



Trees in Winter

& Making Syrup from Bigleaf Maples



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Department of
Agriculture

National Institute
of Food and
Agriculture

Bigleaf maple









<http://www.lewislp.com/wormy-maple-or-ambrosia-maple/>

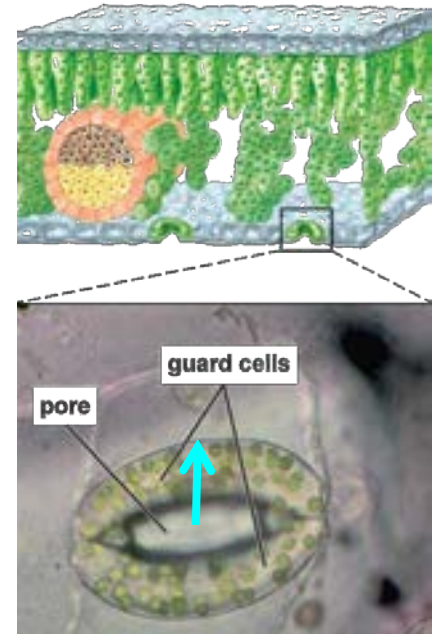
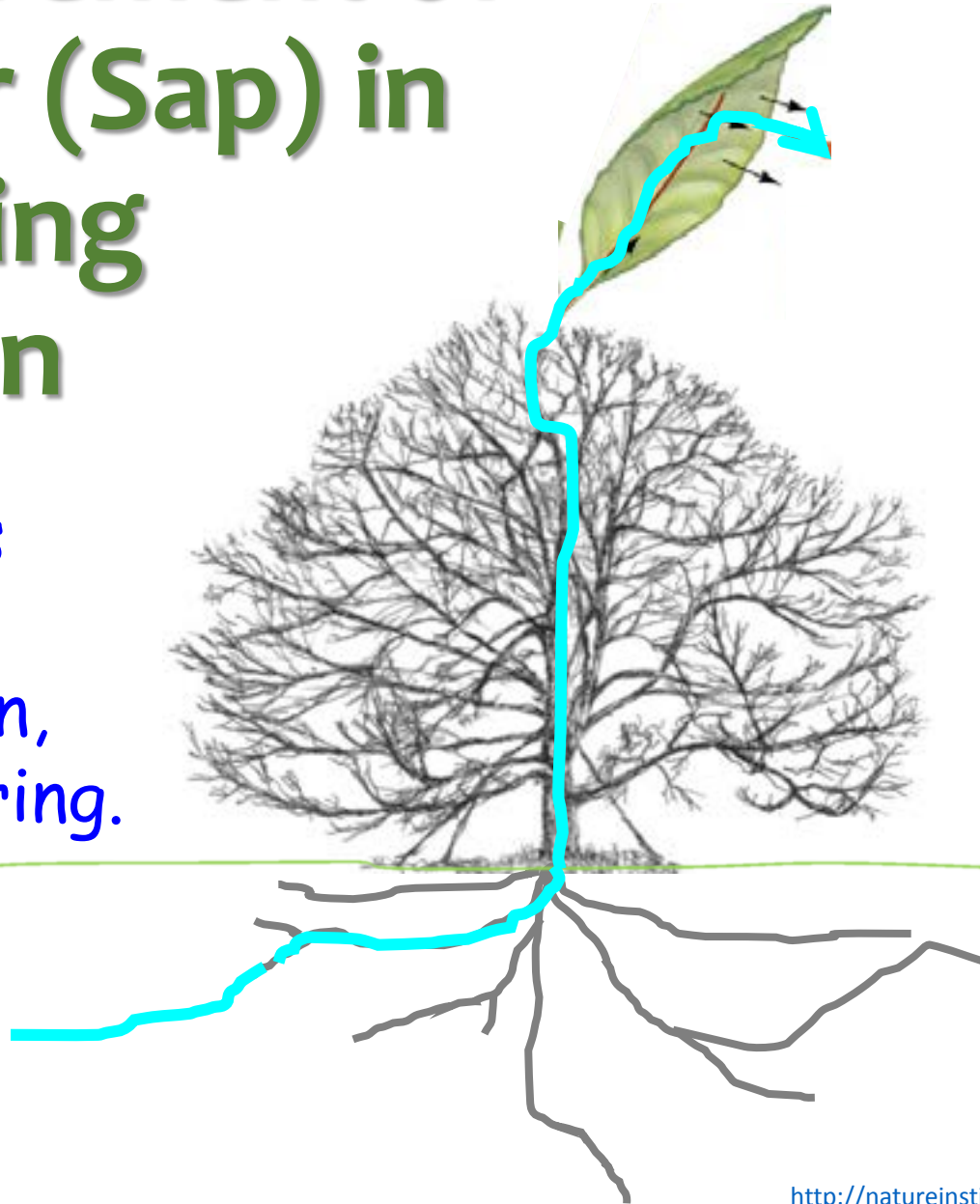


