Abstract Title: Cambial activity of Pinus elliottii var. densa reveals influence of solar radiation on seasonal growth dynamics in the Florida Keys

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Abstract:
We determined the temporal and seasonal dynamics of intra-annual cell formation of south Florida slash pine (Pinus elliottii Engelm. var. densa Little & Dor.), the southernmost native pine in the United States and the foundation species of globally endangered pine rockland ecosystems. Previous investigations indicated that trees form a single and explicit growth ring each year, however limited information exists about the timing of growth ring formation and climatic factors influencing cambial activity. To assess intra-annual cambial activity and identify possible relationships between cell production and climatic factors, wood micro-cores were extracted monthly from six trees during the period March 2010 to March 2011. The results confirmed annual growth ring formation in P. elliottii var. densa and indicated that its growing season extends from February to December, with a short period of dormancy that varied little between individuals. Within the growing season, earlywood cells were produced from February to July, latewood cells produced from July to December, and four of six trees formed false growth rings between June and July. A principal component analysis indicated a homogeneous response of cambial activity among trees to site-specific climatic factors. The first principal component axis explained 71% of the total variance in cell production during the study period. Correlations between seasonal cambial activity and climatic factors indicated that the dynamics of intra-annual radial growth of P. elliottii var. densa, including the formation of false rings, are likely controlled by solar radiation ($r = 0.51; p < 0.1$) in the Florida Keys.

Keywords:
south Florida, growing season, intra-annual growth, xylogenesis, tracheid production, slash pine, wood anatomy