

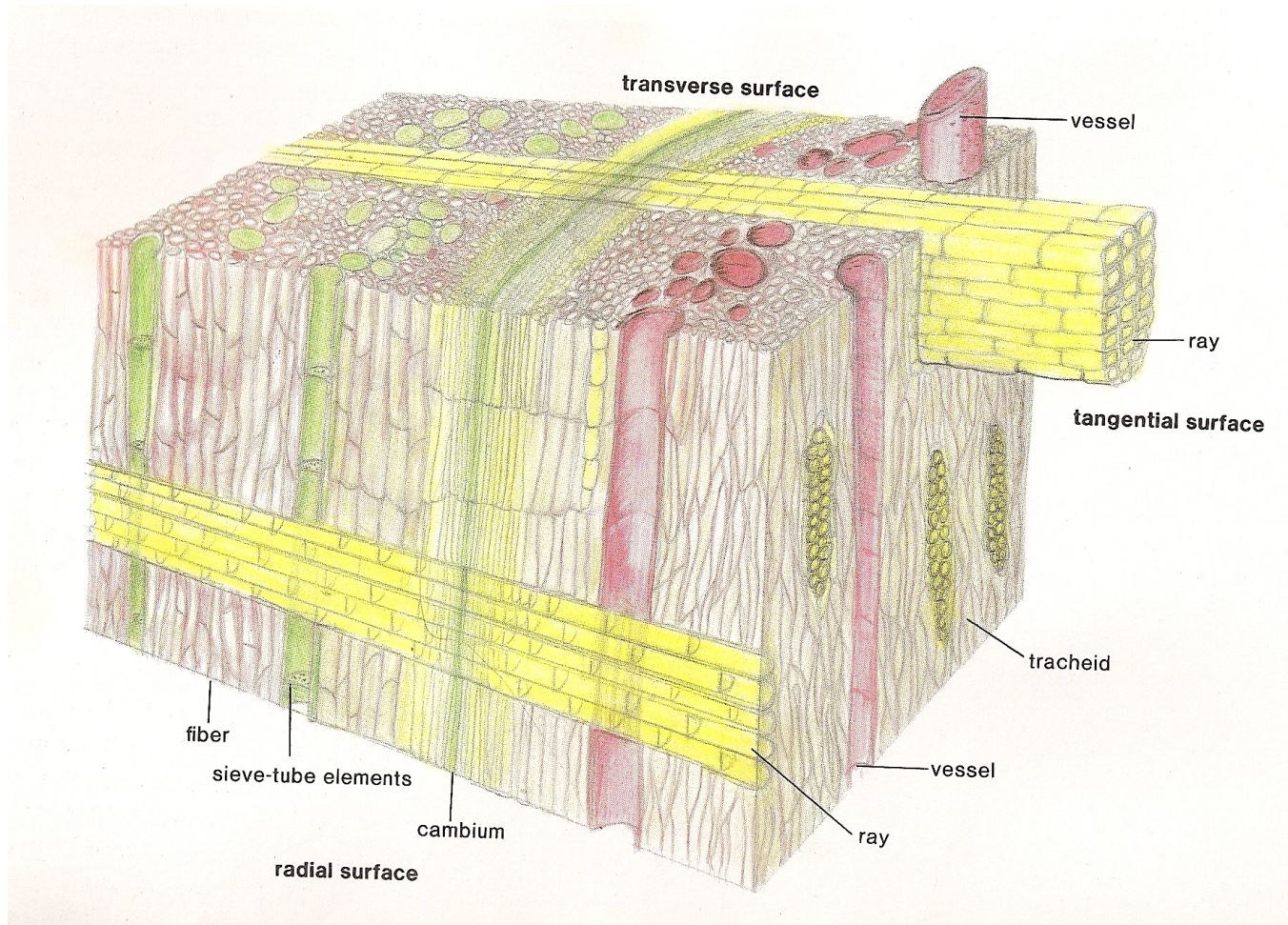
Sampling

- Take three slices with a razor blade.
- Transversal section – across the trunk.
- Radial section – follows the rays.
- Tangential section – 90 degree angle to the rays, under the bark.
- Sections have to be thin enough to see under a light transmitting microscope.