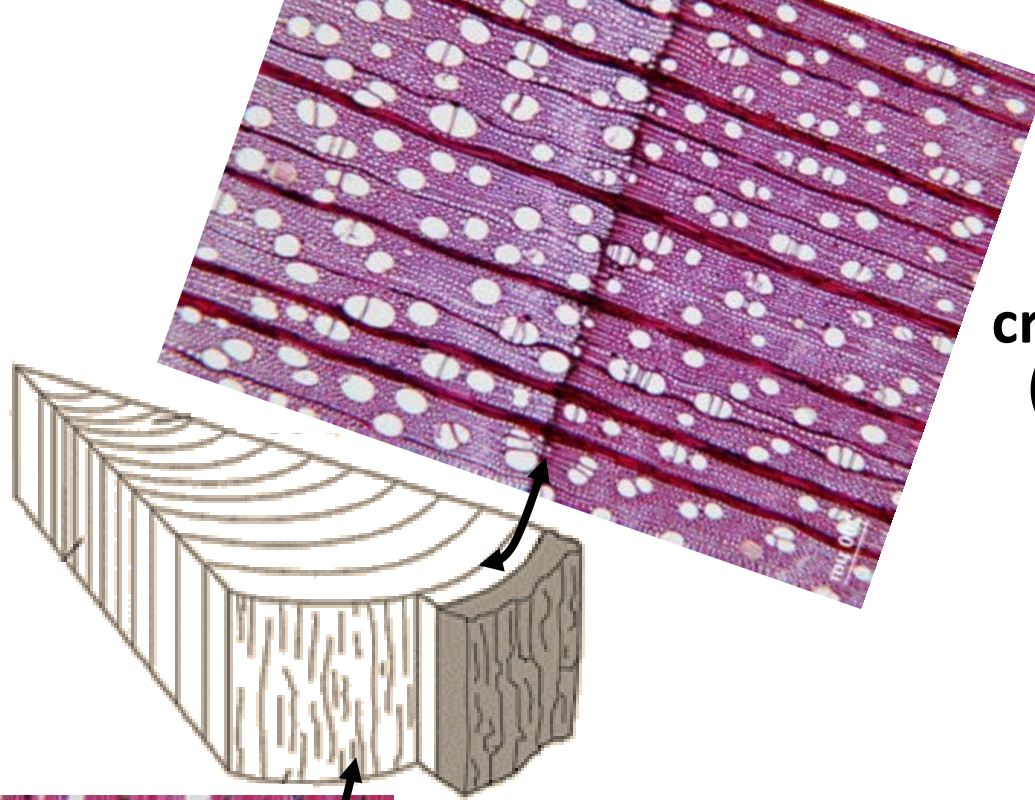
1. **Movement of Water (Sap) in Growing Season**
2. **Movement of Water (Sap) in Winter**
3. **Making Syrup**
4. **Why Don't We Have an Industry Here?**



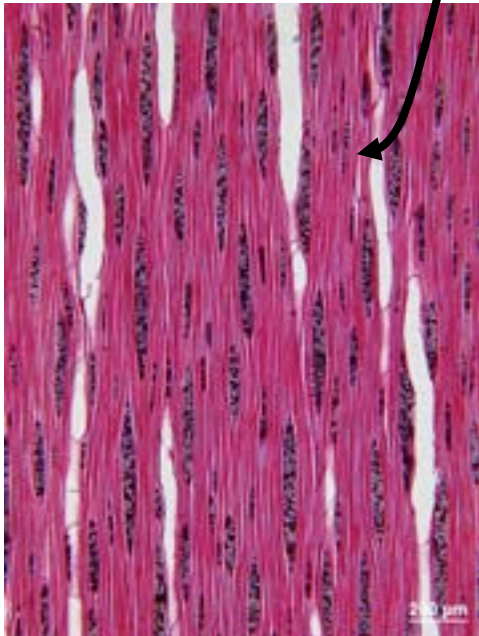
1. Movement of Water (Sap) in Growing Season

Water is pulled, in tension, like a string.





