Why do Trees Bud and Other Things?

Nature Walk & Talk - May 2, 2026

Washington County Master Gardeners Tree Trek

A cooperative project of WCMG and SMINC

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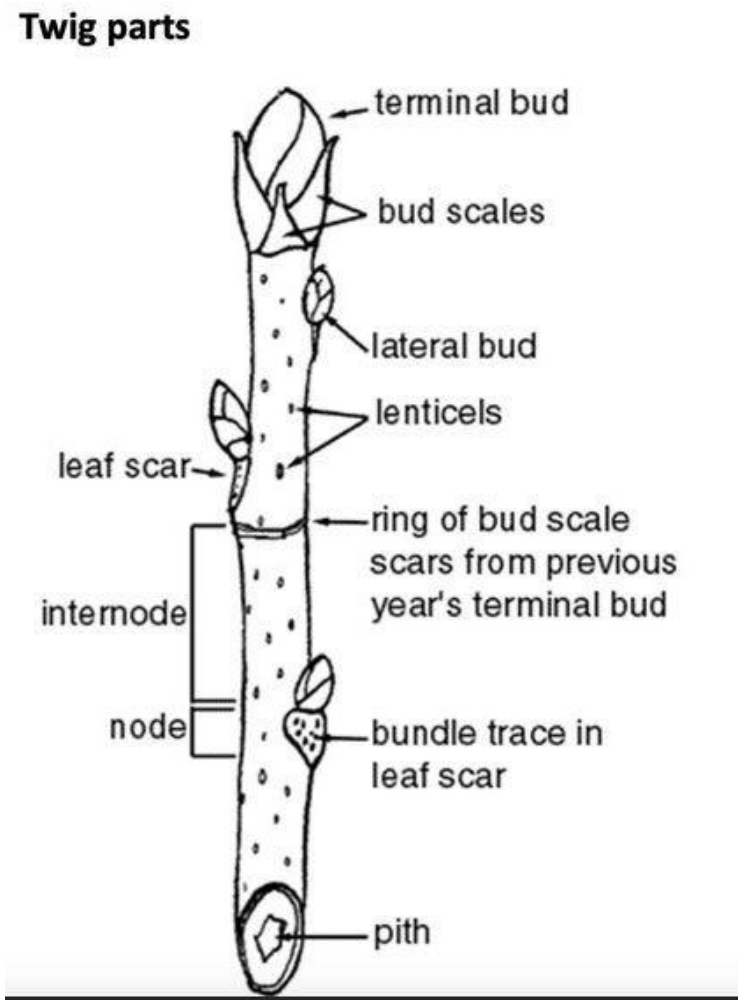
UNIVERSITY OF MINNESOTA EXTENSION

SALLY MANZARA NATURE CENTER INTERPRETIVE

Anatomy of a Twig



Twig Terminology

- Terminal (apical) bud – the primary growing point at the tip of a plant's stem, twig or branch. Regulates the development of lateral/axillary buds, stem length, and outshoots; this is described as "apical dominance".

- Lateral (axillary) bud – embryonic shoots located at the node of the leaf axil.

- Lenticels – porous tissue in the bark of woody stems that provides a pathway for the direct exchange of gases between the internal tissues and atmosphere. Bark is otherwise impermeable to gases. This is a similar function of the stomata in the leaves of a plant.

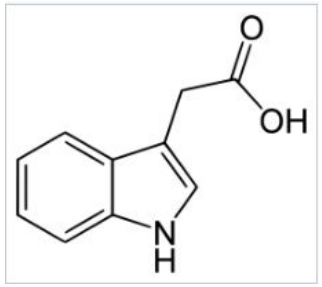
- What happens when the terminal bud breaks off or is browsed by deer?

Where do buds come from?

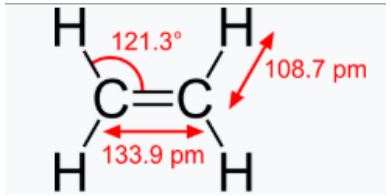
Buds are grown during the summer when the tree is most active and has plenty of daylight, water and sugars to produce growth. The length of a stem and number of lateral buds created depends on rainfall, sunny days, and available nutrients. This is all regulated by the apical (terminal) bud (apical dominance) and its interactions with ethylene and auxins.

The buds are protected by scales when the plant goes dormant due to low light levels and lower temperatures. Abscisic acid slows growth during dormancy and the buds “wait” until conditions change.

