgidae

Common names: Eurasian pine adelgid; pine woolly aphid; red pine adelgid; common pine aphid; pine adelgid

Host type: conifer

Hosts: *Pinus* spp.

A pest of *Pinus* spp., this aphid feeds on shoots at times causing tip dieback. It occurs in Africa, Australia, Europe, New Zealand and North and South America. This aphid was first detected in Kenya in 1969 in pine plantations at the Kenya Forest Research Centre arboretum near Muguga. Attempts to eradicate infestations by destroying infested pines were unsuccessful (Odera, 1974; Odera and Arap Sang, 1975; Odera and Arap Sang, 1980). Control of this pest by biological control is variable - in some areas this method has been highly successful and significantly less so in others. This aphid has been moved into new areas mostly by movement of infested planting stock.

<http://www.insectimages.org/browse/subimages.cfm?SUB=8092>

<http://www.cabicompendium.org/NamesLists/FC/Full/PINEPI.htm>

<http://www.fzi.uni-freiburg.de/InsectPestKey-long%20version/pineus.htm>

http://www.ento.csiro.au/aicn/name_s/b_3293.htm

***Pissodes nemorensis* Germar, 1824**

Other scientific names: *Pissodes approximatus*; *Pissodes canadensis*; *Pissodes deodarae*

Coleoptera: Curculionidae

Common names: eastern pine weevil; northern pine weevil; deodar weevil

Host type: conifer

Hosts: *Pinus* spp.; *Cedrus* spp.; *Picea* spp.

Pissodes nemorensis is a weevil that is polyphagous on conifers such as *Pinus* spp., *Picea* spp. and *Cedrus* spp. The primary damage caused by *P. nemorensis* is the ring-barking of the growing tips of young pine trees causing tip dieback resulting in growth retardation and poor form of the tree. Although it seldom kills the tree, the stress it induces in the tree makes the tree more susceptible to other pests and diseases. It also infests dying and dead trees and logs. The weevils breed in the cambium layer. *Pissodes nemorensis* is also a potential vector of *Fusarium circinatum* when this fungus becomes established in mature pine stands. They disperse by means of flight or transport of infested logs.

This species is native to North America and was discovered in South Africa in 1942 (Gebeyehu and Wingfield, 2003). It has since caused significant damage to local pine plantations. *P. nemorensis* is present throughout all pine-growing areas in the country and is often associated with stressed trees (Gebeyehu and Wingfield, 2003).

http://www.eppo.org/QUARANTINE/insects/Pissodes_nemorensis/PISONE_ds.pdf

http://www.cfl.scf.rncan.gc.ca/collections-cfl/ficheinsecte_e.asp?id=1837

<http://www.forestpests.org/southern/deodarweevil.html>

<http://www.nrf.ac.za/sajs/abnov03h.stm>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/pissodes.pdf>

***Scolytus kirschii* Skalitzky, 1876**

Other scientific names:

Coleoptera: Scolytidae

Common names:

Host type: broadleaf

Hosts: *Ulmus* spp.; *U. procera*

In February 2005, the exotic bark beetle, *Scolytus kirschii*, was detected infesting English elms (*Ulmus procera*) growing on a farm in Stellenbosch, South Africa (Six *et al.*, 2005). This appeared to be the first report of an infestation of *Scolytus* species in this country and it also appeared to be the first account of the establishment of *S. kirschii* outside southern and central Europe, the Mediterranean region, and Central Asia.

The beetle's presence in South Africa is of considerable concern owing to its ability to kill ornamental elms resulting in considerable economic impact, the potential that it may switch hosts from exotic elms to related indigenous trees, and its potential impact as a vector of the causal agents of Dutch elm disease (DED), *Ophiostoma ulmi* and *O. novo-ulmi* (Six *et al.*, 2005). While none of the attacked trees were infested with DED, the damage to the trees by the beetles alone was sufficient to cause tree death.

Scolytus kirschii is monogamous. Females attack the trees and initiate galleries in the phloem layer just beneath the outer bark, where breeding occurs. Egg galleries are constructed following the grain of the wood and larval galleries extend at right angles away from the egg galleries, typically, but not always, directed against the grain.