**cross-section
(endgrain)**



**tangential
section**

Bigleaf maple wood

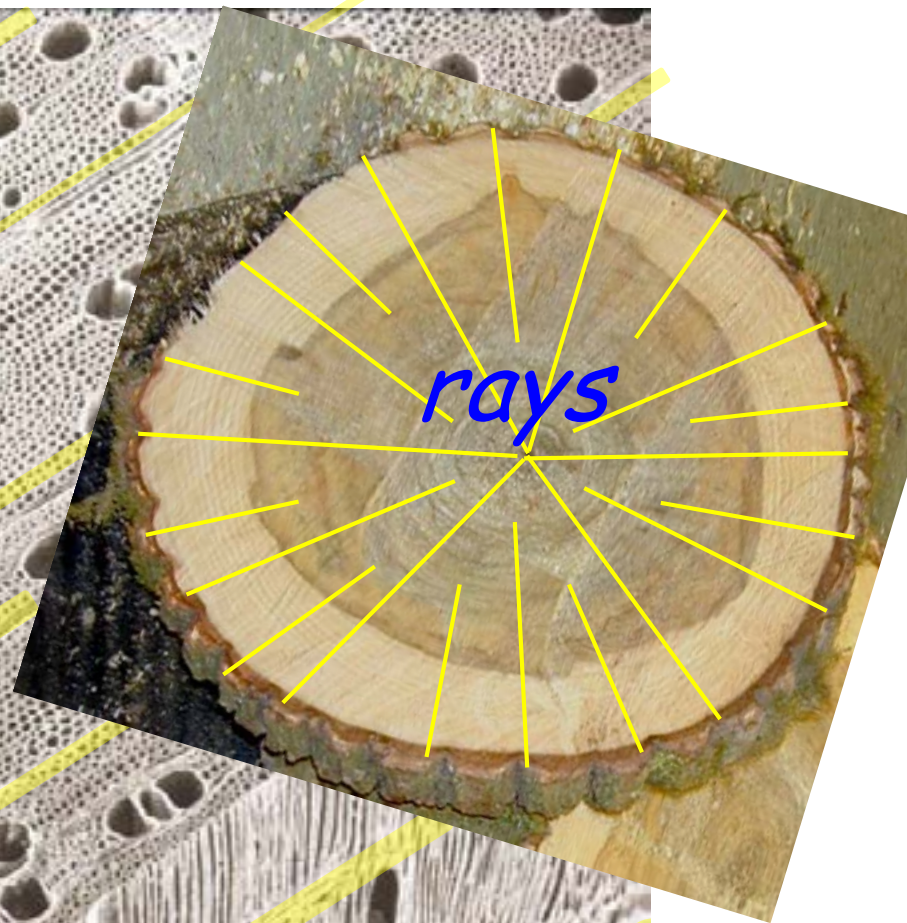
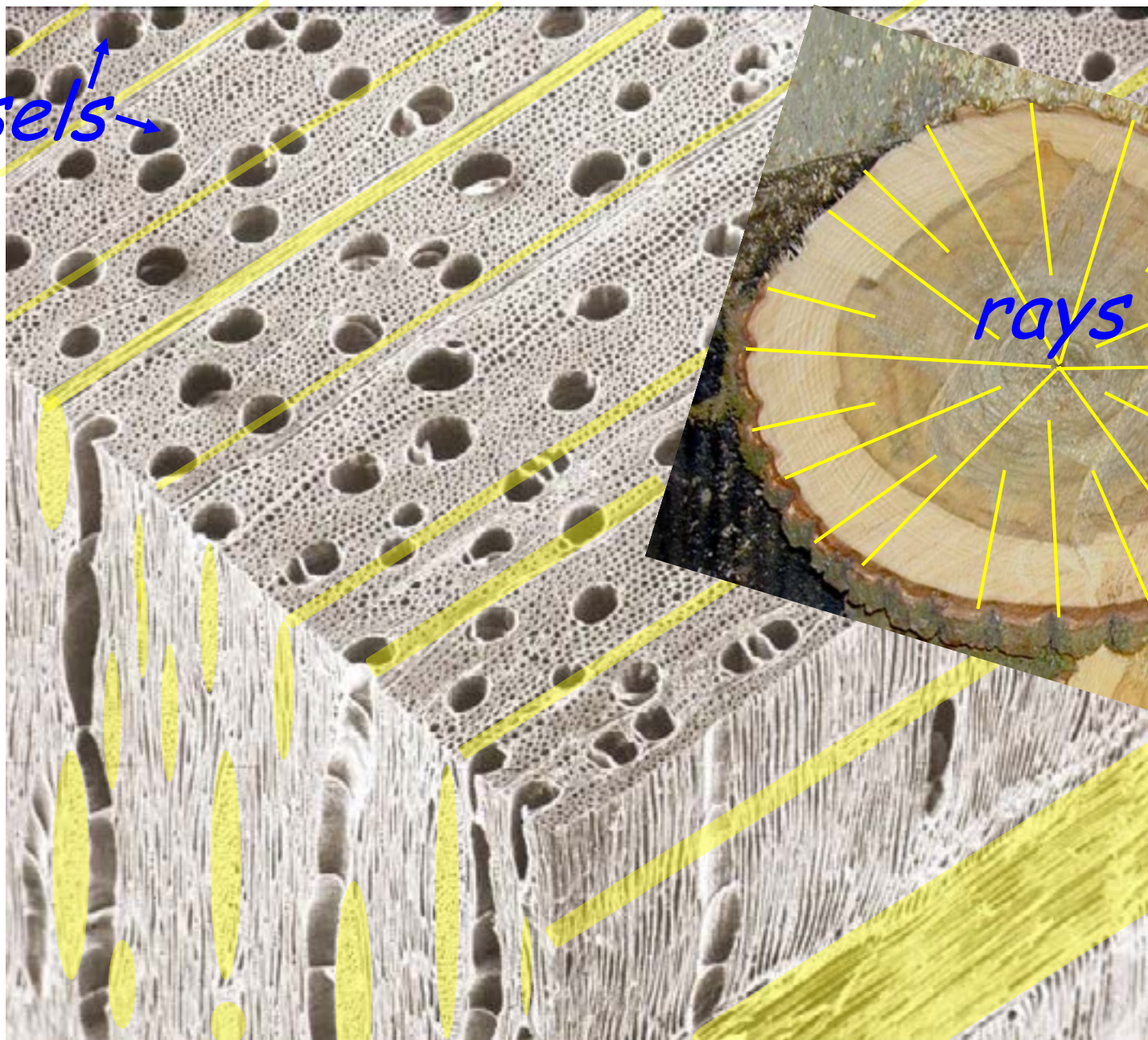
<https://tropicalwoods.weebly.com/>