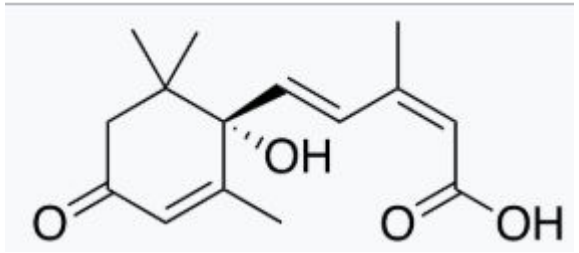
Auxin example



Ethylene



Abscisic Acid



The Chemistry of Budding or Coming Out of Dormancy

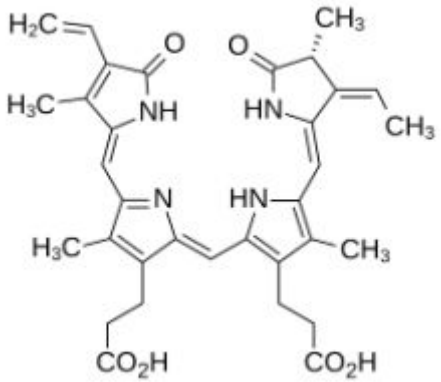
- Phytochromes – activated by increased red light due to longer days
- Abscisic acid (ABA) – slows processes during dormancy and diminishes
- Auxin – a growth hormone for growth and development becomes dominant
- Ethylene – reverses its role of leaf detachment (senescence) and facilitates bud breakage and tree rehydration

Phytochome – a protein with a light-absorbing moiety

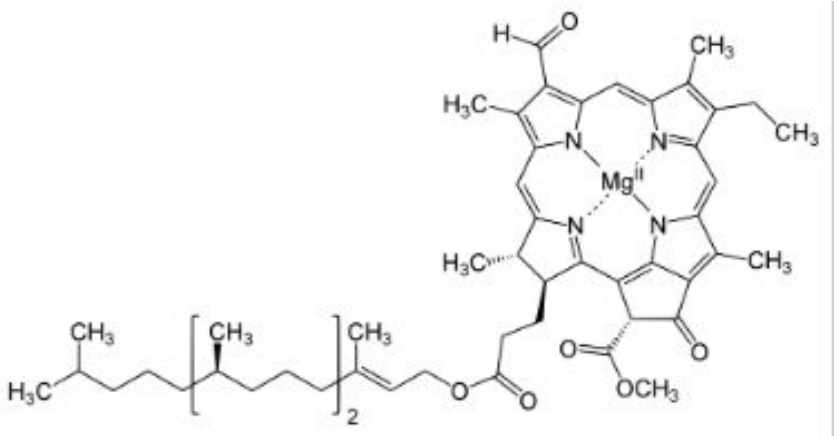
Phytochromes are a class of photoreceptor proteins found in plants, bacteria and fungi. They are activated either by red or far-red light. Phytochromes also act as temperature sensors, as warmer Temperatures enhance their de-activation. All of these factors contribute to the plant's ability to germinate..

Active moieties for various biological purposes

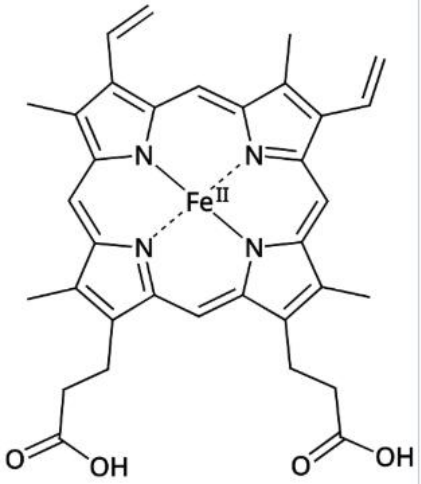
Phytochromobilin



Chlorophyll (photosynthesis)



Hemoglobin (oxygen carrier)



Identifying Trees by Their Buds

Are there male and female trees? It depends…

Monoecious trees/plants: have separate male flowers and female flowers on the **same** plant.

Pine
Oak
Birch
Fruit
Glossy Buckthorn

Dioecious trees/plants: have male flowers on one plant and female flowers on **another** plant.

Ginko
Eastern Red Cedar
Cottonwood
Common Buckthorn

Are there advantages to having only male trees? It depends…

- No fruit, berries or seeds are produced
  - Less mess to clean up

- LOTS of pollen is still produced
  - Bad for allergy sufferers!

- Plants will adapt and find ways to propagate…
  - Common buckthorn can morph from male to female?
  - Sequential hermaphroditism

THANK YOU!

