AN APPROACH TO DEALING WITH RING QUALITY PROBLEMS IN CYPRESS

When we began working with cypress (Taxodium distichum) tree rings in southwest Florida during the mid 1970's, we merely wanted to age trees to see if this factor would be sufficient to explain size difference of trees in Corkscrew Swamp. As our work progressed, we became involved in a variety of approaches for increasing the certainty of our age estimates and our confidence in identifying real annual growth increments. These have primarily involved sampling of known-age stands and stands affected by known major perturbations which could be expected to have caused significant changes in growth rates.

The major problem affecting the confidence we have in our ring counts on cores is the variation in "ring quality" or the degree to which rings meet our criteria to be considered as an annual growth increment. In the case of cypress, our basic criteria for a "good" ring is a band of cells that gradually decrease in size until at some point a continuous row of small cells is bordered by a continuous row of much larger cells. This criteria has proved to be a reliable standard based on data from trees whose age we have been able to verify independently. However, among the trees we have sampled, most of those older than 100 years and even many younger specimens have not had rings that were consistently of this quality.

In reponse to the problem of evaluating reliability of data from trees with rings of varying quality levels, we developed a rating system to classify the quality of each ring we measure. Basically, the categories reflect our confidence in counting a particular growth increment as an annual ring. A "good" ring is one that would be recognized without magnification on a sanded sample. A "fair" ring easily meets our criteria, but is not sufficiently distinct to be recognized without magnification. A "poor" ring only marginally meets our criteria and could represent a false ring. Bands of cells that do not even marginally meet our criteria, but represent some interruption of growth, are considered to be "false" rings and their numbers are recorded for each annual ring in which they occur. The information on ring quality and number of false rings, in terms of either an entire core or certain portions of one, is used in subsequent analyses to evaluate the credibility of any particular ring's age and to allow us to give added weight to more reliable data when discrepancies in interpretation occur in different cores.

Investigators involved in the development of tree ring chronologies and the use of tree rings to document environmental events or changes in environmental conditions frequently utilize unusually narrow rings as chronology markers or to document the occurrence of adverse environmental events. Unfortunately, in cypress, narrow rings are highly correlated with what we classify as "poor" rings, and thus have to be considered somewhat unreliable indicators of real annual growth increments. This could limit their value in many tree ring analysis studies involving cores from cypress.

One possible means of minimizing this problem would be to utilize relatively young cypress, generally those less than 50 to 100 years old. Examination of the relationship between ring width and age for numerous older specimens has revealed a much greater variability in ring width, with some up to 7 mm, during the first 30 to 90 years of a tree's life than after about 90 to 150 years when maximum ring widths are rarely more than 1mm. In general, the larger average size of ring widths in younger trees correlates with better quality rings. Thus, any conclusions about the significance of relatively narrow rings would generally be most reliable if based on data from trees less than 50 to 100 years of growth for older trees.

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Cambial Activities. 1981. Increment 4. 7 pp.

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