<http://insidewood.lib.ncsu.edu>

Closer view—sugar maple



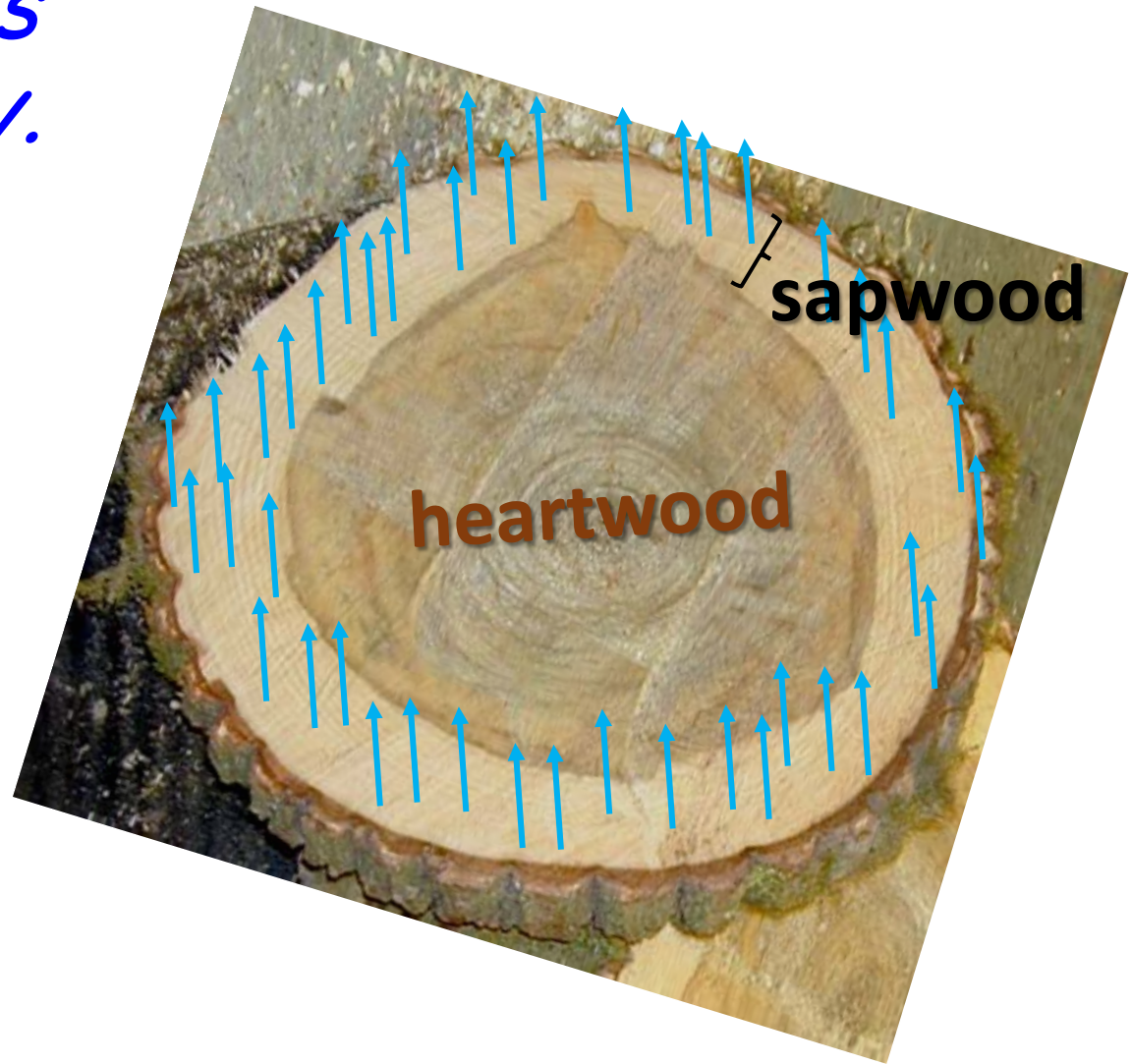
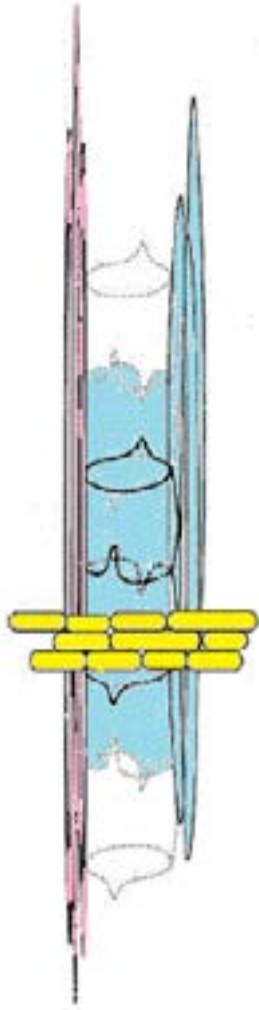
vessels



