

THE INTERNATIONAL RESEARCH GROUP ON WOOD PROTECTION

Section 1

Biology

Detection of Anti-Fungal Sapwood Extractives in Non-Durable Scots Pine (*Pinus sylvestris*), Rubberwood (*Hevea brasiliensis*) and Jelutong (*Dyera costulata*)

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ABSTRACT

A general laboratory bioassay method of [Woodward and Pearce \(1985\)](#) was adopted to detect anti-fungal activity of sapwood or heartwood extractives of 5 Malaysian hardwoods [dark red meranti heartwood (*Shorea* spp.), red balau heartwood (*Shorea* spp.), kulim heartwood (*Scorodocarpus borneensis*), jelutong sapwood (*Dyera costulata*) and rubberwood sapwood (*Hevea brasiliensis*), including the temperate *Pinus sylvestris* (Scots pine sapwood). The heartwoods of these species and Scots pine sapwood are known to be highly resistant to decay by soft-rotting Ascomycetes and anamorphic fungi (about 1-7% wood mass loss), while the sapwoods of rubberwood and jelutong had much reduced soft rot resistance (respectively 35, 32% wood mass loss) but obviously prone to sapstain and mold attack, including that of Scots pine. Crude methanol extracts of woodmeal samples of each wood species were loaded on to thin-layer chromatography plates at between 0.003 and 0.1 g fresh mass equivalent of woodmeal per spot so as to optimize resolution of separated compounds, and developed with chloroform:methanol solvent (ratio 19:1). The dried plates were sprayed with fresh fungal spores of *Cladosporium cucumerinum* and incubated at >90% RH for 5 days in the dark. Presence of anti-fungal compounds was revealed by white regions along the solvent transect for each extract of each species where inhibited spore germination and mycelial growth of *C. cucumerinum* occurred. Comparisons of anti-fungal activity of extracts between species and between sapwood and heartwood were made. Results revealed that several zones of inhibitory activity, indicated by their R_f-values, were clearly visible on chromatographic separations of methanol extracts of these 5 wood species. The inhibitory zones for 2 heartwood extracts (except kulim) did not move from the origin which was also resistant to infection. However inhibition zones were also detected for the sapwoods of rubberwood, jelutong and Scots pine against *C. cucumerinum* despite the known sapstain and decay susceptibility of these wood substrates. The presence of hitherto unidentified anti-fungal compounds in the sapwoods of these species may elicit limited potency or narrow spectrum protection from fungal infection and onset of stain or decay.

Keywords: Antifungal bioassay, wood extractives, wood durability, soft rot, sapstain