From: Greg Reighard <grghrd@clemson.edu>
Subject: wood anatomy question
Date: September 21, 2021 at 4:13:39 PM EDT
To: cdr14@psu.edu

Dear Dr. Ray:

I enjoyed your recent presentation on chestnut wood anatomy. I grew up in PA where remnants of old chestnut stumps could still be found in the woods next to our farm. My grandfather use to tell me stories of how the ground was covered in chestnuts and they would let the pigs have a go at it. I graduated from PSU in Forestry and took wood anatomy with Dr. Baldwin.

During my career I got to explore many different forest ecosystems since I traveled extensively for my work and could make time to enjoy local forests. I was surprised at the size of the sumac wood section that you showed in your talk. I have never seen a native sumac species greater than 4 inches in diameter. They are a pioneer species and eventually get shaded by other trees. What is the history of that specimen?

My wood anatomy question concerns wisteria. I have been eradicating wisteria from our University forest the past 3 years and several of the larger vines are at least 60-70 years old based on when the farmsteads were abandoned and obtained by the University. When I cut some of the larger vines, I could not understand what I saw. The internet did not provide any answers either. What I saw in cross-section (transverse cut) were ~10-12 rows of vessels plus late "wood" (= rings), then a thick solid layer of wood (diffuse?) with no vessels. I saw as many as 6 or 7 of these composite rings (10-12 rows of vessels + late wood each with a solid thick band). If the rings of vessels and late wood were representative of years, what was the solid thick band that appeared every 10-12 "years"? Does the vine at a predetermined time realize it needs to strengthen itself and produces a different type of wood every decade or so? I have attached pictures of a section that was not polished — just rough cut with a handsaw.

Thank you for your time:)

Sincerely,

Greg

P.S. I attached a picture of some maples from a friends place in Somerset Co. Would these maples likely have curly grain?

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---------- Forwarded message ---------
From: Chuck Ray <cdrpsu@gmail.com>
Date: Wed, Sep 29, 2021 at 12:56 PM
Subject: Re: wood anatomy question
To: Gregory Reighard <grghrd@clemson.edu>

Hey, Greg. Sorry for the slow reply...I was working on the road all last week, pondering your question. Never been asked before, and wisteria is not in any wood reference source that I could find.

However, after looking at your pictures, more on the internet, and putting some of our PSU specimens under the scope, I've come to a somewhat educated guess (SWAG?)

I suspected the wide flat rings were bark, but couldn't exactly figure out how they displayed that way. This photo gave me an idea.

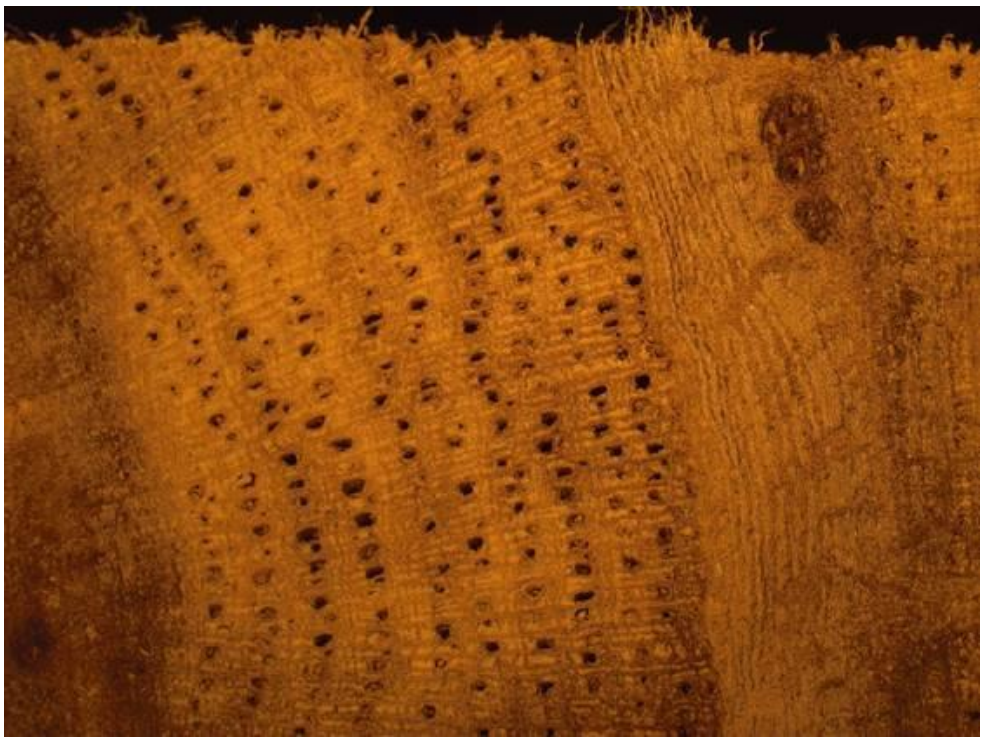
I blew up the transverse surface of the picture...