<http://fabinet.up.ac.za/personnel/docs/2005%20Six,%20de%20Beer,%20Beaver,%20Viss er,%20Wingfield%20SA%20J%20Sci.pdf>

***Sirex noctilio* Fabricius, 1793**

Other scientific names: *Sirex melanocerus* Thomson, 1871; *Paururus noctilio*

Hymenoptera: Siricidae

Common names: European wood wasp; sirex; sirex woodwasp; steel-blue horntail

Host type: conifer

Hosts: *Pinus radiata*; *P. taeda*; *P. pinaster*; *P. sylvestris*; *P. nigra*; *P. pinea*; *P. elliottii*; *P. echinata*; *P. palustris*; *P. patula*; *P. caribaea*; *P. kesiya*; *P. strobes*; *Abies* spp.; *Larix* spp.; *Picea* spp.; *Pseudotsuga menziesii*

The European woodwasp is native to Europe and northern Africa, where it infests various species of conifers including *Abies* spp., *Larix* spp., *Picea* spp., *Pinus* spp. and *Pseudotsuga* spp. Adult females lay eggs in stressed or dying trees. Each generation takes between one and two years. When the females lay eggs in trees they also insert a fungus (*Amylostereum areolatum*) and a toxic mucus which usually kill the trees, thus making a suitable habitat for the larvae. The larvae feed on the fungus causing degradation in the quality of timber.

This insect has been accidentally introduced into many Southern Hemisphere countries, including Argentina, Australia, Brazil, Chile, New Zealand, South Africa and Uruguay (Ciesla, 2003). In these countries, the wasp has become a major pest in pine plantations, causing up to 70 and 80 percent mortality in certain areas of Uruguay and Australia respectively. In 1994, *Sirex noctilio* was introduced into South Africa and it is causing considerable damage in the Cape and is now spreading to new areas.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=33&langdisplay=english>

http://www.na.fs.fed.us/spfo/pubs/pest_al/sirex_woodwasp/sirex_woodwasp.htm

<http://www.invasive.org/browse/subimages.cfm?sub=4093>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/sirex.pdf>

<http://fabinet.up.ac.za/biennialreport/docs/report1.pdf>

<http://www.metla.fi/iufro/iufro95abs/d2pos86.htm>

http://www.forestrytas.com.au/forestrytas/pdf_files/forest_health_leaflets/insect_pests/pe stsinfosheet7sirexwasp.pdf

<http://www.maine.gov/agriculture/pi/pestsurvey/pestinfo/woodwasp.htm>

***Thaumastocoris peregrinus* Carpintero and Dellapé, 2006**

Other scientific names:

Hemiptera: Thaumastocoridae

Common names: bronze bug

Host type: broadleaf

Hosts: *Eucalyptus viminalis*; *E. camaldulensis*; *E. grandis*; *E. tereticornis*; *E. smithii*; *E. grandis* x *camaldulensis*; *E. grandis* x *urophylla*

Originating from the eastern regions of Australia, *Thaumastocoris peregrinus* is a gregarious, sap-sucking bug that has become a significant pest in commercially important exotic *Eucalyptus* plantations of South Africa. It poses a major threat to the forest sector by reducing the photosynthetic ability of the tree, resulting in stunted growth and even death of severely infested trees. It infests many eucalypt species and their hybrids, including *Eucalyptus camaldulensis*, *E. grandis*, *E. smithii*, *E. tereticornis*, *E. viminalis*, *E. grandis* x *camaldulensis* and *E. grandis* x *urophylla* (Wood Southern Africa and Timber Times, 2007).

After the discovery of *T. peregrinus* in South African plantations, intensive, nationwide surveys were conducted by researchers at the Tree Protection Co-operative Programme (TPCP). The surveys looked at several eucalyptus species, hybrids and their clones and covered various geological and climatic regions. These surveys, along with reports from other researchers in the country, have shown that the bronze bug occurs in all eucalypt growing areas from Tzaneen in the north to Cape Town in the south (Wood Southern Africa and Timber Times, 2007).

