**Phellinus noxius**

**System:** Terrestrial

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fungi</td>
<td>Eumycota</td>
<td>Hymenomycetidae</td>
<td>Aphyllorhales</td>
<td>Hymenochaetaceae</td>
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</tbody>
</table>

**Common name**: limu mea (Samoan, Samoan Archipelago), brown root rot (English, worldwide)

**Synonym**: *Fomes noxius*, Corner, 1932

**Similar species**: *Phellinus lamaensis*

**Summary**: Root and crown rot caused by *Phellinus noxius* is pantropical in distribution. Also known as brown root rot disease, it is present in native forests but most often noticed in disturbed areas. It has a broad host range and causes major losses in timber and hardwood plantations, agroforests and landscapes. The fungus forms an infection centre and spreads from tree to tree by root contact. It can exist on decaying roots in the soil for more than 10 years.

**Species Description**

A thick, dark brown to black crust forming around infected roots and lower stems is diagnostic for brown root rot disease. Decayed wood is white and reddish-brown to black strands are usually seen near the surface. Conks occasionally grow from the crust, are brown to black on the upper surface and gray-brown on the lower, or spore-forming surface.

The mycelial crust that forms around infected roots and lower stems is diagnostic for *P. noxius*. Mycelium is present between the bark and sapwood. Decayed wood is white, soft and crumbly, laced with reddish strands of hyphae that turn black with age. Fruiting bodies may grow from the crust and are effused, effused-reflexed, or resupinate. They are brown to black and rough on the sterile surface, gray to gray-brown on the fertile surface (Brooks, 2002b).

**Lifecycle Stages**

The main vegetative stage of *P. noxius* is a dikaryotic mycelium. Sexual spores are produced on specialized cells called basidia and are wind dispersed. The basidiospores germinate to form a homokaryotic mycelium which fuses with a compatible homokaryotic mycelium to form the dikaryotic stage (Adaskaveg and Ogawa, 1990).

**Uses**

*P. noxius* and other wood decay fungi play an important role in the forest ecosystem as primary decomposers.
**Habitat Description**
The disease may be found in open places in the primary forest canopy, including areas disturbed by storms, landslides, etc. Most often it is encountered in secondary forests, on land cleared for hardwood plantations, agroforestry, or human habitation. It is less often found in wet, poorly drained soils (Brooks, 2002a).

**Reproduction**
Sexual reproduction by basidiospores, asexual by fragmentation of mycelium and possibly by arthroconidia (Chang, 1996).

**Nutrition**
*P. noxius* is able to metabolize lignin as well as the complex polysaccharides of wood (Adaskaveg and Ogawa, 1990).

**General Impacts**
Brown root rot is reported as a disease of forest trees in Southeast Asia and the Pacific. It is usually cited, however, for its damage to forest and hardwood plantations, fruit orchards, and landscapes. Mahogany, rubber, hoop pine, and cocoa plantings have been seriously affected. Plantations and orchards cannot be replanted for many years due to the longevity of *P. noxius* in the soil and its broad host range (Brooks, 2002a).

**Management Info**
Push-heap-and-burn clearing was used in hoop pine plantations in Queensland (Bolland, 1984) to remove infected stumps and some roots. However, remaining diseased roots are an inoculum source until all fungal mycelium is dead. Planting grasses with deep, fibrous root systems may speed up root decomposition. Flooding fields for more than one month may eliminate the fungus (Chang, 1996). When replanting infested areas, space trees as far apart as practical. Rogue out plants with symptoms of yellowing, wilting, or leaf drop as soon as possible.

