

Subject: Re: Effect of early spring on tree growth

Date: Tuesday, March 24, 2020 at 2:11:45 PM Eastern Daylight Time

From: Neil Pederson

To: Teixeira, Kristina A.

External Email - Exercise Caution

Hi Krista,

I would think so, at least for many species in the eastern US, especially if you can catch initial growth.

Neil

On Mar 23, 2020, at 2:13 PM, Teixeira, Kristina A. <TeixeiraK@si.edu> wrote:

Thanks! Would the intra-annual resolution of dendro bands be pretty novel, as far as you know?

Kristina J. Anderson-Teixeira

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From: "Pederson, Neil" <neilpederson@fas.harvard.edu>

Date: Monday, March 23, 2020 at 1:04 PM

To: "Teixeira, Kristina A." <TeixeiraK@si.edu>

Subject: Re: Effect of early spring on tree growth

External Email - Exercise Caution

Hi Krista,

Spring temperatures and deciduous trees are less closely related. However, this paper by Ross implies that some populations do benefit from a warmer late winter -> early spring. The paper is, secretly, an ecology paper if you read between the lines. It is controversial, but the winter temperature signal is being found more and more.

And, see this manuscript in revision; please do not share elsewhere. Loic D'Orangeville connected leaf phenology to growth [as measured by dendrometer bands]. So, there is a bit of a signal there.

As a part of the review process, one reviewer suggested these papers [refs pasted below]. I've not reviewed them yet, but they say we are missing some things. I am not positive the have to do with spring signal or leaf phenology, but they might be useful.

I only have one more hour today. I'm going to jump into the proposal now.

Neil

Cuny, H. E., Rathgeber, C. B. K., Lebourgeois, F., Fortin, M., & Fournier, M. (2012). Life strategies in intra-annual dynamics of wood formation: example of three conifer species in a temperate forest in north-east France. *Tree Physiology*, 32(5), 612–625.

<https://doi.org/10.1093/treephys/tps039>

Fernández-de-Uña, L., Aranda, I., Rossi, S., Fonti, P., Cañellas, I., Gea-Izquierdo, G., 2018. Divergent phenological and leaf gas exchange strategies of two competing tree species drive contrasting responses to drought at their altitudinal boundary. *Tree Physiol.* 1–14. doi:10.1093/treephys/tpy041

Guada, G., García-González, I., Pérez-de-Lis, G., Vázquez-Ruiz, R. A., & Montserrat-Martí, G. (2018). Dry matter content during extension of twigs, buds and leaves reflects hydraulic status related to earlywood vessel development in *Quercus pyrenaica* Willd. *European Journal of Forest Research*, pp. 1–13.

<https://doi.org/10.1007/s10342-018-1104-5>

Gričar, J., Lavrič, M., Ferlan, M., Vodnik, D., & Eler, K. (2017). Intra-annual leaf phenology, radial growth and structure of xylem and phloem in different tree parts of *Quercus pubescens*. *European Journal of Forest Research*, 136(4), 625–637.

<https://doi.org/10.1007/s10342-017-1060-5>

Kitin, P., & Funada, R. (2016). Earlywood Vessels in Ring-Porous Trees Become Functional for Water Transport After Bud Burst and Before the Maturation of the Current-Year Leaves. *IAWA Journal*, 37(2), 315–331.

<https://doi.org/10.1163/22941932-20160136>

Lavrič, M., Eler, K., Ferlan, M., Vodnik, D., & Gričar, J. (2017). Chronological Sequence of Leaf Phenology, Xylem and Phloem Formation and Sap Flow of *Quercus pubescens* from Abandoned Karst Grasslands. *Frontiers in Plant Science*, 8(March), 1–11.

<https://doi.org/10.3389/fpls.2017.00314>

Michelot, A., Simard, S., Rathgeber, C., Dufrêne, E., Damesin, C., Dufrêne, E., & Damesin, C. (2012). Comparing the intra-annual wood formation of three European species (*Fagus sylvatica*, *Quercus petraea* and *Pinus sylvestris*) as related to leaf phenology and non-structural carbohydrate dynamics. *Tree Physiology*, 32(8), 1033–1045.

<https://doi.org/10.1093/treephys/tps052>

Oladi, R., Pourtahmasi, K., Eckstein, D., & Bräuning, A. (2011). Seasonal dynamics of

wood formation in Oriental beech (*Fagus orientalis* Lipsky) along an altitudinal gradient in the Hyrcanian forest, Iran. *Trees - Structure and Function*, 25(3), 425–433.
<https://doi.org/10.1007/s00468-010-0517-7>

Pérez-de-Lis, G., Rossi, S., Vázquez-Ruiz, R. A., Rozas, V., & García-González, I. (2016). Do changes in spring phenology affect earlywood vessels? Perspective from the xylogenesis monitoring of two sympatric ring-porous oaks. *New Phytologist*, 209(2), 521–530. <https://doi.org/10.1111/nph.13610>

Pérez-de-Lis, G., Olano, J.M., Rozas, V., Rossi, S., Vázquez-Ruiz, R.A., García-González, I., 2017. Environmental conditions and vascular cambium regulate carbon allocation to xylem growth in deciduous oaks. *Funct. Ecol.* 31, 592–603. doi:10.1111/1365-2435.12789

Prislan, P., Gričar, J., de Luis, M., Smith, K. T., & Čufar, K. (2013). Phenological variation in xylem and phloem formation in *Fagus sylvatica* from two contrasting sites. *Agricultural and Forest Meteorology*, 180, 142–151.
<https://doi.org/10.1016/j.agrformet.2013.06.001>

Urban, J., Bednářová, E., Plichta, R., Gryc, V., Vavřík, H., Hacura, J., ... Kučera, J. (2015). Links between phenology and ecophysiology in a European beech forest. *IForest*, 8(AUG2015), 438–447. <https://doi.org/10.3832/ifer1307-007>

On Mar 23, 2020, at 12:37 PM, Teixeira, Kristina A. <TeixeiraK@si.edu> wrote:

Hi Neil,

A hopefully quick question— do you know any literature on the impact of early spring on tree growth in temperate deciduous forests? I'm trying to assess the importance of making an effort to get dendrometer band measurements at SCBI this spring. (Fortunately we got the pre- growing season reading a couple weeks ago.) We have a 9-yr record of biweekly measurements, and with the ~1-mo early spring, it seems that capturing growth this spring could be really cool—perhaps a nice intern paper?

Thanks,

K

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