

Wood features, Part 1

Medullary rays are cellular structures found in wood. The ones we know, are found in various hardwoods often with the common name oak. However they occur in softwoods where they tend to be very thin and invisible even at 10 time magnification.

These medullary rays are essential for the radial conduction of the water, minerals and other organic substances. They transport the substances from centre to periphery. These rays are also known as vascular rays or pith rays.



Transverse section of white oak, [*Quercus alba*](#). A ray appears diagonally, from top left to bottom middle.

Species with prominent medullary rays are highly sought after by wood workers. Most species of the *Quercus* genus have medullary rays. *Quercus* common name is Oak.

In Australia, species such as Red Forest Oak (*Allocasuarina torulosa*), Bull Oak (*A. luehmannii*), River Sheoak (*Casuarina cunninghamiana*), Silky Oak (*Grevillea robusta*), Beef Wood (often called Red Silky Oak) (*Stenocarpus salignus*) and *Banksia* are highly sought after for their prominent medullary rays.

Yes, the 3 eucalypt species making Tassie Oak have medullary rays but they are too narrow to see with the naked eye.

They appear as radial planar structures, perpendicular to the growth rings, which are visible to the naked eye. In a transverse section they appear as radiating lines from the centre of the log. In an axial/cross section they may appear as a variety of transverse markings, depending on how close the section is to the plane of the ray. In a tangential section they may be hard to see at all.

They are formed by the activity of fascicular cambium. During the process of the division of cambium, the cambium cuts out cells on both the outer and inner side. Most of these cells transform into xylem and phloem. But certain cells don't transform into xylem and phloem and remain as such. These cells cut out by the cambium towards the periphery are phloem parenchyma while those towards the pith are xylem parenchyma. Both of these cells together work as secondary medullary rays.

Medullary rays are best seen in the timber cross section (very useful for end turning) and in quarter sawn timber, where the wood is cut into boards with the growth rings roughly perpendicular to the face of the board, the medullary rays often produce beautiful figure such as silver grain, medullary spots, pith flecks, etc.

Most sawmills, in particular the larger ones cut timber by the backsawn method. This is a faster method of converting sawlogs to timber and in Euclyptus on average you obtain a 2% greater timber volume from each sawlog. However, with the backsawn method some of the timber will be perpendicular to the growth rings.