rays

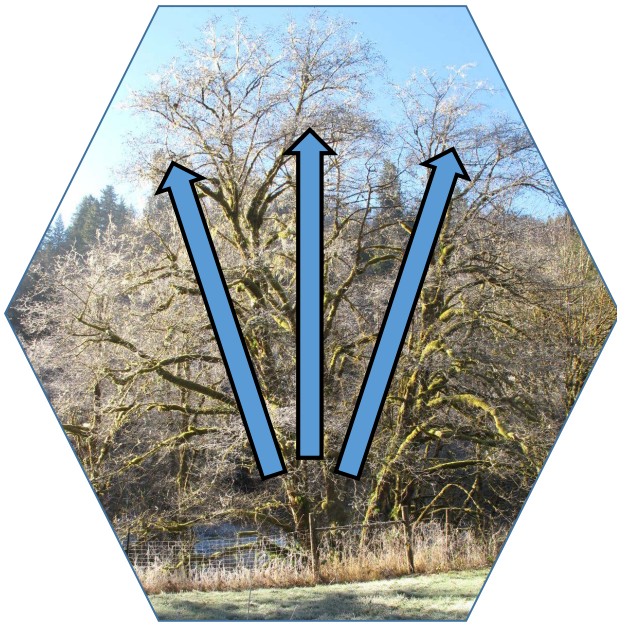
ray

*Water goes up
through vessels
in sapwood only.*

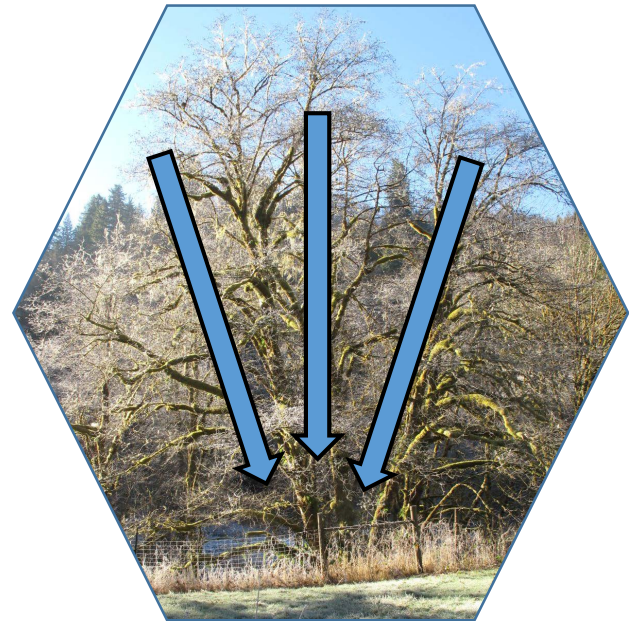


2. Movement of Water (Sap) in Winter

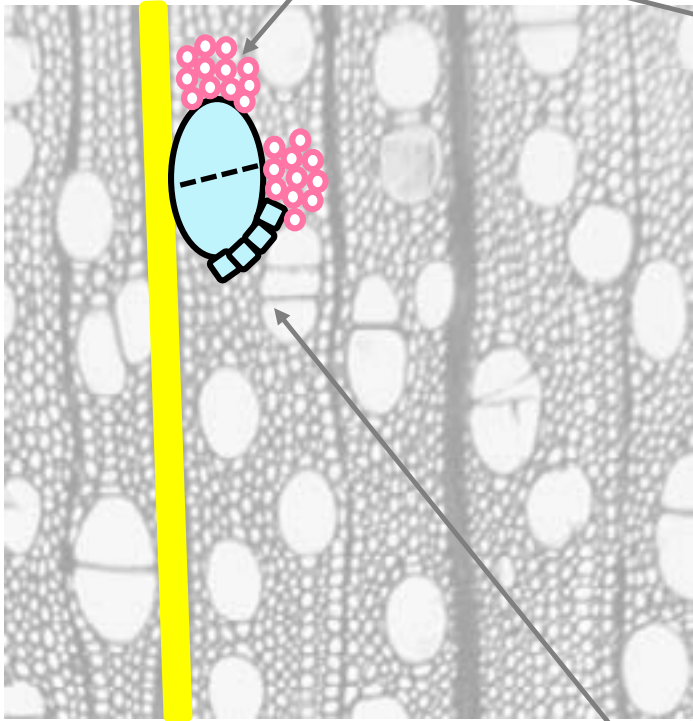
*Pulled up during
freezing*



*Descends after
thaw*



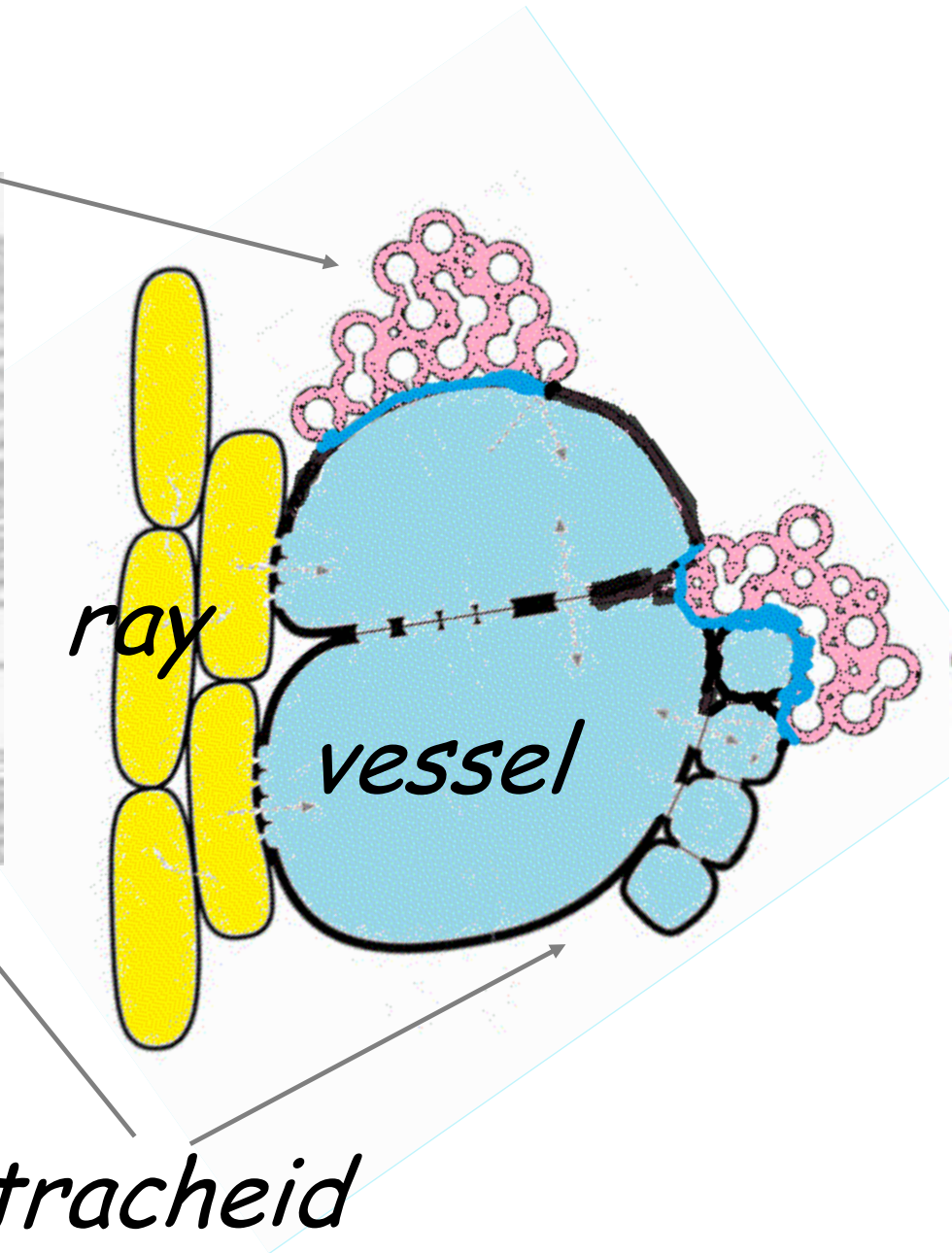