...and noticed how the growth rings sort of seemed to grow together in different directions, meaning of course, that the encompassed bark would have to be in-between the growth rings.

So I got this small juvenile specimen under the scope...

...which revealed that wisteria is a semi-ring-porous hardwood with uniseriate rays. The first flush of pores are followed by additional pores as the wood grows, and the earlywood and latewood are, practically speaking, indistinguishable. No flat "rings" visible in this early growth.

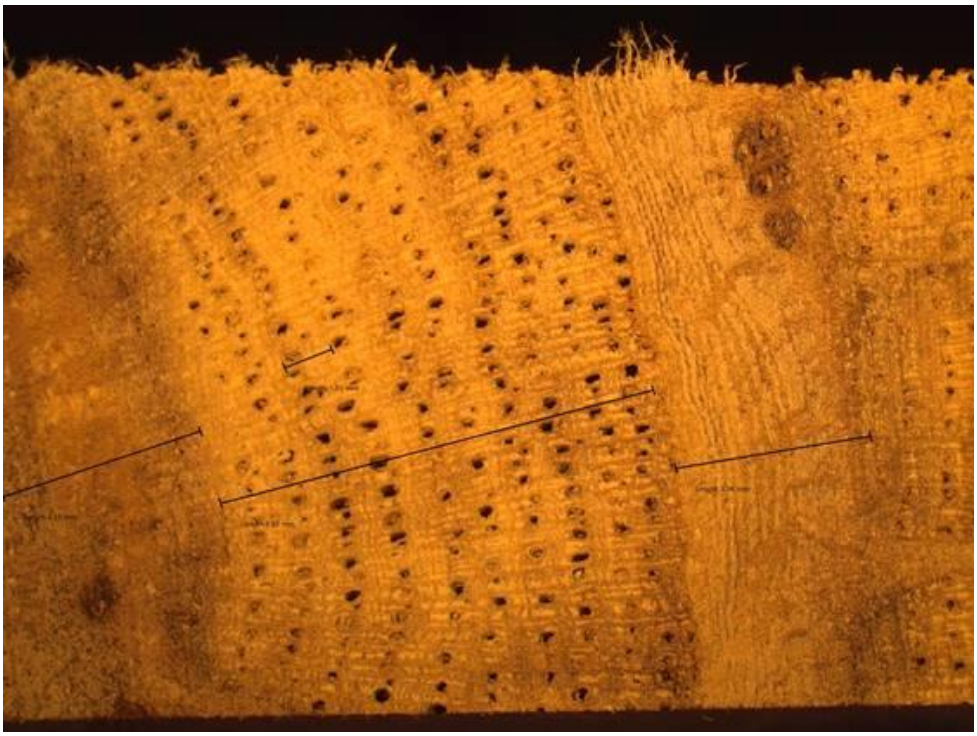
So, examined a mature wood specimen.



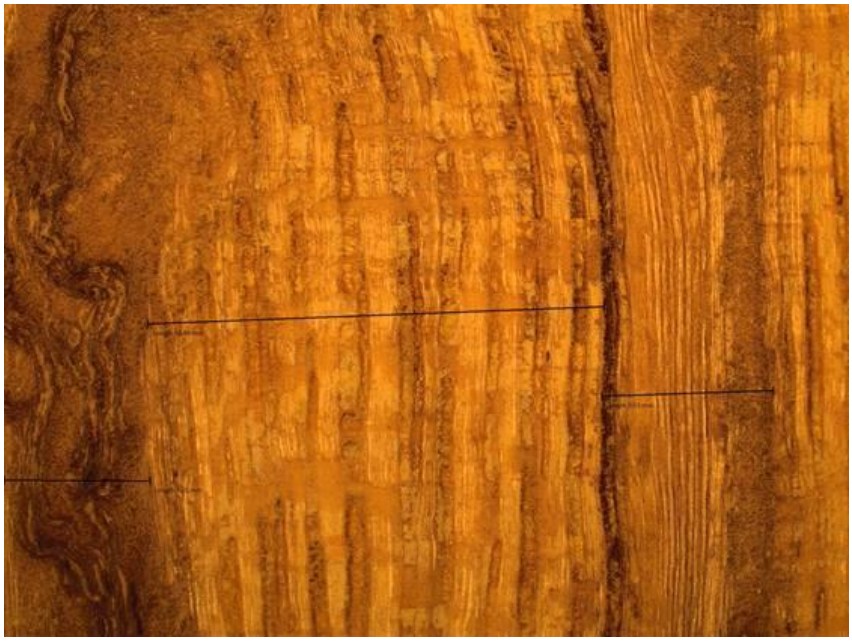
Here, we see something similar to what you observed...roughly ten growth rings separated by woody "bands", let's call them. Notice the fiber length on the band at the top mid-right...this strengthened my thought that we were looking at a band of bark.