**Pathway**
Dispersion is possible through transport of infested soil.


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**ALIEN RANGE**

[1] AMERICAN SAMOA

[1] CAMEROON

[1] CÔTE D'IVOIRE

[1] FRENCH GUIANA

[1] INDIA

[1] KENYA

[1] NIGERIA

[1] PAPUA NEW GUINEA

[1] SRI LANKA

[1] TANZANIA, UNITED REPUBLIC OF

[1] AUSTRALIA

[1] CONGO

[1] FIJI

[1] GHANA

[1] INDONESIA

[1] MALAYSIA

[1] NORTHERN MARIANA ISLANDS

[3] SAMOA

[1] TAIWAN

[1] VANUATU

**BIBLIOGRAPHY**

19 references found for *Phellinus noxius*

**Management Information**


**Summary:** An overview of wood decay pathology of fruit and nut trees, problems in commercial orchards, and a table of fungi collected in California, Oregon, and Washington

**Summary:** The impact of *Phellinus noxius* in hoop pine (*Araucaria cunninghamii*) in Queensland, Australia, plantations is presented, along with the biology of the pathogen, disease symptoms and distribution, and a host list for the region.


**Summary:** Based on a 2-yr survey of Tutuila Is., American Samoa, for *Phellinus noxius*. Includes details on the pathogen, survey, a partial host list, and management recommendations. **Available from:** http://www2.ctahr.hawaii.edu/adap2/Ascc_Landgrant/Dr_Brooks/BrochureNo4.pdf [Accessed July 2006]

**Summary:** This introductory lesson plan for high school or college students offers text and images of the signs and symptoms of brown root rot disease, plus pathogen biology, disease cycle and epidemiology, management and significance worldwide. **Available from:** http://www.apsnet.org/education/LessonsPlantPath/BrownRootRot/default.htm [Accessed July 2006]


**Summary:** Arthroconidia, basidiospores, and mycelium of *Phellinus noxius* in soil tested for survival at different soil water potentials. Infested woody debris appears to be the long-term soil survival mechanism for this organism, which doesn't appear to form chlamydospores.


**Summary:** The geographic distribution of *Phellinus noxius* on Taiwan and some affected hosts.


**Summary:** Root disease of *Delonix regia* and associated tree species in the Marianas Islands caused by *Phellinus noxius*.


**Summary:** Workshop addressing current and future needs for management policy to direct use of native and existing hardwood plantations. Lists insect and disease (*Phellinus noxius*) pests of Samoan forests and timber.


**Summary:** Methodology of initial identification of *Phellinus noxius* in Acacia trees in peninsular Malaysia, description of rot.


**Summary:** *Phellinus noxius* is one of the most destructive pathogens of rubber trees. Signs of the fungus and symptoms of the disease are followed by several methods of detection: visual examination of the roots, stick-trapping, and remote sensing. Preventive and curative methods are mentioned.


**Summary:** A survey of the distribution and impact of *Phellinus noxius* on *Cordia alliodora*, newly introduced in Vanuatu as a high value timber for potential export.


**Summary:** Touches on nursery practices, site preparation for mahogany planting, disease symptoms, establishment and spread of infection, effects of root pruning and status in natural forests.


**Summary:** Symptoms of *Fomes noxius* (*Phellinus noxius*) on cacao in Fiji, including field and experimental observations.

General information


**Summary:** A summary of research on the incidence of brown root rot disease in the native forests of American Samoa, including host range. **Available from:** http://www2.ctahr.hawaii.edu/adap2/Ascc_Landgrant/Dr_Brooks/TechRepNo37.pdf [Accessed July 2006]

**Summary:** Identified by Corner in this 1932 paper as *Fomes noxius* sp. nov., it is compared with two similar species, *F. lamaiensis* and *F. pachyphloeus*. These species were later reclassified by Cunningham in the genus *Phellinus*. Corner describes his field and laboratory observations, including drawings of the disseminations of these species that clearly define them from each other.

Hawksworth, D.L., Kirk, P.M., Sutton B.C., and Pegler, D.N. 1995. Ainsworth & Bisby’s dictionary of the fungi. CAB International, UK. **Summary:** Used for family classification of *Phellinus* spp., this text gives definitions of mycological terms as well as short descriptions of various fungal taxa.
