

**Mount Allison
Dendrochronology Lab**

Little Dyke Detrital Wood Samples:
Identification and Tree-ring Measurements

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Abstract

The first step in establishing the species and age of a detrital piece of wood from Little Dyke, Nova Scotia was to complete tree-ring measurements and examine its anatomical properties at the Mount Allison Dendrochronology Laboratory. The two workable samples that were delivered to the MAD Lab were oven dried, reinforced, cut and sanded to a smooth polish. The ring widths of the pieces were then measured using a high-resolution scanner and program WinDENDRO™ to a precision of 0.01 mm. The images were used to determine the species of the detrital wood samples and to compile the minimum ages and growth pattern from each sample. The samples were determined to be eastern white pine (*Pinus strobus*), with a minimum age ring sequence of 131 years. The relatively long sequence of measurements from the samples will lead to an increased chance of eventually crossdating the samples into a living chronology.

Introduction

In the late-fall of 2011, the MAD Lab was contacted by Linda Giddens who found some wood buried on her property near Little Dyke, Nova Scotia (Figure 1). Subsequent excavation and sampling of the wood, allowed her to bring two pieces of one tree to the Mount Allison Dendrochronology Lab (MAD Lab).

In order to answer the question of how old the sample was when it died, and to obtain information on the species of the wood, the MAD Lab was contracted to help answer her questions. To do this, the MAD Lab needed to acquire clear radial images of the two samples provided, and these images would be able to help determine answers to the two key questions: 1) What is the species of the tree, and; 2) What is the approximate age of the tree (how many annual growth rings did it have) when it died.

Methods

The two waterlogged samples were wrapped in duct tape and plastic to help bind the wood, and then they were oven dried at 45° C for 10 days. Every 12 hour period, the samples were checked and rewrapped if necessary. Once dried, enough to resist binding in the saws, they were each cut in half to make a total of four samples (11BED001A, 11BED001B, 11BED002A, and 11BED002A). Each sample was reinforced with adhesive, and oven dried for a further 24 hours. The samples were then sanded with progressively finer sandpaper grades: 80, 120, 220, 320 and 400 grit. The smoothed samples displayed the radial cell structures of the wood well, which made defining characteristics more easily visible under a microscope (Figure 2). The samples were then measured using a high-resolution scanner, paired to the software program WinDENDRO™, a digital measuring system which analyzes tree rings to a precision of 0.01 mm. Each sample was measured on a linear transect from the pith, outward towards the bark side of the tree. These ring-width parameters were then graphed.



Figure 1: Excavation at the Linda Giddens site at Little Dike, NS.

Results

Observations of the anatomical structures of ring boundary transitions, and specifically the identification of resin ducts throughout the samples revealed characteristics typical of eastern white pine (*Pinus strobus*). The resin ducts (Figure 2A and 2B) leave no doubt that the species is white pine.