This pest was originally identified as *Thaumastocoris australicus* (Jacobs and Naser, 2005) until Carpintero and Dellapé (2006) described a new species, *T. peregrinus*, which is morphologically very similar to *T. australicus*. They also reported that the *Thaumastocoris* pest in South Africa showed unique morphological characteristics only found on *T. peregrinus*. The identification of the *Thaumastocoris* pest in South Africa as *Thaumastocoris peregrinus* has since been confirmed through genetic testing and in consultation with a taxonomic specialist of the genus *Thaumastocoris* (Nadel, pers. comm.).

<http://www.fao.org/forestry/site/26061/en>

<http://fabinet.up.ac.za/personnel/showperson.php?id=rnadel>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/Thaumastocoris%20symptoms%20photos.pdf>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/Thaumastocoris%20symptoms%20photos2.pdf>

<http://www.fabinet.up.ac.za/pdfs/tpcp-news/WoodSA%20May%202007%20P10-11.pdf>

<http://www.nctforest.com/showpage.asp?id=44&contentid=423&catid=24>

Diseases

Indigenous diseases

***Armillaria fuscipes* Petch (1909)**

Other scientific names:

Basidiomycota: Marasmiaceae

Common names: Armillaria root rot

Host type: broadleaf and conifer

Hosts: *Eucalyptus* spp.; *Pinus* spp.

The genus *Armillaria* causes root rot and death to woody plants in both natural and planted forests in boreal, temperate and tropical regions of the world. Armillaria root rot has been described from various parts of Africa on many different hosts. In South Africa,

Armillaria root rot has been reported on economically important *Pinus* and *Eucalyptus* species grown in plantations since the early 1900s (Coetzee *et al.*, 2000).

Most reports of Armillaria root rot in South Africa suggest that *A. mellea* is the causal agent. However, it has recently been suggested that the causal species in South Africa is actually *Armillaria fuscipes* (Coetzee *et al.*, 2000; Coetzee *et al.*, 2005).

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=145388>

***Ceratocystis albifundus* M.J. Wingf., De Beer & M.J. Morris (1996)**

Other scientific names:

Ascomycota: Ceratocystidaceae

Common names: Ceratocystis wilt

Host type: broadleaf

Hosts: *Acacia mearnsii*; *A. decurrens*; *A. caffra*; *Burkea africana*; *Combretum molle*; *C. apiculatum*; *C. zeyherii*; *Faurea saligna*; *Ochna pulchra*; *Ozoroa paniculata*; *Protea* spp.; *P. gagedii*; *Terminalia sericea*

Ceratocystis albifundus causes a serious wilt disease of Australian *Acacia mearnsii* trees in South Africa. It has also been reported infesting *A. mearnsii* trees in Uganda and Kenya (Roux *et al.*, 2001). In addition to exotic tree species, *C. albifundus* has also been reported on native South African trees including *Protea gagedii*, *Burkea africana*, *Combretum molle*, *C. apiculatum* and *C. zeyherii*, *Terminalia sericea*, *Ochna pulchra*, *Ozoroa paniculata*, *Acacia caffra* and *Faurea saligna* (Roux *et al.*, 2004).

C. albifundus causes considerable damage in plantings of *Acacia mearnsii* and is considered the most important pathogen of these trees in South Africa (Roux and Wingfield, 1997). The disease causes swellings, blisters and lesions on stems, as well as discolouration of the wood, and has been known to kill one year old trees within six weeks after inoculation (Roux *et al.*, 1999). Trees of all ages are affected however, with infection most commonly resulting in rapid wilt and death. The fungus needs wounds to be able to initiate an infection and thus often causes disease after hail wounds, weeding damage and corrective pruning practices. An insect association, although not yet proven, is very likely, as this has been proven for other species in the genus *Ceratocystis*.

It has previously been suggested that *C. albifundus* is native to Southern Africa. This hypothesis was based on the fact that the fungus has been reported only from Africa and that herbarium specimens from a native South African *Protea* sp. contain a fungus resembling *C. albifundus*. Various population diversity studies have supported the hypothesis that *C. albifundus* is native to South Africa (Roux *et al.*, 2001; Roux *et al.*, 2004; Barnes *et al.*, 2005).

