

## TALKING TIMBER



### BLUE STAIN - A PROBLEM OR NOT?

*Andrew True asks wood scientist colleagues whether blue stain has any structural implications*



The summer of 2018 has been excellent for weather. However, the long hot and dry days without rainfall has put an immense stress on western Europe's coniferous forests. The trees cannot get sufficient moisture and that, in turn, weakens the tree, leading to a greater potential to attack from insects, especially from the bark beetle.

Blue stain, or sapstain, in pine sapwood is well known, but the severe summer stress and the action of bark beetles have put spruce trees more at risk than normal. And spruce is the major source of commercial softwood.

Sawmills will do their best to minimise blue stain, by speeding up the process from the forest to drying kiln, but it cannot be avoided 100%, especially when the number of logs is so great.

Blue stain creates a market issue because customers don't like it. It is a characteristic perceived as a defect. And whilst this might be a significant issue for appearance uses, should it be so for structural and other non-appearance end uses? Does it lead to rot and other weakening issues? Does blue stain structurally weaken the product in any way?

I put these questions to two colleagues from the Wood Technology Society.

"Beetles such as *Ips typographus* (the European spruce bark beetle) can carry fungal spores and deposit them in and under the bark while feeding on the phloem (the innermost layer of the bark)," said Bangor University's Morwenna Spear, one of the UK's top wood scientists. "The spores then lie dormant in the tree until the wood starts to dry out after felling.

"Sapstains typically colonise the wood whilst its moisture content is falling from saturated (freshly felled) to nearer 100-140% moisture content. So, speed of handling in the forest and through the sawmills is crucial. Keeping logs wet (ponding/spraying) is important. There are also chemical treatments to help prevent sapstain before drying.

"The good news is that sapstain fungi live on nutrients in the sap and not on nutrients within the cell wall material, so there is negligible strength loss," continued Dr Spear. "This is why stain is almost exclusively in sapwood. Under a microscope it can be seen that the stain fungi preferentially colonise the higher sugar content sap contained within the ray cells.

"Use of the wood for structural purposes is not compromised but the colour may affect joinery markets or other uses where appearance matters. But, whilst blue stain itself is benign, if the sapwood timber remains undried for a long period, beware of

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the onset of secondary colonising fungi such as white rots and brown rots (as pictured), which will have a much greater impact on strength and saleability."

"Grading standards have criteria for excluding soft rot and dote, which are potentially strength reducing, but generally do not limit stain because it is widely accepted to have no meaningful effect on mechanical properties," said Edinburgh Napier University's Dan Ridley-Ellis, a leader in the field of grading and utilisation of wood.

"For example, both EN14081-1 table 1 and BS4978 clause 5 say stain is not a structural defect and is acceptable without limitation," continued Dr Ridley-Ellis.

"Whilst it may be regarded as unsightly for carcassing, it can be used as a decorative feature with the right finishes and marketing."

Thus, wood science and technology demonstrate that blue stain alone presents no issue to the structure or integrity of spruce and that our customers need to be made aware that it can still safely be used for structural and other non-appearance uses, despite what it looks like.

But, then again, beauty, as they say, is in the eye of the beholder ... and the marketing department! ■

*Below left:*  
A board with a severe case of bluestain

*Below right:*  
A Canadian bluestain 'pebble'



**The Wood Technology Society**

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