Axial and radial systems

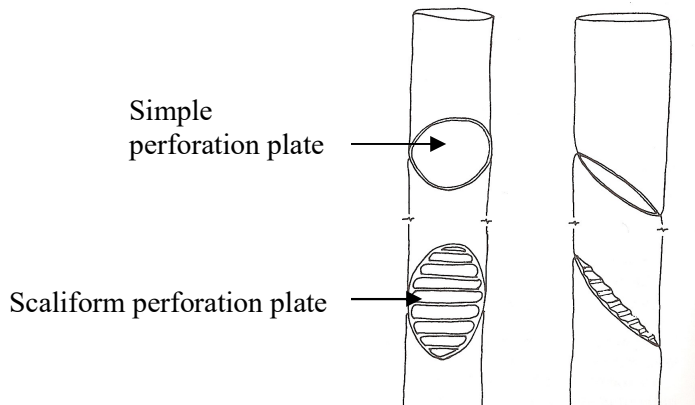
- Sections used to view diagnostic characteristics.
- Same features from different perspectives.
- Key used to identify.



After Stern, K. 1994. *Introductory Plant Biology*. Sixth Edition. USA : Brown Communications Inc. Fig. 6.8

Dicotyledons

- Dicotyledons- 'hardwoods'.
- Structurally diverse.
- Vessels bring nutrients up and down the tree.
- End walls of vessel elements have to allow water to pass through and so are open – called perforation plates.
- These plates can be simple (a circular hole) or scaliform (with parallel bars).



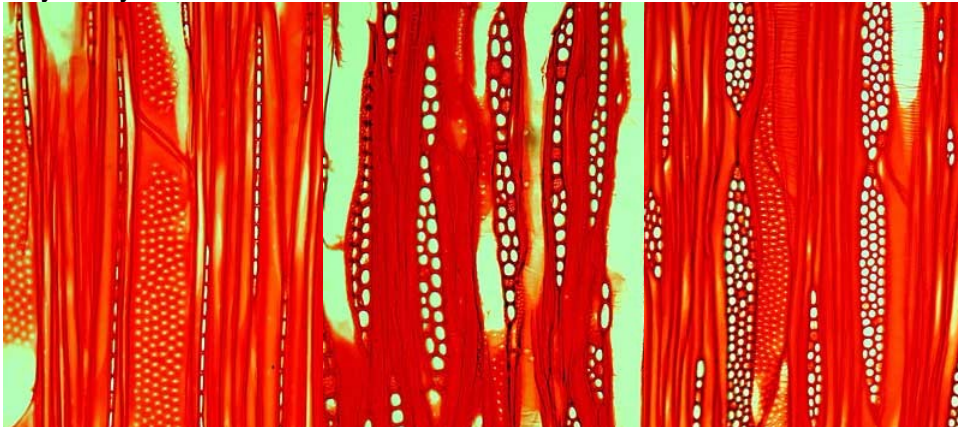
Vessel arrangement



Diffuse - *Acer pseudoplatanus*
Ring porous – *Fraxinus excelsior*
Radial – *Prunus avium*

Rays - Dicotyledons

- Rays may be uni, tri or biseriate, or multiseriate.

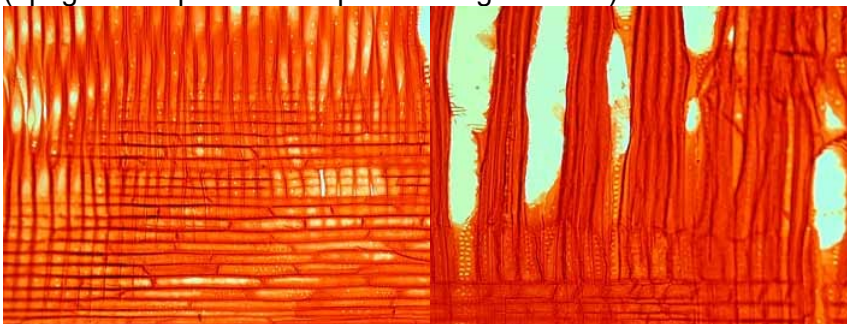


Uniseriate – *Populus tremula*

Biseriate – *Pyrus malus*

Multiseriate - *Acer pseudoplatanus*

- Rays may be homogenous (rectangular shaped cells) or heterogenous (upright cells placed on top of rectangular cells).

