

- Sapstain is caused by the presence of fungi in the timber
- Many factors influence the growth of fungi in wood and the various fungi that cause stain in timber are easily spread in the environment
- Recommended environmental controls include improved hygiene around the log storage yard and the sawmill, reducing infection potential in and around the drying yard and shed and allowing for adequate ventilation between stacks of timber
- There are other potential control methods including antisapstain preservatives and biological controls that may be useful in reducing or preventing sapstain

Sapstain, also called bluestain, is a fungal stain in timber caused by the presence of pigmented fungal hyphae in the wood. Sapstain is commonly associated with softwood timbers, particularly pine, but also occurs in hardwoods. Some timbers, like ash eucalypts, are light in colour. When the dark strands of fungal hyphae grow in the wood they appear as dark coloured 'stains' on the light-coloured timber.

Factors that influence the growth of fungi in wood

Many factors influence the growth of fungi in wood, including:

- availability of water
- availability of oxygen
- temperature
- pH.

The various fungi that cause stain in timber are easily spread in the environment by:

- spores carried by air, water and insects
- spores in soil and other infected logs.

From year to year, climatic conditions will therefore have a significant impact on the development of sapstain.

Research has shown that the risk of fungal stain cannot be completely eliminated. However, steps can be taken to help reduce the risk of sapstain development and its spread in logs and timber.

Recommended environmental controls

Log stacks: Logs are often stacked together at the forest landing, forest log dump and sawmill log storage yard. Transport logs from the forest to the sawmill as soon as practicable to prevent infection of the logs in the forest. Do not place logs with heart rot in the log storage yard at the mill. Reduce infection



An example of good environmental controls against sapstain with no mud, timber above a layer of gravel, timber racked out and not block stacked and adequate ventilation between timber stacks.

potential around the log storage facilities by cutting grass and weeds regularly, and by not allowing mud to build up in the log yard and contact the logs. Use of clean log bearers or skids and a thick layer of crushed rock may help to minimise log contact with mud in the yard. Use of water sprays that constantly spray the logs and the log ends may reduce infection potential in the log yard by preventing oxygen uptake by the fungi. However, incorrect water storage with too little water and uneven coverage of the logs may exacerbate the problem instead.

Sawn timber: Various factors within the sawmill environment may exacerbate the sapstain problem. Sawmill residues, tall grass and weeds, and mud provide sources of infection for sapstain fungi. Timber stacked in confined situations, particularly under-cover and without adequate ventilation, promotes fungal stain development. Reduce infection potential in and around the drying yard and shed by removing grass and weeds and preventing the buildup of mud. Adjust spacing to allow for adequate ventilation between stacks of timber. Use clean, dry racking sticks when stacking timber. Do not block-stack timber.

Sapstain and its prevention

Preservative control methods

Preservative control may be applied by dipping the sawn timber in a dip tank immediately after milling. Preservative control may also be sprayed onto individual pieces of timber using an automated conveyer belt system with an in-line spray-box. Most experience in Australia has been with the dip tank system of application of surface preservatives such as antisapstains. There are several companies in Australia that can supply antisapstain preservatives. A full listing of antisapstain preservatives registered for use in Australia and registered suppliers is available from the Australian Pesticides and Veterinary Medicines Authority website.

The application of antisapstain preservatives to timber is unlikely to have any lasting residual effect. The preservatives are only applied to the surface of the timber and many components of the preservatives biodegrade in a matter of months. When working with treated timber, specific precautions and instructions, which are available from the timber preservative companies, should be followed. The usual safety precautions when cutting, sanding and planing timber should still be used, such as a dust mask and appropriate dust extraction.

The use of bleach and other sterilising agents around the sawmill may have a localised, temporary effect but are unlikely to provide long-lasting or effective control of sapstain fungi. The fungal spores may be resistant to the sterilising agent. Because the sterilising agent is being sprayed on and around the logs and timber, it is unlikely to penetrate the cracks and outer layers of wood necessary to kill the sapstain fungi or slow its spread in already infected timber.



Mill hygiene is critical to preventing the spread of sapstain fungi.

Biological control

The potential for sapstain fungi to grow and discolour timber may be reduced through the use of biological controls. Biological control of sapstain uses another organism, often a fungus, to either kill or reduce the sapstain fungus; to exclude the sapstain fungus from growing; or to displace the sapstain fungi with another fungus that is unable to discolour the timber.

Biological control of sapstain has been tested in the field and in the laboratory internationally. HortResearch in New Zealand (now called the New Zealand Institute for Plant and Food Research) had a research program for biological control of sapstain in the 1990s. There has been variable success with using biological control agents against sapstain fungi and many aspects are not completely understood. There is considerable potential for research in this area of sapstain control.



Removing tall grass and weeds from areas where timber is stored may help to reduce the spread of sapstain.

Further information is available in the brochure 'Sapstain in eucalypt timbers' and other sources:

APVMA website 2011. PUBCRIS Registration database. Accessed 17 Aug. 2011. <<http://services.apvma.gov.au/PubcrisWebClient/welcome.do>>

International Research Group on Wood Protection website 2011. Accessed 22 Aug. 2011. <<http://www.irg-wp.org/>>

Forintek website 2011. Accessed on 24 Aug. 2011. <http://www.forintek.ca/public/pdf/Public_Information/fact%20sheets/dicolor_eng.1oct02.pdf>

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