University of Minnesota Extension

Washington County Master Gardener Volunteer Program

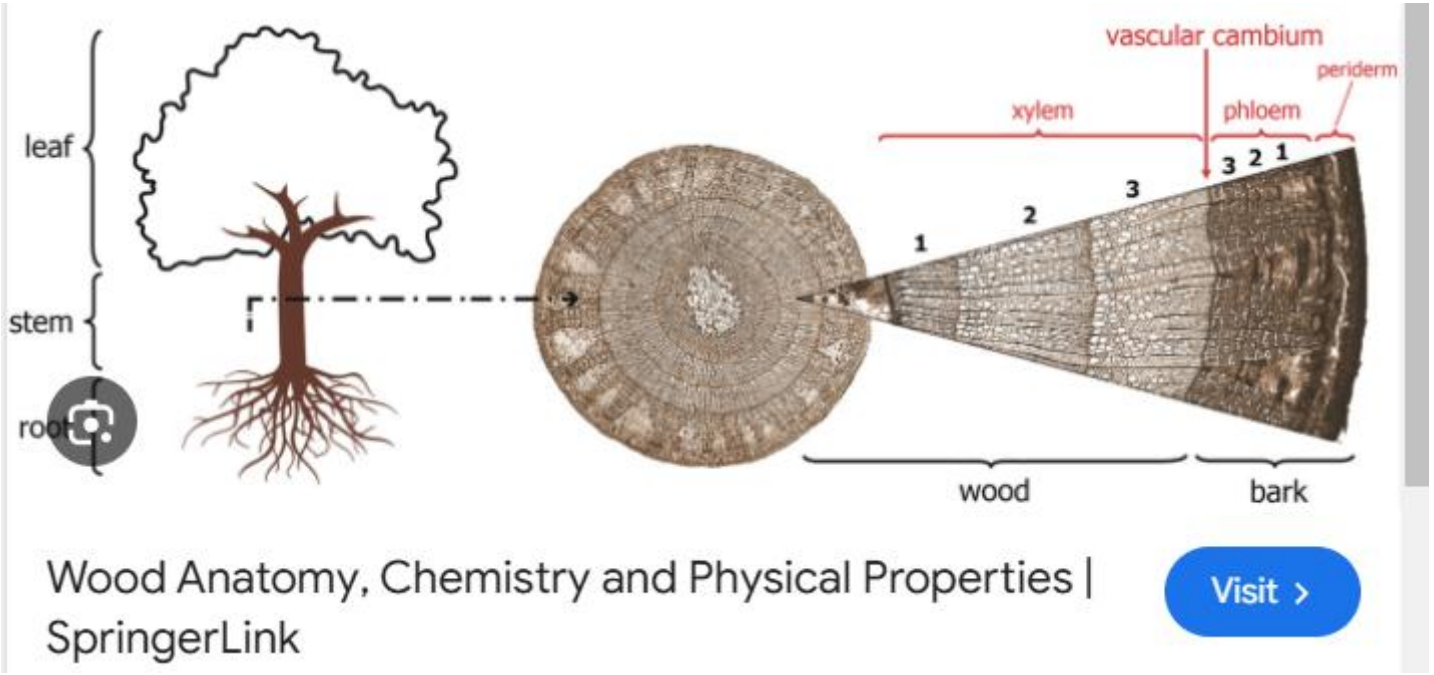
Request A Master Gardener

- WCMG can present at your school, business, place of employment, library, garden club, church, etc.
- Classes are offered on pollinator health, vegetable gardening, native plants, managing buckthorn, composting and many more topics.
- **Complete request form at washingtoncountymg.org**

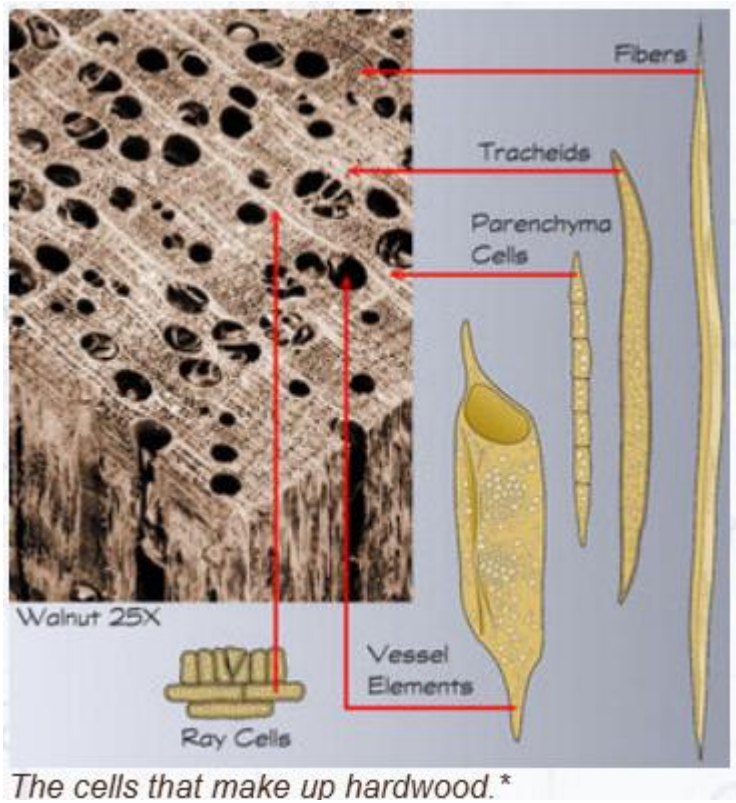
Connect With Us!

