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**Annual-growth-ring analysis of an
Arctic *Salix* from Newfoundland and Labrador**

By

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ABSTRACT

A small ~7.5 cm long sample of an Arctic willow was delivered to the MAD Lab to distinguish if “annual” rings within the piece of wood could be distinguished. The sample was thought to be uncharacteristically large for the region in which it was sampled. Forty-four rings-like structures could be identified with the average width of the rings being 0.32 mm. The sample in question was also burnt in the past, and the wounding and scarring of the wood is easily visible in the sample.

INTRODUCTION

A sample of an arctic willow (*Salix* sp.), measuring approximately 7.5 cm long, with a 2.5 cm diameter was delivered to the MAD Lab for a preliminary analysis to determine if ring sequences could be distinguished in the sample. The sample was collected in northwestern Newfoundland and Labrador under the supervision of Parks Canada representatives and taken to the MAD Lab for analysis. It was found lying prostrate on the ground and seemed unusually large in comparison to the other specimens in the area. The main objective of this analysis is to determine if an annual ring sequence can be distinguished and if so, to determine how many growth rings are present in the sample.

RESEARCH METHODS

A small 1.0 cm wide portion of the *Salix* sample was sawn off of the main branch and sanded with a fining upward sequence of sandpaper (through 80, 120, 220, 320, 400, and 600 grit). The sample was then polished with a buffing wheel to rid the sample of fine dust and to make the cell structure of the sample stand out.

The sample was scanned at 2400 dpi and a ring-width analysis was conducted on the sample using a WinDendro™ Image analyzing system (Figure 1). Ring boundaries that were difficult to discern on the WinDendro™ system, were double checked using a 63x continuous zoom microscope for ring-width measurement accuracy.

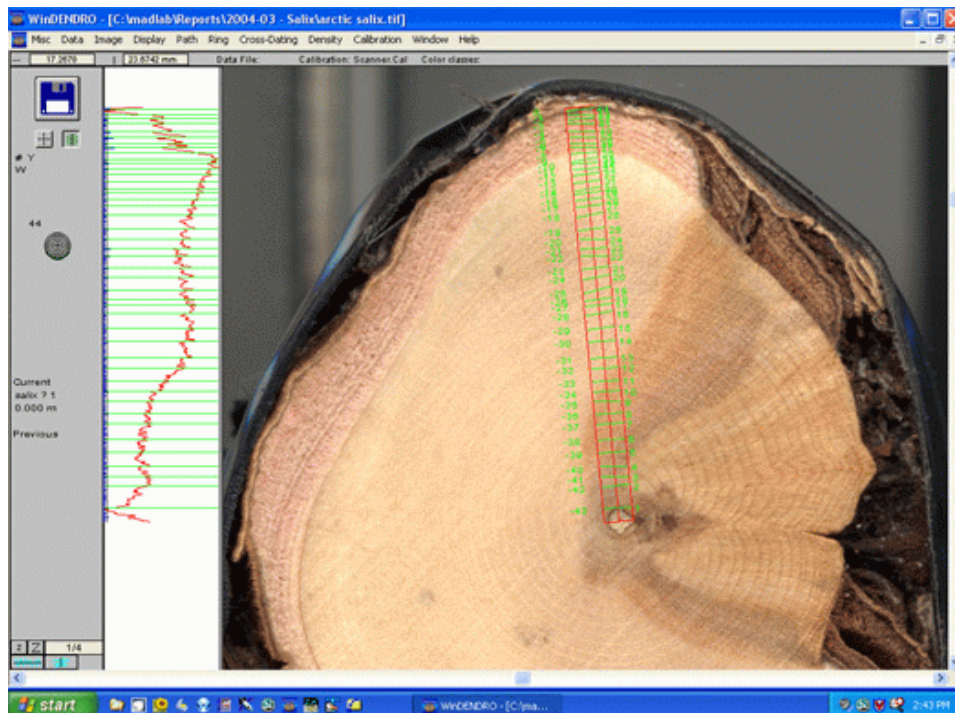


Figure 1 - Location of the measurement path on the *Salix* sample. Note the discoloured quadrant on the right side of the sample probably due to a fire scar and subsequent rot.