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/ceratocystis.pdf>

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=437121>

***Chrysoporthe austroafricana* Gryzenhout & M.J. Wingf. sp. nov. (2004)**

Other scientific names:

Ascomycota: Chryphonectriaceae

Common names: Chrysoporthe canker

Host type: broadleaf

Hosts: Myrtaceae; *Eucalyptus* spp.; *Tibouchina* spp.; *Syzygium cordatum*; *S. guineense*
Chrysoporthe canker is one of the most important diseases of *Eucalyptus* spp. planted in tropical and subtropical regions worldwide. For many years, the disease was reported to be caused by the fungal pathogen *Cryphonectria cubensis* however recent studies have shown that the fungus in South Africa is not conspecific with *C. cubensis* and it was recently described as a new genus and species, *Chrysoporthe austroafricana* (Gryzenhout *et al.*, 2004).

C. austroafricana is known only from Africa, where it causes severe cankers on *Eucalyptus* spp. and on ornamental *Tibouchina* trees, both of which have been introduced into South Africa (Wingfield, Swart and Abear, 1989; Conradie, Swart and Wingfield, 1990; Myburg *et al.*, 2002; Wingfield, 2003; Roux *et al.*, 2005; Nakabonge *et al.*, 2006). The origin of *Chr. austroafricana* is unknown, but it is possible that it expanded its host range from native trees related to *Eucalyptus* and *Tibouchina* spp. to these exotic hosts. Subsequent surveys of some indigenous South African Myrtales led to the discovery of *C. austroafricana* on native *Syzygium cordatum* and *S. guineense* (Heath *et al.*, 2006). Pathogenicity trials showed that *C. austroafricana* is more virulent on exotic *Eucalyptus* spp. than on native *S. cordatum*.

<http://fabinet.up.ac.za/tpcp/pamphlets>

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=500035>

Introduced diseases

***Botryosphaeria dothidea* (Moug.) Ces. & De Not.**

Other scientific names: *Caumadothis dothidea*; *Dothiorella mali*; *Sphaeria dothidea*

Ascomycota: Botryosphaeriaceae

Common names: Botryosphaeria canker

Host type: broadleaf

Hosts: *Eucalyptus* spp.; *E. grandis*; *E. nitens*; *Acacia mearnsii*

Botryosphaeria dothidea causes dieback and canker in *Eucalyptus* spp. This species was first reported from South Africa in 1994 as the cause of dieback of *Acacia mearnsii* (Smith, Kemp and Wingfield, 1994). It tends to attack trees that have been stressed by such factors as drought, late frosts, cold winds, hot winds, insect damage or pruning. The infection often leads to discolouration of the wood, which can extend throughout the tree. Infection by this fungus can lead to the development of cankers on stems and branches. The stems and branches often break at the site of the cankers. There is a significant degree of variability in susceptibility to disease amongst *Eucalyptus* spp. *B. dothidea* was found to occur as a latent symptomless endophyte in healthy leaves of *E. grandis* and *E. nitens* in South Africa (Smith, Wingfield and Pertini, 1996).

The entire taxonomy of the genus *Botryosphaeria* has undergone major changes in the last few years. (See Crous *et al.*, 2006 for more information).

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/botryosphaeria.pdf>

<http://www.forestryimages.org/browse/bimages.cfm?SUB=545&area=13>

***Botryosphaeria eucalypticola* Slippers, Crous & M.J. Wingf. (2004)**

Other scientific names: *Fusicoccum eucalypticola* Slippers, Crous & M.J. Wingf. sp. nov. (anamorph)

Ascomycota: Botryosphaeriaceae

Common names: Botryosphaeria canker

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Botryosphaeria eucalypticola was recently reported to be common in South Africa (Slippers *et al.*, 2004). It infests eucalypt species causing canker and dieback. It is believed that this fungus, as with *B. eucalyptorum*, was introduced into this area with planting stock or seed from Australia which is not surprising given its common occurrence in Australia from where *Eucalyptus* planting material and seed is commonly obtained for plantation development (Slippers *et al.*, 2004).