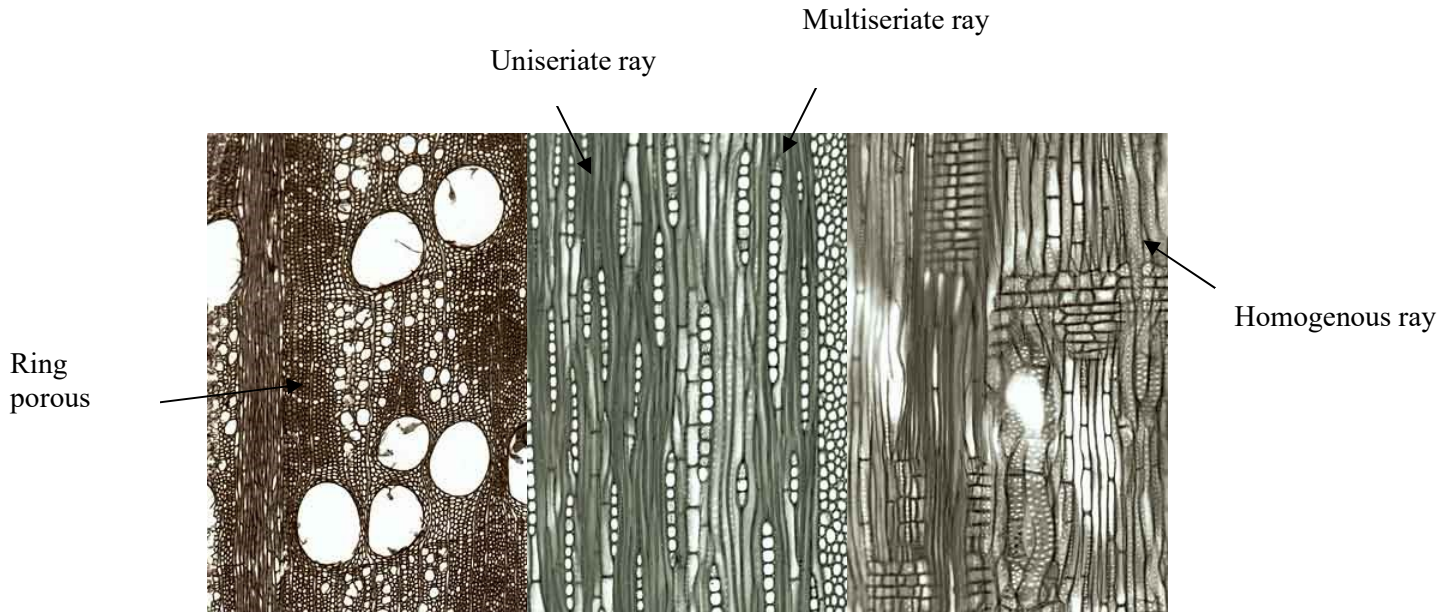


Homogenous - *Acer pseudoplatanus*

Heterogenous - *Viburnum opulus*

Pedunculate oak– *Quercus robur*

- Ring porous.
- Tyloses in heartwood.
- Flame like distribution of latewood vessels and parenchyma.
- Broad rays visible to the naked eye.
- Uniseriate and multiseriate rays.
- Multiseriate rays up to 1mm wide and 5cm high
- Simple perforation plates.
- Homogenous rays.