fiber



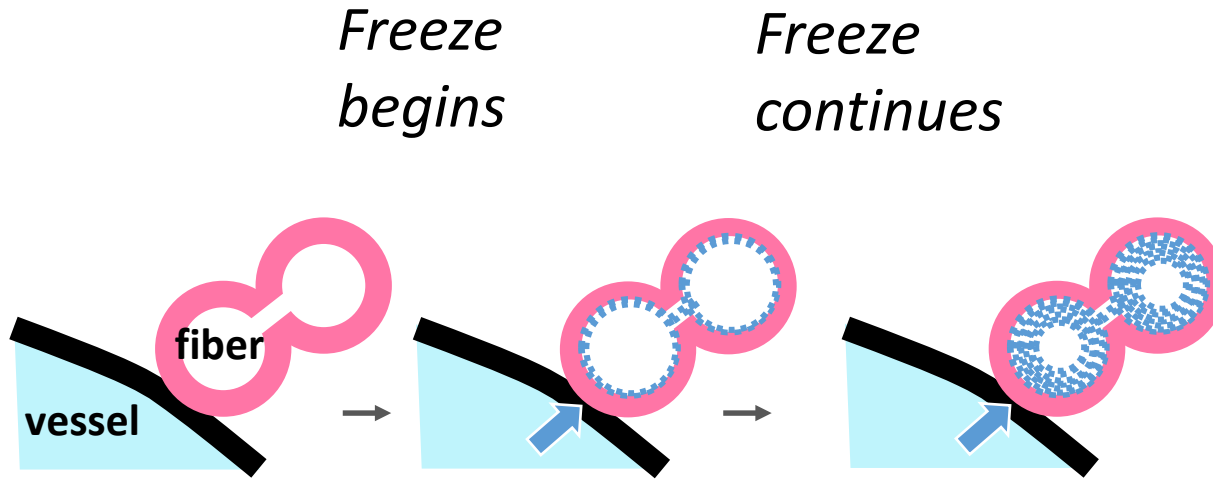
ray

vessel

tracheid



Freezing:

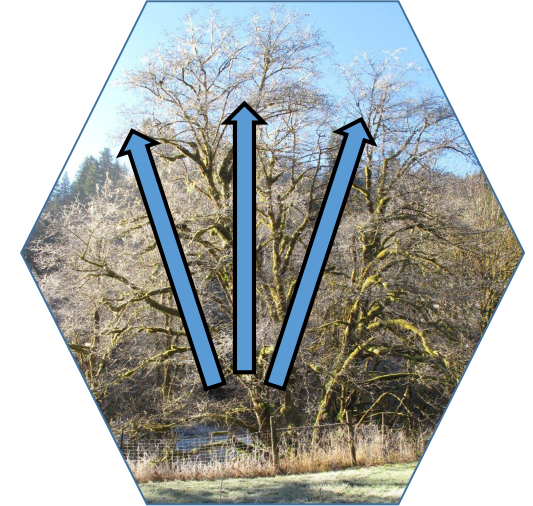


Fiber is
gas-filled.

Water freezes in fibers,
more is pulled up.

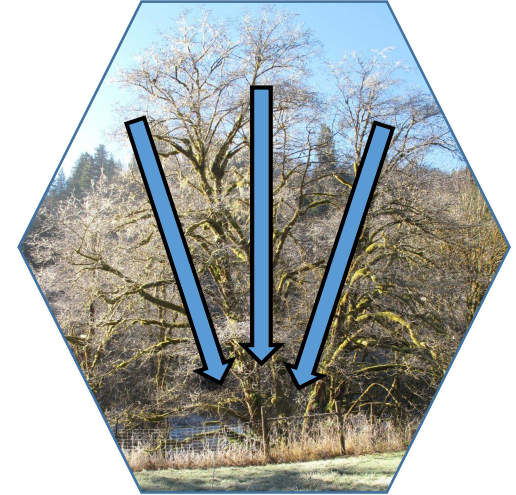
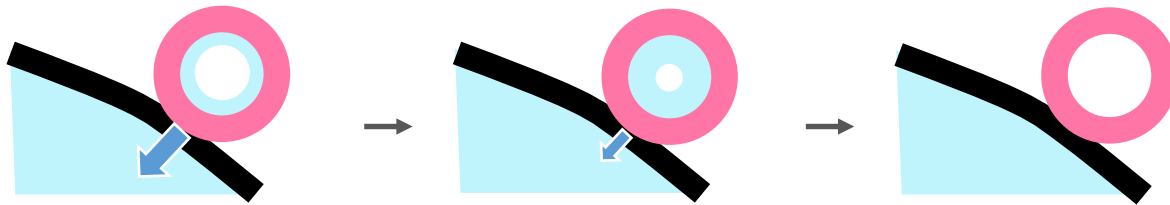
Vessel is
water-filled.

