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Old-growth trees of Prince Edward Island: Survey of ages for five softwood species at Valleyfield Demonstration Woodlot

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Abstract

Five species of softwood trees were sampled by the Mount Allison Dendrochronology (MAD) Lab in Valleyfield Demonstration Woodlot near Montague, Prince Edward Island. These species were black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), white pine (*Pinus strobus*), eastern hemlock (*Tsuga canadensis*) and red spruce (*Picea rubens*). The ages of these trees were found to be between 46 and 148 years. These samples were used to create the first ever chronologies of radial tree growth on Prince Edward Island, which serve to broaden the basic dendrochronological knowledge of the PEI region.

Introduction

Valleyfield Demonstration Woodlot was created by the PEI Department of Environment, Energy and Forestry with the purpose of demonstrating proper forest management and increasing awareness of PEI forests. Located near Montague, Prince Edward Island at the intersection of Routes 326 and 354, Valleyfield is one of six demonstration woodlots on PEI (Government of Prince Edward Island Website, 2007).

The purpose of the Mount Allison Dendrochronology (MAD) Lab in sampling at Valleyfield Demonstration Woodlot was to create radial growth chronologies for the trees of Prince Edward Island. No other radial growth chronologies had existed for the region prior to this study. Valleyfield Demonstration Woodlot was chosen as a sampling site because it was reputed to have some of the oldest trees on PEI.

Methods

Sampling by the MAD Lab took place at on June 13, 2007. Samples were taken at breast height using 4.3 and 5.1 mm increment borers and stored in plastic straws. Black spruce (*Picea mariana*), balsam fir (*Abies balsamea*), white pine (*Pinus strobus*), hemlock (*Tsuga canadensis*) and red spruce (*Picea rubens*) were all sampled. The increment borers were disinfected using 70% isopropyl rubbing alcohol before sampling began and before each new tree species was sampled. Two samples were taken 90° from each other.

In the lab, the core samples were glued into grooved wooden boards and sanded to a high polish using 80, 120, 220, 320, 400 and 600 grit sandpaper. The ring widths of each core sample were then measured using either a light microscope with 63X magnification and a Velmex stage system, or a high-resolution scanner and WinDendro™ Imaging software.

Results

The age of each core sample can be found in Table 1. This information is summarized in Table 2, which gives the ages of the oldest samples as well as the mean ages for the tress of each species. The oldest tree sampled at the woodlot was found to be a 148 year-old eastern hemlock, and the youngest sampled, a 46 year-old white pine.

Discussion

In many cases slight discrepancies exist between the ages of samples from the same tree because not all samples reached the pith (center) of the tree, and repeated sampling of the tree was not permitted. Also, rings from years with particularly poor growing conditions are not always visible around the entire circumference of the tree, and so there may be locally absent rings in any given core sample, as a sample only covers a very small section of the circumference of a tree. The dates given in Table 1 therefore represent minimum DBH ages only for the trees of Valleyfield Demonstration Woodlot.

It should be noted that although red spruce samples are shown in Table 2 to have the oldest mean age, only one tree was sampled, therefore this number is not an accurate representation of the entire red spruce population of Valleyfield, rather it is the mean age of one tree in the stand.

Conclusion

The trees sampled in Valleyfield Woodlot were found to be older than expected prior to sampling. The chronologies created from these samples represent an important step toward the MAD Lab's goal of establishing the first old growth tree chronologies for the region of Prince Edward Island. It is hoped that the present chronologies can be extended further back in time by using wood preserved in historical Island structures. These extended chronologies could be used to gain information about past climates in the region for the period of time before written weather records were kept. They could also be used to date other historical structures through dendroarcheological crossdating.

References

The Official Website of the Government of PEI, Canada. "The PEI Department of Environment Energy and Forestry: Valleyfield Demonstration Woodlot." Online: http://www.gov.pe.ca/envengfor/index.php3?number=73372. Accessed December 3, 2007.

Table 1 – The year of the first ring measured on each sample from Valleyfield Demonstration Woodlot. The oldest sample of each species is bolded, while samples that extend to the pith are marked with an asterisk.

Sample	End year of sample				
	Black spruce	Balsam fir	White pine	Hemlock	Red spruce
1a	1948	1942	1951	1935	1897
1b	1952	1943	1958	1927	**1882**
2a	1886	1936*	1899	1936	
2b	1897	1942	1884	1889	
3a	1903	1914	1892	1917	
3b	1890	1912	1961	1920	
4a	1899	1925	1883	1905	
4b	1886	1925*	1899	1917	
5a	1880*	1930	1922	1868	
5b	1882	1931	1904	1872	
6a	1894	1945	1931	1901	
6b	**1878***	1954	1924	1874	
7a	1931	1949	1899	1928	
7b	1934	1932*	1924	1877	
8a	1934	1932	1927	1918	
8b	1930*	1933	1900	1922	
9a	1925*	1939	1888	1880	
9b	1911	1939	1916	1885	
10a	1891	1945	1926	1898	
10b	1891	1945	1890	1894	
11a		1937	1886	1909	
11b		1935*	**1879**	1900	
12a		1952	1901	1918	
12b		1948	1894	1926	
13a		1936	1888	1894	
13b		1939	1884	1925	
14a		1934	1917	1874	
14b		1928*	1910	1922	
15a		1958	1908	1910	
15b		1952*	1902	1920	
16a		1929		1877	
16b		1941		1917	
17a		1956		1900	
17b		1943		**1959***	
18a		1887		1919	
18b		1882		1877	
19a		**1876***		1954	
19b		1892		1954	
20a		1960		1885	
20b		1950		1893	
21a		1950			
21b		1944			
22a		1968			
22b		1957			

Table 2 – The last year of growth, age in years of oldest sample, mean last year of growth, mean age of samples, and mean ring width in millimetres for each species sampled in Valleyfield Demonstration Woodlot.

Species	First year of growth	Age of oldest sample (years)	Mean first year of growth	Mean age of sample (years)	Mean ring width (mm)
Black spruce	1878	129	1907	100	1.11
Balsam fir	1876	131	1936	71	1.37
White pine	1879	128	1908	99	2.25
Eastern hemlock	1859	148	1907	100	2.04
Red spruce	1882	125	1890	117	1.57