Website: washingtoncountymg.org
Email: wcmg@umn.edu
Facebook: UMN Extension Washington County Master Gardeners
Ask A Master Gardener Hotline: 651-430-6690

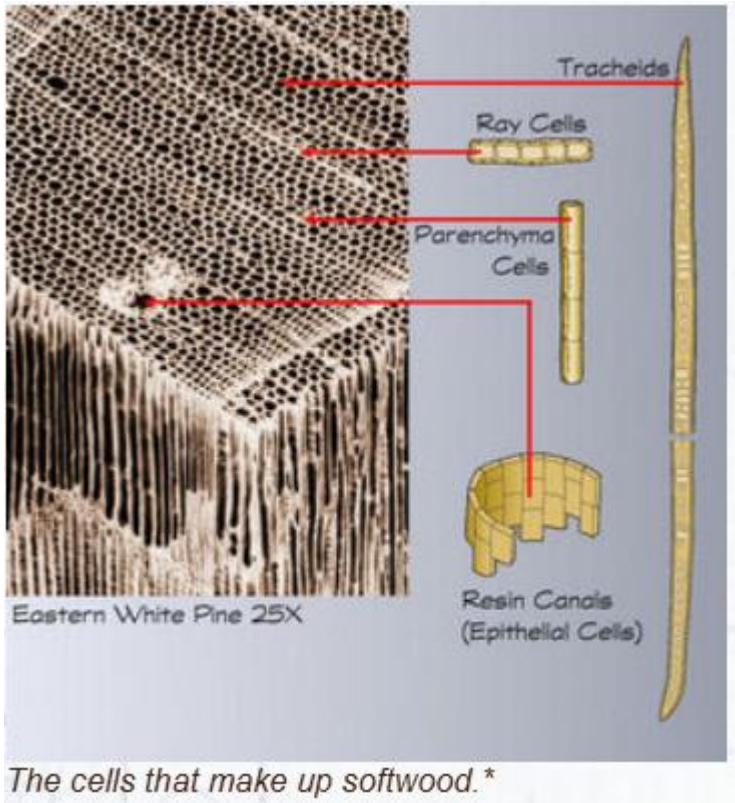
Backup Slides -



https://workshopcompanion.com/KnowHow/Wood/Hardwoods_&_Softwoods/1_Wood_Botany/1_Wood_Botany.htm



