

**Report on the interception of *Fusarium circinatum* (Pitch Canker) on imported seedlings of Douglas fir (*Pseudotsuga menziesii*)**  
**11 February 2004**

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**1) Introduction - The New Zealand Forest Industry and Pitch Canker Disease**

Pitch canker is caused by a fungus with the scientific name *Fusarium circinatum*. It is believed that pitch canker originated in Mexico and spread north into eastern USA (first report 1946) and then western USA (first report 1986). World-wide the disease has been recorded in Japan (first report 1980s), South Africa (first report 1990), Chile and Spain (both first reported early to mid 1990s).

Pitch canker has been recorded on species of pine (*Pinus*) and on Douglas fir (*Pseudotsuga menziesii*). The causal fungus *Fusarium circinatum* was once considered a subspecies of *Fusarium subglutinans* and can be difficult to distinguish from this or other closely related species. The fungus requires a moist substrate for infection and can be spread by insects or water splash, and where host trees have been wounded by such things as insect attack, strong winds or pruning, can be spread by the wind. None of the known insect vectors are established in New Zealand.

The fungus can survive in soil for 6 months and in wood pieces for over 12 months. Currently there is no effective treatment for the disease in mature trees.

While Douglas fir and many pine species are relatively resistant to the Pitch canker disease, Radiata or Monterey pine (*Pinus radiata*) is considered highly susceptible to the disease with mortality rates in mature trees reaching 80% in some areas of California. The most significant impact of the disease outside of North America has been in South Africa where 100% mortality in seedling nurseries has been reported.

The impact to New Zealand's commercial forestry industry could be considerable. The predominant plantation species in New Zealand is Radiata or Monterey pine (*Pinus radiata*). Should the disease become established in New Zealand, aspects of the forestry industry would be significantly impacted resulting in a degradation of the industry as a whole. In 2002 forestry exports were worth \$3.7 billion or 12.5% of New Zealand's total merchandise exports. Forestry has the potential to become one of New Zealand's largest export earners but is vulnerable to pests and diseases.

## 2) New Zealand's Current Import Requirements for Pitch Canker Host Material

Based on the current understanding of the epidemiology of the Pitch Canker disease caused by *Fusarium circinatum*, New Zealand considers living host material to include all species of *Pinus*, Douglas fir (*Pseudotsuga menziesii*), and soil or objects contaminated by soil. The following is a summary of New Zealand's current import requirements for the three main classes of *Fusarium circinatum* (Pitch Canker) host material:

**Nursery Stock:** Douglas fir (*Pseudotsuga menziesii*) scion material may be imported into quarantine from areas considered by the Ministry of Agriculture and Forestry to be free of *Fusarium circinatum* or Pitch Canker disease. These requirements are currently suspended. The import into New Zealand of *Pinus* spp. nursery stock is prohibited.

**Seed (growing):** Import health standards for seed for sowing from Douglas fir (*Pseudotsuga menziesii*) and *Pinus* species where issued on 10 July 2002. Under these standards seed may be imported from any country, but requires stringent high security quarantine on arrival in New Zealand unless imported from countries considered by the Ministry of Agriculture and Forestry to be free of *Fusarium circinatum* or Pitch Canker disease.

**Seed (consumption):** No restrictions related to *Fusarium circinatum* or Pitch Canker disease.

**Wood:** Sawn timber of *Pinus* species originating from areas considered by the Ministry of Agriculture and Forestry **not** to be free of *Fusarium circinatum* or Pitch Canker disease must be heat treated to 70°C (core temperature) for 4 hours. There are currently no restrictions on wood from Douglas fir (*Pseudotsuga menziesii*) or from *Pinus* species in forms other than sawn timber (e.g. wood packaging).

**Woodware:** Pines cones must be heat-treated (70°C (core temperature) for 4 hours) or contain no seed and have been completely covered in lacquer or a thick paint or varnish layer.

**Foliage:** Foliage from conifer trees must be heat-treated to 70°C (core temperature) for 4 hours.

**Soil:** Prohibited unless heat sterilised.

## 3) Interception of *Fusarium circinatum* on Imported Scion in Quarantine

During 2003 a New Zealand based company imported 3 consignments of Douglas fir (*Pseudotsuga menziesii*) scion from counties in California (Sierra-Nevada region) and Oregon. The scion were grafted onto New Zealand grown root stock and held in a Ministry of Agriculture and Forestry supervised quarantine facility. Samples of tissue showing disease symptoms were regularly taken from the scion and tested for the presence of *Fusarium circinatum*, and causal agent of Pitch Canker disease in pines. On the 4<sup>th</sup> November 2003 a preliminary diagnosis of *Fusarium circinatum* was

made by Forest Research Ltd, a MAF approved diagnostic service provider, from one of the samples taken from scion imported from Amador County in California.

The New Zealand Ministry of Agriculture and Forestry responded at that time by suspending all permits to import Douglas fir cuttings or similar material from the USA, and ordering the destruction of the infested consignment. The initial diagnosis of *Fusarium circinatum* was recently confirmed by Professor Tom Gordon, UCLA Davis, California, by inoculating susceptible *Pinus* trees and comparing lesion development with those of known *Fusarium circinatum* isolates.

#### 4) New Zealand Response to the Confirmed Identification

Conformation that the isolated fungus was *Fusarium circinatum* raises a number of important questions about the epidemiology of Pitch Canker:

- a) How widespread is the causal agent of Pitch canker, *Fusarium circinatum*, in the USA or surrounding other areas known to be infested with the disease?
- b) As Douglas fir seems to be acting as a symptomless host, how can countries known to harbour the Pitch Canker disease confirm that areas growing Douglas fir are free of *Fusarium circinatum*?
- c) What other plant species are acting as symptomless hosts of *Fusarium circinatum*?

As answers to these questions can not be easily answered at this time, the New Zealand Ministry of Agriculture and Forestry now requires the following further measures to be taken on host material being imported into New Zealand:

- 1) Until further notice New Zealand will no longer consider any areas of the USA to be free of *Fusarium circinatum*. This therefore will require all *Pinus* or *Pseudotsuga menziesii* seed to be imported into high security quarantine facilities in New Zealand.
- 2) Nursery stock of *Pinus* species or *Pseudotsuga menziesii* will be prohibited entry into New Zealand.
- 3) Sawn timber or poles of *Pinus* species or *Pseudotsuga menziesii* originating from areas considered by the Ministry of Agriculture and Forestry **not** to be free of *Fusarium circinatum* or Pitch Canker disease must either have been:
  - a) Heat treated to 70<sup>0</sup>C (core temperature) for 4 continuous hours; or
  - b) Kiln dried to less than 20% moisture content at temperatures exceeding 56<sup>0</sup>C.

These new measures will become effective from 11 February 2004.

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