

Natural durability of white cypress

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There is no doubt that the heartwood of the native Australian conifer, white cypress (*Callitris glaucophylla* Thompson et Johnson, syn. *Callitris columellaris* F Muell) is highly resistant to degradation by insects and wood decaying fungal organisms. The following are cited in support of this statement:

Recognition in Standards and other Authorities

White cypress is rated as **Durability Class 1** (the highest level) in the *Queensland Timber Utilisation and Marketing Act (1987)*. Timber of this class is suitable for use in the ground without requiring additional preservative treatment to protect the heartwood. In Australian Standard *AS1604.1-2000 Specification for preservative treatment Pt 1: Sawn and round timber*, white cypress is rated as **Class 2** (expected life in the ground of 15 years or more). Keating and Bolza, CSIRO (*Characteristics, Properties and Uses of Timber*, Volume 1, 1982) rate white cypress as **Class 1**, with a note that it is very resistant to termites and *Anobium* borers. Bootle (*Wood in Australia*, 1983) rates white cypress heartwood as **durable**, particularly resistant to termites. Smith et al (*Building Timbers – Properties and recommendations for their use in Queensland*, 1991) rate white cypress as **Durability Class 1**, and expect it to **resist both decay and termite attack for at least 25 years and up to 50 years** or more. They recommend it for use in ground contact and under other severe hazards, for weather-exposed framing and boards, cladding, fascias, bargeboards, external decking, in addition to the usual range of weather-protected situations.

Examples of findings of scientific research

Rudman, P. (1963) The causes of natural durability in timber Pt XIII: Factors influencing the decay resistance of cypress pine (*Callitris columellaris* F. Muell.) *Holzforschung* 17 (6) 183-188. Decay resistance of cypress heartwood was assessed by laboratory soil jar bioassays against four wood-rotting fungi. As has been observed with most durable timber species, wood within about 30mm of the pith of some trees was less durable than mature heartwood. Apart from this small proportion, cypress heartwood was **decay resistant**.

McEvoy, C. and G.C. Johnson (1989) *A laboratory evaluation of the decay resistance of cypress pine*, CSIRO Forestry & Forest Products Divisional Report, 11pp. Cypress heartwood was not decayed by any of the four wood-rotting fungi to which it was exposed in a laboratory soil jar test. Western red cedar heartwood was resistant to three of these fungi, but decayed by the fourth. The authors conclude that cypress heartwood is **very durable**.

Rudman, P. and F.J. Gay (1964) The causes of natural durability in timber Pt XIV: Intra-specific variations in termite resistance of cypress pine (*Callitris columellaris* F. Muell.) *Holzforschung* 18 (4) 114-116. Cypress heartwood from both slow-grown and fast-grown trees was consistently **highly resistant to attack** by the subterranean termite *Coptotermes lacteus* (Frogg.). The results indicated that both toxicant and repellent compounds were present in the heartwood.

French, J.R.J., P.J. Robinson, Y. Yazaki and W.E. Hillis (1979) Bioassays of extracts from white cypress pine (*Callitris columellaris* F. Muell.) against subterranean termites *Holzforschung* 33 (5) 144-148. Naturally-occurring compounds were solvent-extracted from cypress heartwood, impregnated into wood and filter papers, and exposed to termites in a laboratory test. The **heartwood extractives were toxic** to all three

subterranean termite species tested – *Coptotermes acinaciformis* (Frogg.), *Nasutitermes exitiosis* (Hill) and *Mastotermes darwiniensis* (Frogg.).

Evans, P.D., J.W. Creffield, J.S.G. Conroy and S.C. Barry (1997) Natural durability and physical properties of particleboard composed of white cypress pine and radiata pine *Forest Products Journal* 47 (6) 87-94. Resistance of particleboard to damage by termites and fungi during laboratory bioassays was increased by substitution of cypress heartwood for radiata pine. Particleboard made from cypress heartwood alone was as **resistant to termites and fungi** as insecticide- or fungicide-treated radiata pine particleboard.

Kennedy, M.J. (1999) *Milestone Report 2, Forest and Wood Products R&D Corporation Project PN98.1400: Cypress sapwood preservation from natural residue extractives*. Ten blocks of each of various timbers were exposed to the subterranean termite species *Coptotermes acinaciformis* (Frogg.) by placing in a plastic box upturned on feeder strips beside a nest in a forest in North Queensland. The termites immediately invaded the box and consumed the susceptible material. After three months, blocks were rated for termite resistance on a scale from 0 (total destruction) to 10 (minimal surface browsing). Block ratings were:

Timber	Block ratings	Average	Classification
Radiata pine sapwood	0,0,0,0,0,0,0,0,0,0	0	Not resistant
Radiata pine heartwood	6,0,0,0,10,0,0,0,0,0	1.6	Not resistant
LOSP-treated radiata pine sapwood (H3 TBTN/Permethrin)	10,10,10,10,10,10,10,10,10,10	10	Resistant
Cypress sapwood	8,0,7,9,10,10,7,0,8,7	6.6	Not resistant
Cypress heartwood	10,10,10,10,10,10,10,10,10,10	10	Resistant

The outcome of this experiment confirmed in an extremely severe field situation what had previously been demonstrated in laboratory bioassay work. Cypress heartwood is highly resistant to subterranean termite damage, performing as well as timber treated with any currently approved preservative. Although termites may engage in ‘exploratory browsing’ on both preservative-treated and naturally durable timber such as cypress heartwood, they soon lose interest and cease feeding, so they do not cause significant damage to this material. Cypress heartwood may be used with confidence in even the most hazardous building situations.