So I added measurements...

and found each growth ring to be about 1 mm, the band of growth rings to be about 9 mm total, and the woody bands on either side to be about 4 mm.



I then turned the specimen so that this same set of bands was seen from a tangential view...

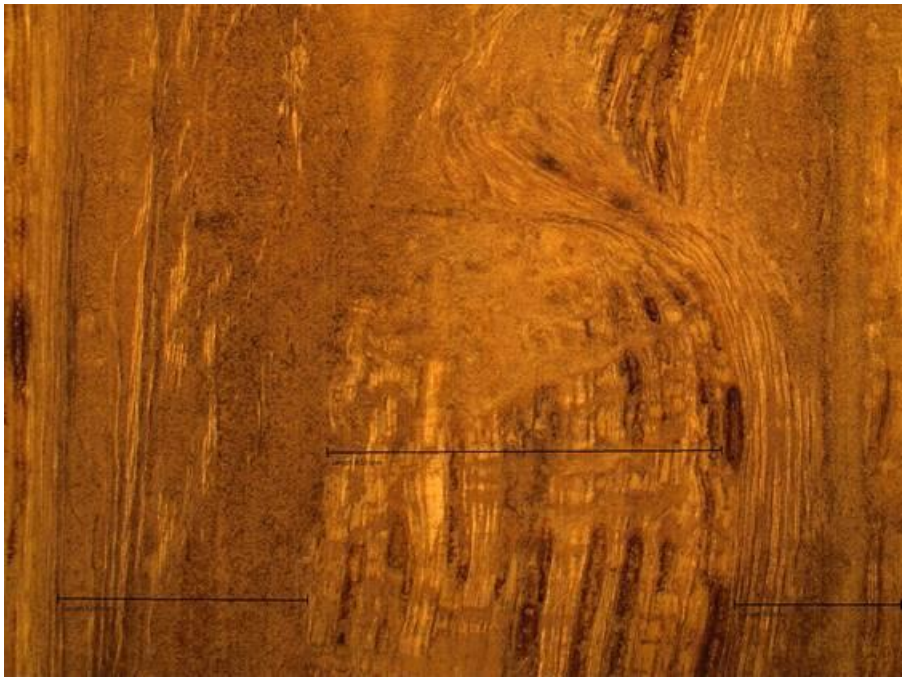


...which, at the top of the tangential view, exhibited roughly the same dimension of growth rings and bands.

But as I moved down the tangential view...

...I saw the growth ring bands in the middle shorten and then finally disappear, and the woody bands come together into one wider woody band, roughly the total width of all three bands previously.

And then, a little further down...



...a new growth ring band begins to appear as the angle of the woody band is transversed.

So, see if you agree with me. It looks like the "woody bands" every few years are encompassed bark. The bark intersection is eventually encompassed by new growth just as knots are, but are displayed in the transverse view of the wood as continuous circular bands created by the intertwining vines and their growth together. That is, the phloem (bark) cells created at the cambium layer expand around each stem as they grow annually (notice the "stripes" in the right-hand band of bark).

A partial proof of this theory would be that the bark bands in the cross-sections should have the same number "stripes" in the outer bark band as growth rings in its adjacent layer of growth rings. It does seem that the right hand bark stripes roughly equal the number of growth rings in the middle.

It also seems, assuming the cambium layer remains active in each stem, the number of the growth rings and bark stripes should decrease as you move away from the center of the stem. Your big cross sections would be great to examine for that phenomenon.

What do you think?

Chuck