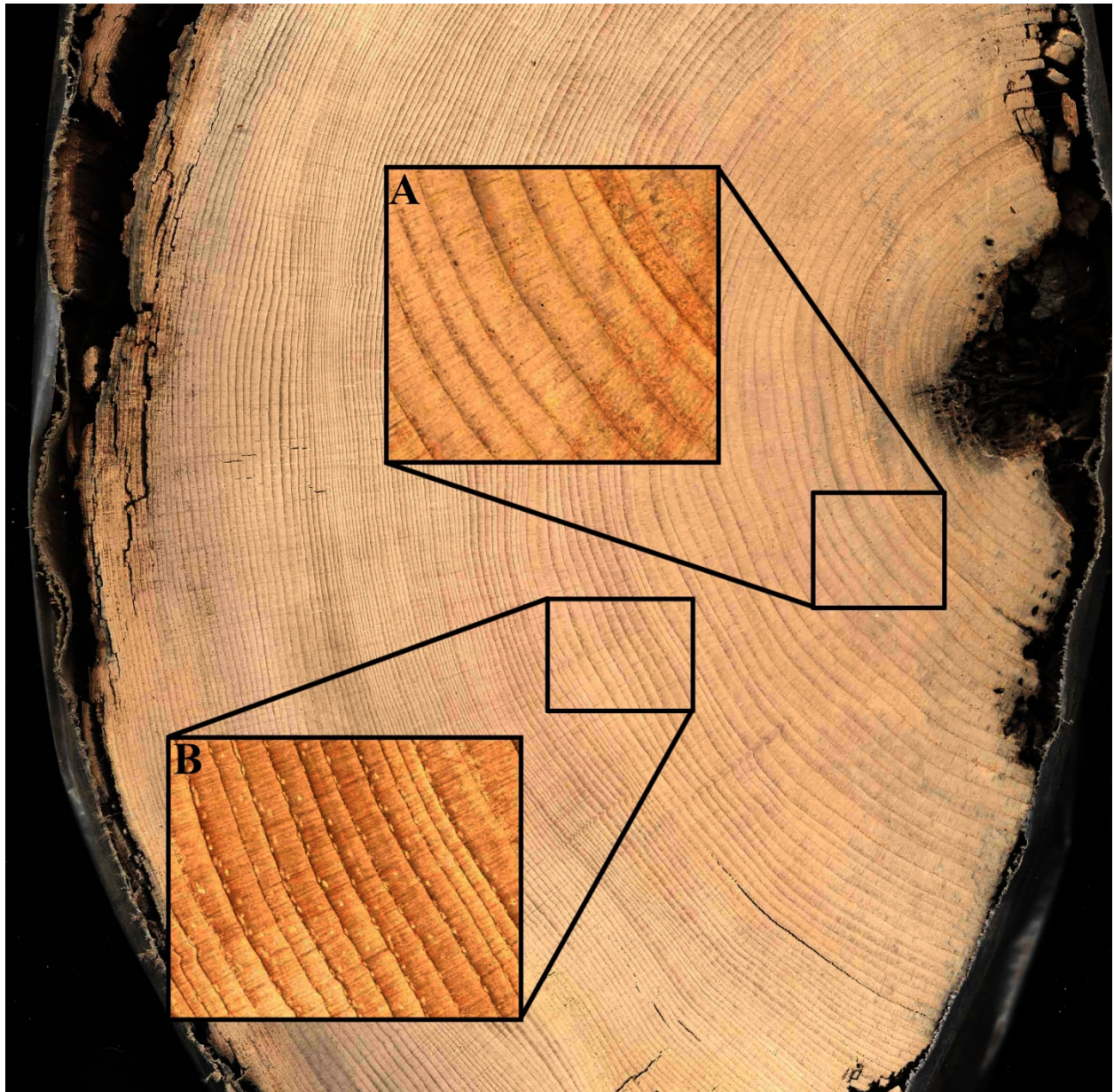


Figure 2: Image of MAD Lab sample # 11BED01B, representing resin ducts seen throughout the samples. For example in A by smaller black pits, and in B, as whiter pits within close proximity to the darker latewood ring boundaries.

The four sample cores had an average-ring width of 0.99 mm/year. Sample paths of 11BED001A had a span of 112 years, 11BED001B had a span of 113 years, 11BED002A had a span of 121 years, and 11BED002B had a span of 131 years. The measurement patterns and span of overlap of all of the samples is illustrated in Figure 3. The Figure illustrates a detrended index of annual growth for each sample. The similar patterns help confirm that these individual pieces of wood are from the same tree.

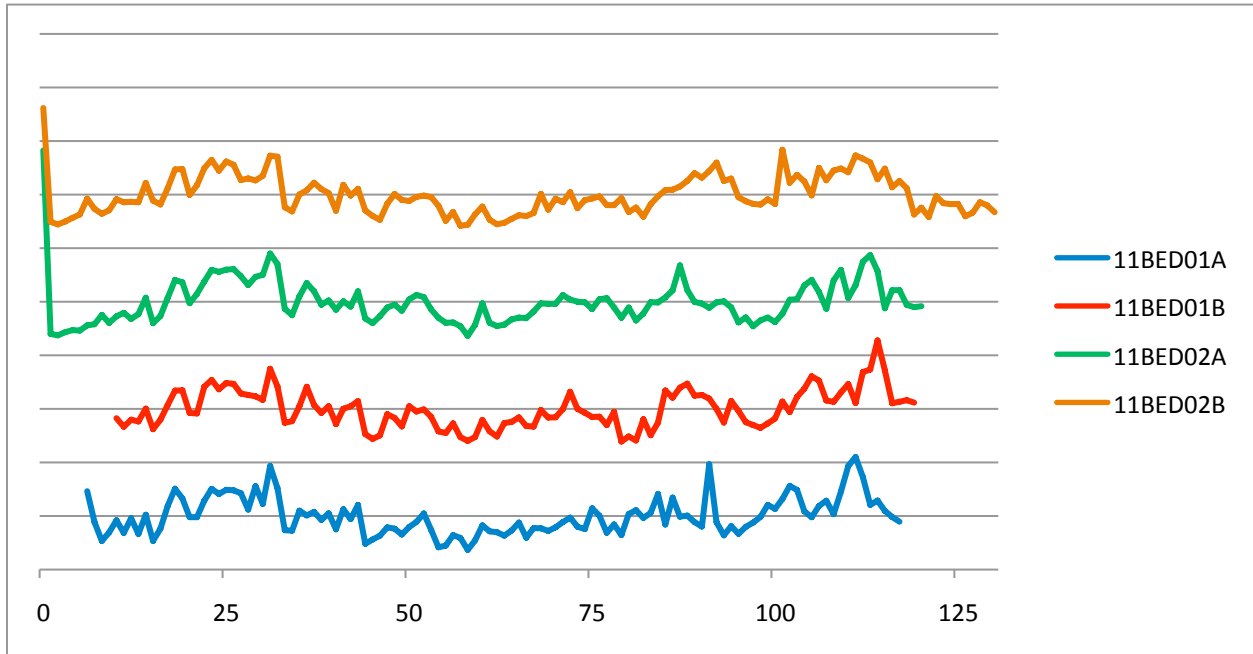


Figure 3: Graph of Little Dyke wood samples indicating the areas of overlap between the individual radii measured, over the entire 131 years of record.

Conclusion

Through analysis and measurements conducted by the Mount Allison Dendrochronology Lab, a radial growth pattern representing a 131-year timespan was established for the Little Dyke detrital wood samples. This length of pattern should be sufficient to eventually allow a statistically significant crossdate to be formed against a live chronology if one ever became available, or if the floating sequence could be tied to a carbon date. Current Nova Scotia white pine chronologies do not extend back to a time period able to determine a calendar date for these samples.