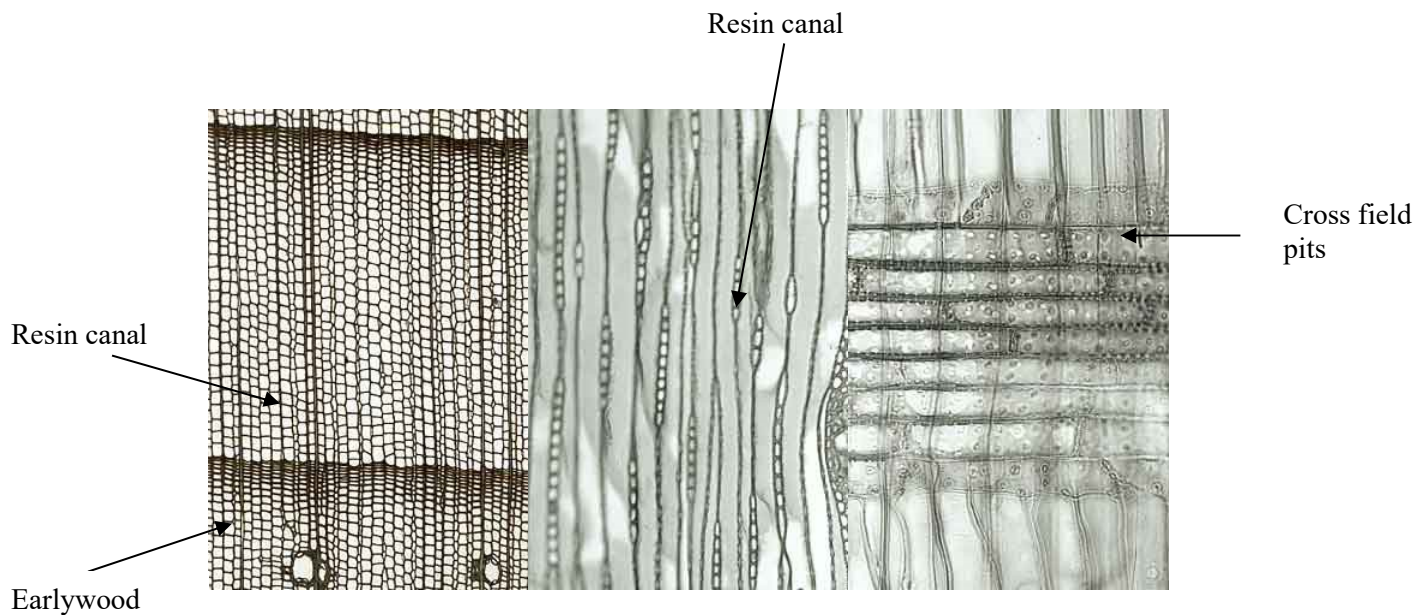
Quercus robur – Transverse, tangential and radial section.

Gymnosperms

- Gymnosperms – ‘softwood’.
- Native Irish softwoods include yew (*Taxus baccata*) and Scots pine (*Pinus sylvestris*). Imported softwoods often include spruce (*Picea abies*).
- Axial system made up entirely of cells called tracheids – long tapering cells that have bordered pits along their length which allow water to pass between them.
- Pits have diagnostic significance – vary in size and shape.
- Rays are all one cell thick but vary in height.
- Resin ducts are present in pine and spruce – linear channels that carry resin up and down the tree.

Picea abies – Spruce

- Gradual transition from early wood to latewood.
- Resin canals bordered by thick walled epithelial cells.
- Average ray height 10-15 cells.
- Resin canals with thick walled epithelial cells
- Longitudinal tracheids with uniseriate, rarely biseriate pits.
- Piceoid pits in cross fields.



Picea abies– Transverse, tangential and radial section

Further reading:

Hather, J., 2000. *The Identification of the North European Woods A guide for archaeologists and conservators*. London: Archetype Publications Ltd.

Schweingruber, F.H., 1978. *Microscopic wood anatomy*. Birmensdorf: Swiss Federal Institute for Forest, Snow and Landscape Research.

Website:

<http://www.woodanatomy.ch/>