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=500089>

***Botryosphaeria eucalyptorum* Crous, H. Smith & M.J. Wingf. (2001)**

Other scientific names: *Fusicoccum eucalyptorum* Crous, H. Sm. ter & M.J. Wingf. 1998 (anamorph)

Ascomycota: Botryosphaeriaceae

Common names: Botryosphaeria canker

Host type: broadleaf

Hosts: *Eucalyptus* spp.

Botryosphaeria eucalyptorum was first described from South Africa associated with canker and dieback of eucalypts in planted forests (Smith *et al.*, 2001). It is believed that this fungus was introduced into this area with planting stock or seed from Australia which is not surprising given its common occurrence in Australia from where *Eucalyptus* planting material and seed is commonly obtained for plantation development (Slippers *et al.*, 2004).

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=467783>

Holocryphia eucalypti

Other scientific names:

Ascomycota: Valsaceae

Common names:

Host type: broadleaf

Hosts: *Eucalyptus* spp; *E. grandis*

The fungus *Holocryphia eucalypti* (previously known as *Cryphonectria gyrosa*) is associated with cankers in the bark of *Eucalyptus* spp. In South Africa the fungus is not considered to be of much economic importance, however, in Western Australia it has been described as the cause of tree mortality.

<http://fabinet.up.ac.za/tcp/pamphlets/pdf/botryosphaeria.pdf>

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=229590>

***Gibberella circinata* Nirenberg & O'Donnell (1998)**

Other scientific names: *Fusarium circinatum* Nirenberg & O'Donnell 1998 (anamorph)

Ascomycota: Nectriaceae

Common names: pine pitch canker

Host type: conifer

Hosts: *Pinus* spp.; *P. patula*

Gibberella circinata [anamorph *Fusarium circinatum* (= *F. subglutinans* f.sp. *pini*)] causes serious root and root collar disease in seedlings (Viljoen, Wingfield and Marasas, 1994) and is also the causal agent of pine pitch canker in mature trees. The fungal spores are airborne and the greatest level of dispersal occurs during windy, wet weather. The fungal infections occur via wounds caused by either mechanical damage or insect injury and are higher under conditions of stress.

This fungus was first discovered in South Africa in 1988 causing disease in seedlings and has not yet been found causing pitch canker in mature trees (Viljoen *et al.*, 1995). It was first found in a single nursery and has since rapidly spread to all South African pine nurseries (Wingfield *et al.*, 2002). It has significantly complicated pine propagation and is resulting in substantial losses in plantation establishment. In South Africa, populations of this fungus have been shown to be genetically diverse due to either multiple introductions of genotypes of the fungus or active sexual recombination (Wingfield *et al.*, 1999). One of the vectors (*Pissodes nemorensis*) of pine pitch canker is already established in South Africa (Viljoen, Wingfield and Marasas, 1994).

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=444883>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/pitchcanker.pdf>

***Mycosphaerella pini* Rostr. (1957)**

Other scientific names: *Cytosporina septospora*; *Dothistroma pini*; *Dothistroma septosporum*; *Eruptio pini*; *Mycosphaerella pini*; *Scirrhia pini*; *Septoria septospora*

Ascomycota: Mycosphaerellaceae

Common names: pine needle blight; Dothistroma needle blight; red band needle blight

Host type: conifer

Hosts: *Pinus* spp.

Dothistroma needle blight causes premature loss of needles and defoliation apart from the needles at the tips of shoots. Infection of the same trees in successive years can lead to stunting of growth and eventually death of the trees. The fungus is spread by movement of infected plants or rain splash.

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/dothistroma.pdf>

http://www.eppo.org/QUARANTINE/fungi/Mycosphaerella_dearnessii/SCIRSP_ds.pdf

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=282775>

***Phanerochaete salmonicolor* (Berk. & Broome) Jülich**

Other scientific names: *Botryobasidium salmonicolor* (Berk. & Broome) Venkatar.;

Corticium salmonicolor Berk. & Broome; *Erythricium salmonicolor* (Berk. & Broome)

Burds.; *Pellicularia salmonicolor* (Berk. & Broome) Dastur; *Terana salmonicolor* (Berk. & Broome) Kuntze

Basidiomycota: Phanerochaetaceae

Common names: pink disease

Host type: broadleaf

Hosts: *Acacia mearnsii*; *Dais cotonifolia*; *Ekebergia capensis*; *Eucalyptus* spp.; *Maesa lanceolata*; *Podocarpus henkellii*; *P. latifolius*

