

DENDROLOGY WOOD ANATOMY LAB IV

I. The first part of this exercise will acquaint you with fundamental anatomical features of gymnosperm wood. The numbers in (parentheses) following each feature below refers to the slide number in the box labeled Angiosperm Wood Demos. The numbers in [brackets] refer to the specimen numbers in the wood identification collection. You will find the on-line help in the Angiosperm Wood component of the MUDES of use during this exercise.

PLEASE RETURN ALL SLIDES TO THEIR APPROPRIATE SLOTS AND BOXES WHEN YOU ARE DONE VIEWING THEM.

Specific objectives for you to strive to master include: a) What section (transverse X, radial longitudinal R, or tangential longitudinal T) is best to use in assessing a particular character state? Hints are provided via abbreviations in the outline below. b) What are the features associated with each character that will permit you to classify the state of that character?

GROWTH RINGS

Variation in vessel size within a growth ring

Ring porous Quercus (2) X [14]
Semi-ring porous Prunus (1) X [9]
Diffuse porous Nyssa (3) X Acer [4]

VESSELS

Pattern of aggregation

Exclusively solitary Eucalyptus (4) X Quercus [14]
Radial groups of 2-4 Carya [19]
Radial groups of 4 Amyris (5) X Ilex [6]
Radial or oblique Castanea (6) X [16]
Tangential arrangement Ulmus (25) X [11]
Pore clusters Gymnocladus (26) X Platanus [7]

Perforation Plates

Perforation plate simple Castanea (6) RT [16]
Multiple perforation plate Liriodendron (7) RT [12]
Sclariform plates with > 20 bars Liquidambar (23) X [8]

Pit and wall details

Spiral thickenings Magnolia (8) RT [10]
Pits minute Betula (9) R [13]
Pits opposite or scalariform Liriodendron (7) RT [12] or Magnolia (8) RT [10]
Pits alternate Betula (9) RT [13]

Lumen features

Tyloses abundant Quercus alba (10) XRT [15]

Metric features

Count the number seen in a 10X objective field:

Fewer than 5/sq. mm Carya illinoensis [19]
Fewer than 20/sq. mm
20-40/sq. mm Soft Maple [4]
More than 40/sq. mm Fagus [17]

Tangential diameter. Determine this feature using wood samples:

< 50 microns - Not visible to naked eye. Ilex [6]
50-99 microns - Larger pores barely visible to naked eye. Soft Maple [4]
100-200 microns - Visible to naked eye Betula [13]
> 200 microns - Distictly visible to naked eye. Carya illionensis [19]

OTHER ELONGATED AXIAL CELLS

Fibers Diospyros (12) XRT Fraxinus [1]
Fiber tracheids Diospyros (2) R Carya [18]
Vascular Tracheids Quercus (10) XR [14]
Vasicentric Tracheids Quercus (10) XR [14]
Spiral thickenings Ilex (13) RT [6]

RAYS

Commonly > 1 mm high Ilex (13) T [6]
Aggregate rays Robinia (16) T
Two distinct widths Quercus (10) T [14]

Degree of seriation.

Exclusively 1-seriate Populus (14) T Tilia [3]
Commonly 2-3-seriate Fraxinus nigra [2].
Commonly 4-10-seriate Ilex (13) T [6]
Commonly > 10-seriate Platanus (15) T [7]

Type of marginal cells.

Homocellular Populus (14) RT Betula [13]
1-3 marginal rows Ochroma (17) RT Liriodendron [12].
4-9 marginal rows Nyssa (3) RT Ilex [6]
10 or more marginal rows Gleospermum (18) RT

Metric features.

Commonly < 4/mm Platanus (15) XT [7]
4-12/mm Castanea (6) XT [16].
Commonly > 12/mm (NA)
Ray parenchyma - vessel pits > 10 micrometers Weinmannia (19) R Castanea [16]

AXIAL PARENCHYMA

Use polarized optics to facilitate identification.

Apotracheal Lithocarpus (20) X Juglans cinerea [21]
Diffuse Malpighia (21) X Juglans cinerea [21]
Paratracheal Castanea (6) X [16]
Vasicentric Weinmannia (19) X Ulmus [11]
Aliform or confluent Maclura (22) X Fraxinus [1]
Rare or absent Liquidambar (23) X [8]
Banded Maclura (22) X Fraxinus [1]
Bands 1-seriate Platanus (15) X [7]
Bands > 4 seriate Robinia (16) X
Bands > 6/mm Carya illinoensis (24) X [19]
Marginal/zonate Fraxinus (25) X [1]

II. Keying woods. The second part of this exercise will give you practice in applying what you mastered in the first section. Using what you have learned relative to character state assessment identify the "unknown" angiosperm specimens 1-21, using the wood and XRT slide samples that are provided and the Angiosperm Wood component of the MUDES.

ULTIMATE OBJECTIVE: YOU WILL BE ABLE TO IDENTIFY 21 KINDS OF HARD (ANGIOSPERM) WOOD EITHER BY SIGHT OR MICROSCOPIC IDENTIFICATION.