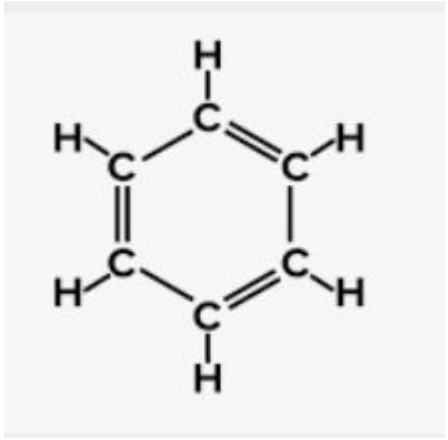
*The cells that make up hardwood.**



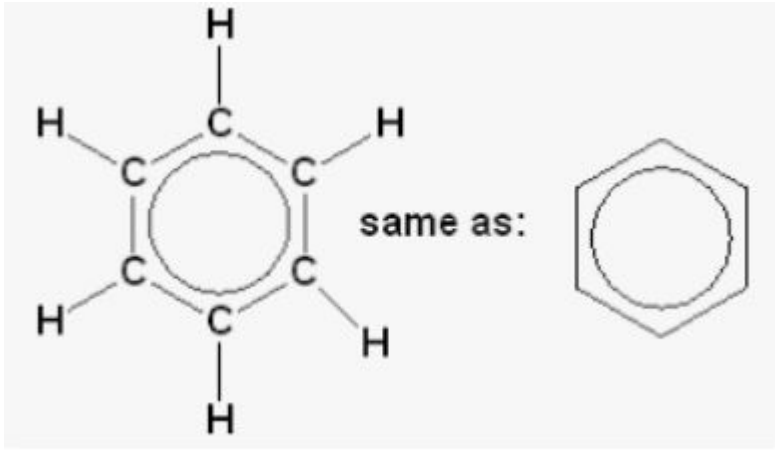
*The cells that make up softwood.**

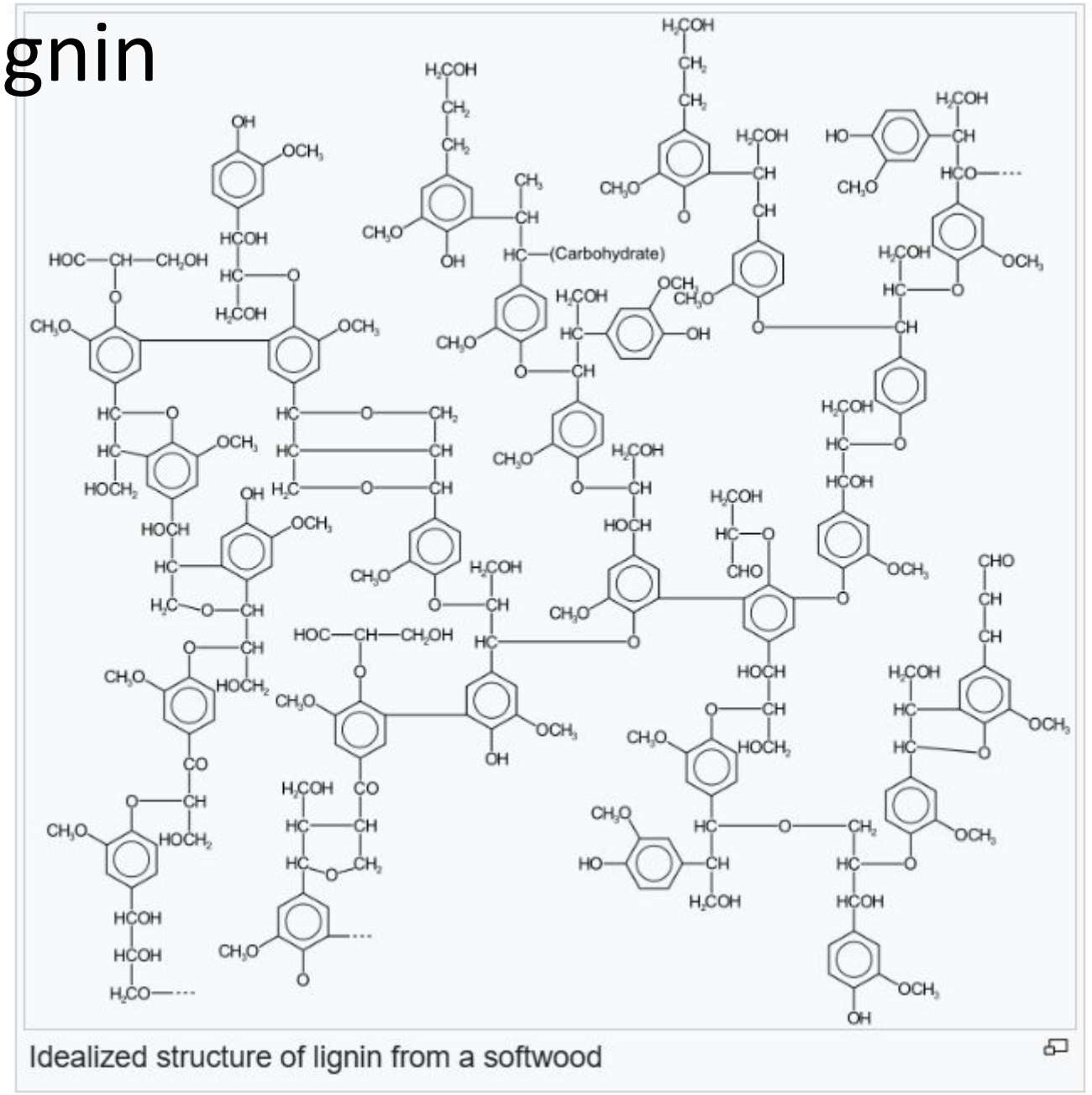
A chemist’s view of Lignin

Benzene ring structure



Simplified drawing





Idealized structure of lignin from a softwood

DNA is often referred to as the "universal genetic code," meaning that the same sequence of nucleotides (codons) translates to the same amino acids across most life forms