MAR08 Pathogen of the month – Mar 2008

Giberella circinata Nirenberg & O'Donnell emend. Britz, Coutinho, Wingfield & Marasas

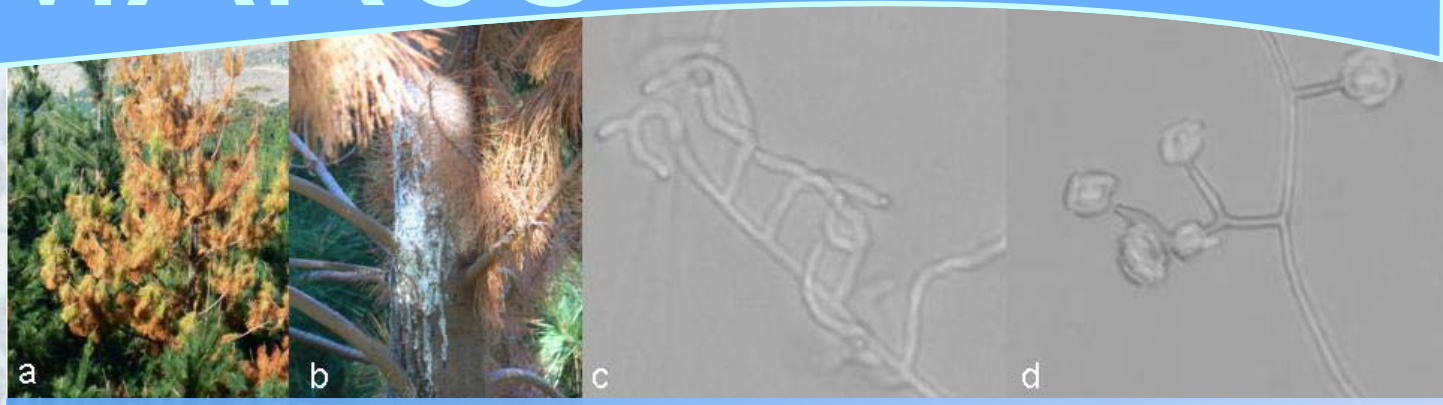

Fig 1: Canopy of infected pine plantation (a); White gum exudate on bole of infected tree (b); Coiled sterile hyphae characteristic of *F. circinatum* (c); Aggregations of microconidia forming on polyphialides and on monophialides (d).
Photo credits: Aaron Maxwell, AQIS Western Australia.

Disease: Pine Pitch Canker
Classification: K: Eumycota, D: Ascomycota, C: Sordariomycetes, O: Hypocreales, F: Nectriaceae.

Pine Pitch Canker is a serious biosecurity threat to Australia's softwood timber industry. It is caused by *Giberella circinata* (anamorph = *Fusarium circinatum*). Pine Pitch Canker causes disease on *Pinus* species and other coniferous genera. It has led to severe disease of southern pines in south eastern parts of North America and of radiata pine in California.

The Pathogen: The Pine Pitch Canker pathogen was first documented by Hepting and Roth (1946) in North Carolina. In 1998 Nirenberg and O'Donnell named the pathogen *F. circinatum*, referring to the anamorph or asexual stage and *Gibberella circinata* as the sexual stage and this name was validated by Britz *et al*. (2002) four years later.

Morphologically *Fusarium circinatum* is similar to species in the *Gibberella fujikuroi* complex. Sporodochia and macroconidia are sparse and may be rare on CLA. Macroconidia are slender, thin-walled, and 3-septate. Microconidia are produced singly or in aggregations. Conidiogenous cells are both polyphialides and monophialides. Chlamydospores are absent. Coiled sterile hyphae on SNA are diagnostic for *F. circinatum.*

Distribution: Pine Pitch Canker originated in Mexico and has spread to south eastern parts of North America and in California, Chile, Japan, Mexico, South Africa and Spain.

Host Range: Many species in the genus *Pinus* and one species of *Pseudotsuga* have been recorded as hosts of Pine Pitch Canker

Impact: Its greatest impact has been associated with *P. radiata* which is the species that dominates the Australian plantation estate. It has been predicted that up to 85% of *P. radiata* trees in parts of California will die as a result of pine pitch canker (Storer *et al.* 1999). The symptoms of the disease include pre and post emergent damping off of seedlings, stem girdling and death of saplings, dieback of shoots and branches, crown decline, resin exudation from branches and the bole of the tree. Symptoms under the bark of infected trees include brown lesions and wood with a golden honey-coloured surface due to resin accumulation.

Detection and control: Diagnosis includes morphology and specific PCR primers based on the IGS region and mating type tests. Control options are limited and good silvicultural practices are the best option. Nursery hygiene is imperative and dying seedlings must be removed and burnt. Fumigation with chloropicrin may control nursery outbreaks.

Further Reading: Gordon (2006) *Phytopathology* 96:657-659; Schweigkofler, *et al. (2004) Applied and Environmental Microbiology* 70: 3512–3520; Gadgil *et al.* (2003) Management Plan Response to an Incursion of Pine Pitch Canker in Australia or New Zealand.
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