Phanerochaete salmonicolor causes a canker and dieback disease, commonly known as pink disease, on many tree species. It is widely distributed in the tropics where it causes branch and stem cankers on a wide variety of woody hosts, primarily hardwoods. Pink disease is potentially important in South Africa because it affects a wide range of native and exotic tree species. The fungus is able to penetrate intact bark usually through lenticels where it may then kill the cambium or, the cambium may be infected directly through wounds. Small branches or stems may be quickly girdled and distal portions are killed. Epicormic branches may be formed below girdling cankers and keep the tree alive. However, these may be infected and killed in future infection cycles, resulting in eventual death of the tree.

During an investigation of diseases of *Podocarpus henkellii* and *P. latifolius* in the Mpumalanga Province of South Africa, typical symptoms of pink disease were observed on the branches of these trees (Roux and Coetzee, 2005). Stem and branch cankers covered with cracked bark and abundant pink mycelial growth were common on the affected trees. In subsequent surveys, the disease was also found on native *Dais cotonifolia* in the same area, and on native *Ekebergia capensis* and *Maesa lanceolata* in the KwaZulu-Natal Midlands. It has also been recorded from exotic *Eucalyptus* sp. and *Acacia mearnsii*.

<http://spfnic.fs.fed.us/exfor/data/pestreports.cfm?pestidval=51&langdisplay=english>
<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=319725>

***Phytophthora cinnamomi* Rands**

Other scientific names:

Oomycota: Pythiaceae

Common names: Phytophthora rot

Host type: broadleaf

Hosts: Myrtaceae; Proteaceae; *Eucalyptus* spp.

Phytophthora cinnamomi causes root and collar rot in a broad range of plants including monocots and dicots such as chestnuts, avocados and *Eucalyptus* spp. Myrtaceae and Proteaceae are particularly susceptible to this fungus. *P. cinnamomi* has been reported from 130 hosts in South Africa, mostly indigenous plants from nurseries, cultivated areas or natural vegetation (Von Broembsen, 1984). The disease causes the roots or collar to rot. If the disease does not kill the trees, then weakened trees frequently lodge. It is usually associated with humid conditions and poorly drained soils. This fungus overwinters as spores or mycelia in the roots or soil and germinates when conditions become favourable.

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=260884>

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/phytophthora.pdf>

Phytophthora nicotianae

Other scientific names:

Oomycota: Pythiaceae

Common names: Phytophthora rot

Host type: broadleaf

Hosts: *Eucalyptus* spp.; *E. fastigata*; *E. elata*; *E. smithii*

Phytophthora nicotianae has been recovered from dead and dying *Eucalyptus* spp. including *E. fastigata*, *E. elata* and *E. smithii* (Maseko *et al.*, 2001). It is believed that this is the causative agent in cooler areas of root and collar rot. It has a very wide host range that includes other tree species and crops.

<http://www.bspp.org.uk/ndr/jan2001/2000-14.asp>

***Rhizina undulata* Fr.**

Other scientific names: *Helvella inflata* Schaeff.; *Rhizina inflata* (Schaeff.) Quél.; *Rhizina inflata* var. *rhizophora* Masee; *Rhizina laevigata* Fr.

Ascomycota: Rhizinaceae

Common names: rhizina root rot

Host type: conifer

Hosts: *Pinus* spp.

Rhizina root rot occurs in commercial pine plantations across South Africa. This fungus colonizes the roots of previously harvested trees and then infects seedlings when they are planted in the same area. Infected seedlings frequently die and the disease is capable of causing death in mature trees. It is spread or exacerbated by insects such as *Hylastes angustatus*.

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/rhizina.pdf>

<http://www.indexfungorum.org/Names/NamesRecord.asp?RecordID=196051>

***Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton**

Other scientific names: *Botryodiplodia pinea*; *Diplodia conigena*; *Diplodia pinastri*; *Diplodia pinea*; *Diplodia sapinea*; *Granulodiplodia pinea*; *Granulodiplodia sapinea*; *Macrophoma pinea*; *Macrophoma sapinea*; *Phoma pinastri*; *Sphaeria pinea*; *Sphaeria sapinea*; *Sphaeropsis ellisii*; *Sphaeropsis pinastri*

Ascomycota: Incertae sedis

Common names:

Host type: conifer

Hosts: *Pinus* spp.

