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Examining Eastern Hemlock Old-Growth Forest at the
2006 Bio-Blitz, Southwestern Nova Scotia

By

Sarah J. Hart, Bethany Coulthard, Natasha O'Neill,
Carolyn Reardon, Ben Phillips, André Robichaud and Colin P. Laroque

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Abstract

The goal of this research project was to help intensively sample a single location across many scientific disciplines as part of the Bio-Blitz team in the summer of 2006. Tree cores were selected from approximately 24 trees at the site of intense sampling for the overall team. Cores were processed using standard techniques and 38 of the 42 cores collected during the Bio-Blitz project illustrated a similar radial growth pattern and so were averaged into a master chronology for the site. The chronology illustrates a similar growth trend to others found in the region and spans the time frame from 1661 to 2006, a 346 year interval.

Introduction

Members of the Mount Allison Dendrochronology Lab (MAD Lab) were invited to be part of the Nova Scotia BioBlitz weekend in the summer of 2006. BioBlitz is a meeting of like minded scientists from across the region working in all areas of biological field research. The goal of the research collective is to intensively sample an area across many scientific disciplines in a short time period, with the goal of collecting and archiving the information of the group in a multi-faceted approach.

Study Site

The MAD Lab provided increment coring data from the chosen site, the Lahave Drumlins old growth forest on the Gasper Bay of Lake Rossingol, in 2006. The old-growth forest site chosen was located at 65.95° N latitude and 44.27° W longitude. The area marked a well drained coniferous forest; the dominant tree species was eastern hemlock (*Tsuga canadensis*). The site was sampled on July 27, 2006 and the raw cores were brought back to the MAD Lab for processing.



Figure 2 – Members of the MAD Lab sampling *T. canadensis* in the LaHave Drumlins.

Methods

Standard dendrochronology practices were used to sample 24 trees at the LaHave Drumlins site. Two cores were taken at breast height for each tree. Cores were taken at 180° to one another since the trees were found growing on a slope. This was done to

acquire cores that could be used together to derive the average growth of the tree species at the site.

All cores taken were transported back to the MAD Lab, air dried, and glued into slotted mounting boards. The cores were then sanded to a 600 grit polish. The ring widths of each sample were then measured using a WinDendro computer software system and a high resolution flatbed scanner to allow for the extraction of growth trends. All samples were measured to 0.001 mm. Ring width patterns for each species were crossdated both visually and statistical using program COFECHA (Holmes et al., 1986). COFECHA correlations were derived using 50 year segments lagged successively by 25 years. Tree patterns that exhibited correlations over 0.3281 were significant to the 99% interval. Each data set was then analyzed using program ARSTAN (Cook 1999). A single detrending method was implemented to derive a master average chronology that illustrated the unified growth signal of all trees.

Results

Thirty-eight of the 42 cores collected during the Bio-Blitz project illustrated a radial growth pattern and were averaged into a master chronology for the site (Figure 1). The chronology illustrates a similar growth trend to other eastern hemlock found in the region and spans the time frame from 1661 to 2006, a 346 year interval.

In general during the last ~100 years, radial growth changed from a low at the end of the 19th century, to its best growth during the 1930s and 1940s. From that period until the mid-1970s radial growth was reduced, but it has since taken a marked upturn and is again

exhibiting some wide radial growth in the last 30 years. This coincided with recent warming trends in the climate.

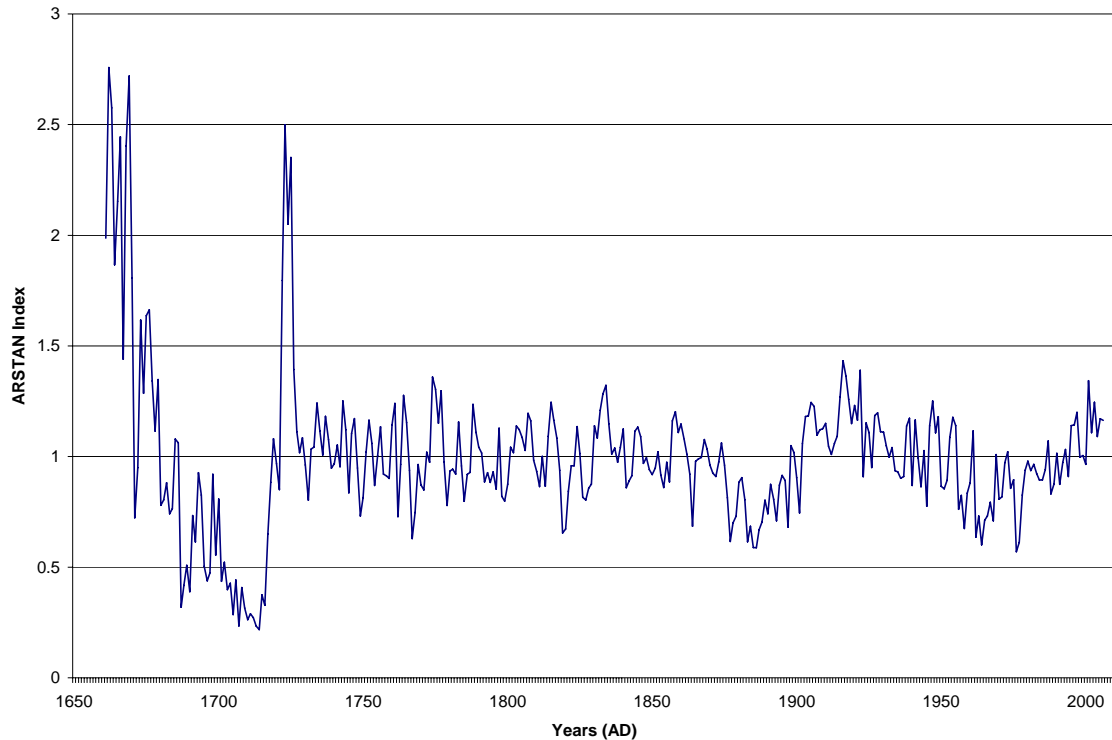


Figure 1 – The eastern hemlock master chronology of the samples collected from the Bio-blitz project. The master correlation (0.491) was significant above the 99% level. The chronology is the average of 38 of the samples taken. Note, average growth is indicated as 1.0 on the Figure, with values above 1.0 above indicating above average growth, and values below 1.0 below indicating below average growth. Note: only one sample makes up the average before 1728.

Conclusion

The data collected at the Bio-Blitz site goes a long way in helping understand the site.

Trees at the site have been growing in place for at least the last 350 years and because of this, a diverse and biologically distinct set of characteristics has evolved in the region over this time frame.

The radial growth of the trees at the site exhibit similar characteristics to other hemlock sites sampled in southwestern Nova Scotia. This illustrates the dominance that the climate plays in the growth of the trees at the site.

References

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