*Pulled up
during
freezing*



Thawing:

*Descends
after thaw*



Thaw causes pressurized gas bubble to form.

**Sap exudes will now exude from a puncture
(pushed, not pulled as in growing season).**

Bubble is encouraged to re-dissolve in a few hours by

surface tension

low amount of gas in thawed water

pressure in bubble

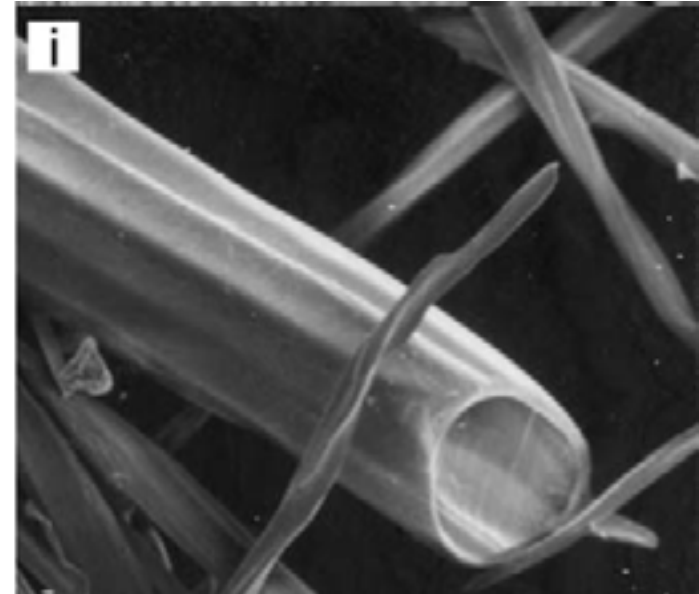
But bubbles take several days to re-dissolve.

And how is sugar involved?

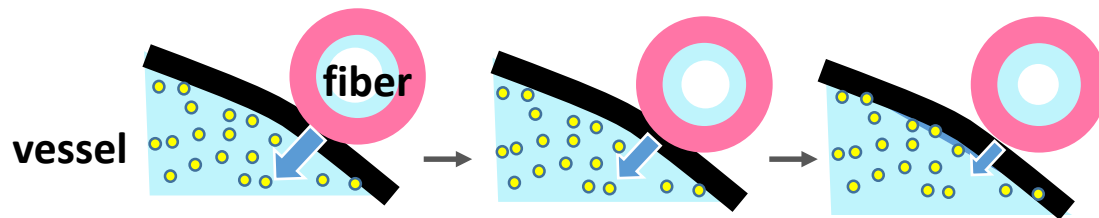
Sucrose (large molecule) is placed into sap by rays, after a few freeze/thaw cycles in fall.

The unpitted cell wall of fibers is osmotic barrier!

Sucrose can't cross into fibers.



Cirelli et al. 2008



Sucrose in vessels has enough osmotic draw to slow down bubble re-dissolution to several days.