RESULTS AND DISCUSSION

Final analysis revealed that 44 rings were present and discernable within the sample (Figure 2). Wood structures that are characteristic of many tree species were present in the shrub specimen. Apical growth cells were present in the pith, while earlywood and latewood cell structures were present in the radial dimension, making it possible to date the “annual” rings. In this case, the rings are treated as annual increments of radial growth, but there is no proof that they truly represent an annual increment. There does not appear to be a wealth of literature on the annual nature of *Salix* rings, and since the exact species of this Arctic willow is unknown, we are hesitant to confirm that they are true annual increments. There also appears to be “rings” within the bark of the specimen, which again is common for many tree species.

The sample also clearly displays a wounding within one quadrant of its radius. The wounding seems to have been through scarring of the bark on the disturbed quadrant by fire. The presence of charcoal on the outside of the wound signifies that approximately 8 years before the last ring, the willow was burnt on that quadrant. Subsequent years of growth were starting to grow over the wounded area. The disturbed quadrant is deeply discoloured, a likely result of rot setting in from an outward crack in the damaged part of the specimen.

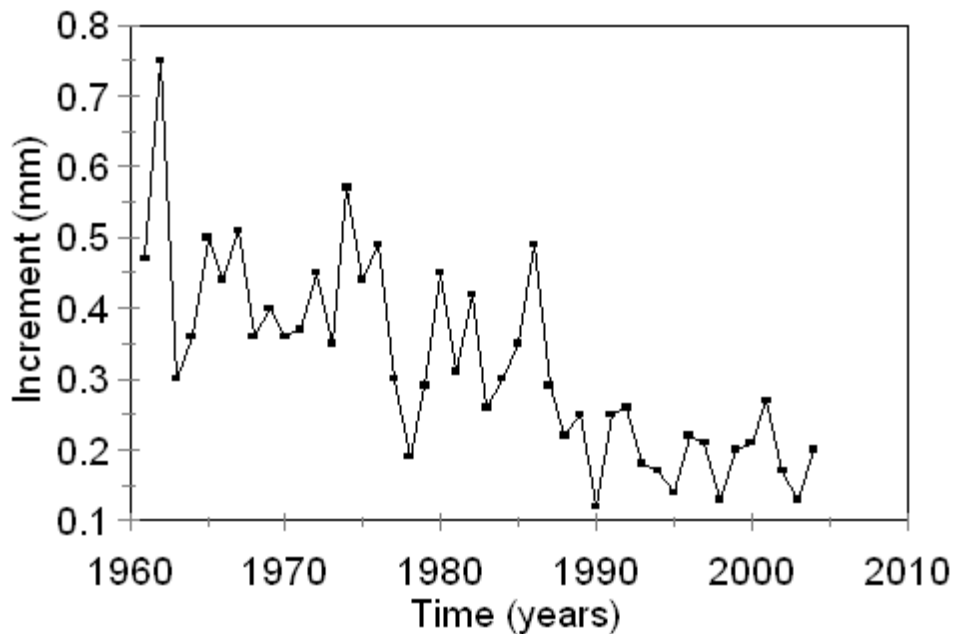


Figure 2 - Radial growth increments of the *Salix* sample over time. *Note: For this analysis, the end date was assumed to be 2004, but the actual end date is unknown.*

CONCLUSION

In conclusion, 44 measurable rings signify that the Arctic *Salix* shrub is probably remarkably old. With no context to put specific age-related information about this species into, the initial results signify that this shrub grows in a radial fashion with annual increment characteristics very similar to tree growth. The average annual increment in radial growth (0.32 mm) is narrow which when put in the context of the probable growing regime of the sample, signifies that the sample has been growing very slowly, for a long period of time.