Sphaeropsis sapinea causes a number of different types of diseases and conditions in conifers including dieback of shoots, stem cankers, root diseases and blue stain fungi. It often exists reasonably benignly on healthy mature trees, however if the trees become damaged, stressed or injured, the fungus then causes disease; it is an opportunistic pathogen. It can also infect shoots of young trees that have not been stressed or injured. Hosts of this fungus include *Pinus* spp.

<http://fabinet.up.ac.za/tpcp/pamphlets/pdf/sphaeropsis.pdf>

<http://www.indexfungorum.org/Names/SynSpecies.asp?RecordID=116379>

http://www.crem.fct.unl.pt/botryosphaeria_site/diplodia_pinea_2.htm

Other pests

Indigenous other pests

No information was available for indigenous other pests (e.g. mites, nematodes, mammals, etc.) impacting South Africa's planted forests.

Introduced other pests

No information was available for introduced other pests (e.g. mites, nematodes, mammals, etc.) impacting South Africa's planted forests.

Diebacks and other conditions

No records were available for diebacks and other conditions affecting South Africa's planted forests.

Capacity for forest health protection

Government level

At the national level, the Department of Water Affairs and Forestry (DWAF) is responsible for forest sector implementation and coordination. Forestry research is done at several institutes including the Forestry and Agriculture Biotechnology Institute at the University of Pretoria (FABI) and the Institute for Commercial Forestry Research (ICFR) in Pietermaritzburg. The ICFR does not deal with forest diseases. FABI was established in 1997 on the foundation of the highly successful and internationally acclaimed Tree Protection Co-operative Programme (TPCP). This programme, initiated in 1990 has supported South African Forestry for more than a decade and has become an institution of that industry. The TPCP provides the entire forestry industry of South Africa with support in the field of tree health, and more particularly Forest Pathology and Forest Entomology. The group includes projects not only in South Africa, but also in other parts of Africa, South America, South East Asia, Europe, Australia and North America. The Centre of Excellence in Tree Health Biotechnology (CTHB) was established in 2004 to investigate pest and disease problems of native trees (<http://www.fabinet.up.ac.za/cthb/index>)

Forestry South Africa (FSA) plays a major role in South African forestry.

Monitoring and detection

An important component of the TPCP and CTHB is to monitor disease development in plantations in permanent sampling plots and through countrywide surveys. Data derived from these studies ensure the early discovery of new diseases and also lead to a long-term perspective on the importance of various diseases. They also lead to the evaluation of the impact of diseases and thus their relative importance.

Companies have permanent sampling plots and monitor them. FABI trains them in disease recognition and when they are unsure, do site visits to consult for them. FABI is responsible for research and student training, which has been adapted to provide a service

to the industry and address some of their problems, however, they are responsible for implementation.

Data management

No reports on diseases and insects affecting indigenous forest are available at national level. However data are available on the area affected by insects, diseases and other damaging agents in forest plantations (FAO, n.d.; FAO, 2004). The TPCP has prepared a number of illustrated leaflets on a number of important diseases to be used as diagnostic aids (<http://fabinet.up.ac.za/tpcp/pamphlets/>).

Pest management

A variety of tactics are used to reduce losses caused by insects and disease. The introduction of the black pine aphid, *Cinara cronartii*, was addressed by a classic biological control program, which involved the introduction and establishment of a parasitic wasp, *Pauesia bicolor* (Hymenoptera: Braconidae). This caused a collapse of the aphid population (Kfir, Kirsten and van Rensburg, 1985; Mills, 1990). The microbial insecticide, *Bacillus thuringiensis* has been tested for control of native defoliators of pine plantations (Murphy, 1998).

Private landowners

Pest management in industrial forest plantations are carried out by private landowners with technical support from institutes such as FABI.

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^{OSN} = Other Scientific Name (other names, synonyms, other combinations, etc. that have been used for this species)

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