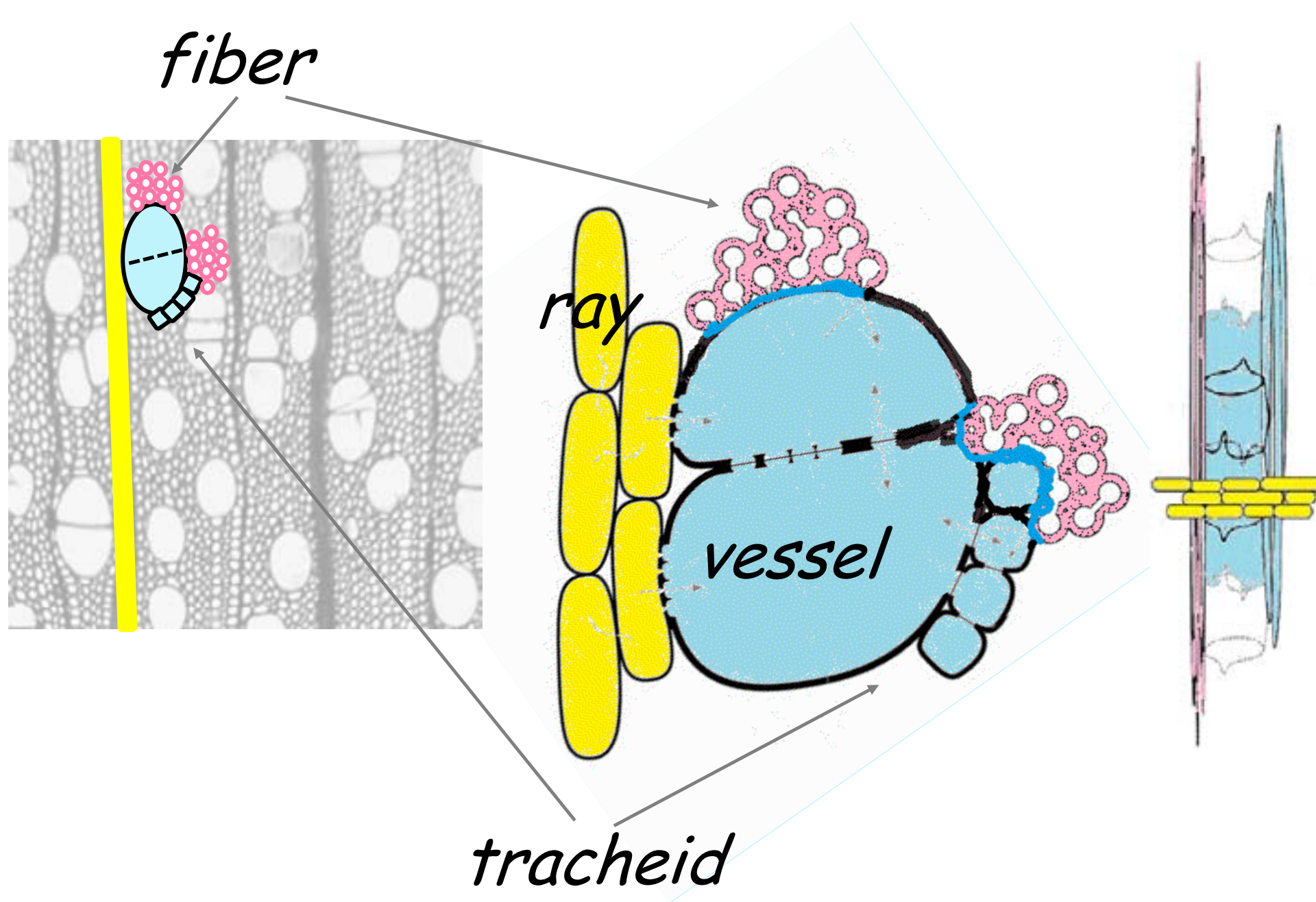
fiber

ray

vessel

tracheid

mod. from Cirelli et al. 2008



3. Making Syrup

*Choose for exposure:
slow freezes,
frequent freeze/thaw cycles.*

A. Select trees





Can use any species of maple or walnut.

B. Drill

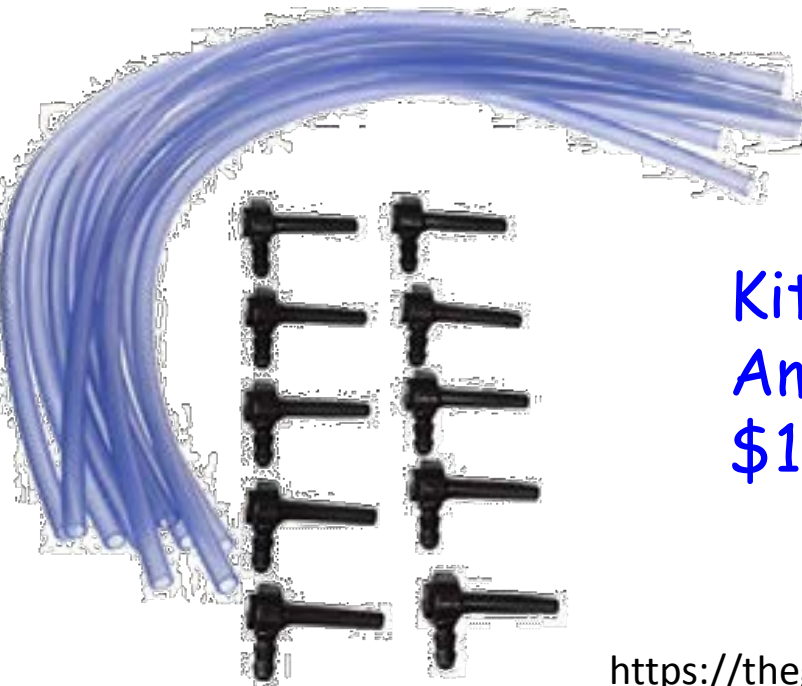
About 2-2.5" deep, angled upward



C. Install



spiles



Kit on
Amazon,
\$19

<https://thegrovestead.com>



D. Collect

Every 2-4 days



Photo credit: Andy Cripes, Gazette-Times

E. Filter

Record volume
collected.



F. Reduce

to $\sim 1/20^{\text{th}}$ the volume; freeze.



G. Finish

Boil to $\sim 1/60^{\text{th}}$ original volume.

Done when T is $\sim 219^{\circ}\text{F}$.



Filter again, or let settle.

Pour into jars; can it.



H. Enjoy



Photo credit: Andy Cripes, Gazette-Times

4. Why Don't We Have an Industry Here?

- Sugar concentration is lower:

	<i>Gallons sap : syrup</i>
<i>Bigleaf maple</i>	<i>60:1</i>
<i>Sugar maple</i>	<i>40:1</i>

- Fewer freeze/thaw cycles here.

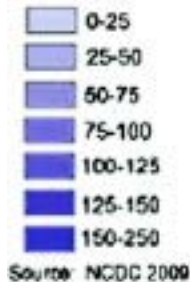
Average Annual Freeze/Thaw Days



But try making syrup anyway:
fun,
can involve kids,
can do it on small scale.

Big
ma
range

<http://nativeplantspnw.com/big-leaf-maple-acer-macrophyllum/>



Hershfield 1974 J. App. Meteor.

More Information?

OSU Extension event:

Nov. 9 (tentative)—Tiffany Hopkins
See me to sign up for updates

My website (www.barbaralachenbruch.com)
has links to:

OSU Extension circular

Info on Backlunds' book

Facebook bigleaf maple tapping page

M.S. Thesis from UBC

My blog (scientist/forester perspectives)



Thanks!

