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Tree ring dating of a red oak stump from East Royalty, PEI

By

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ABSTRACT

A red oak (*Quercus rubra*) tree stump was delivered to the MAD Lab by Bill Glen from the Department of Environment , Energy and Forestry in PEI.. The tree was believed to have been blown down in a storm in January 1989. The stump sample was surfaced and a trace of the ring pattern was analyzed indicating that the tree was 126 years old when it died. Ring measurements indicate that tree growth expresses ring variation in a classic negative exponential pattern. Although no other ring measurement patterns for red oak could be found in the region to verify the ring patterns through crossdating, it is believed that no missing rings are present in the sample. The tree is believed to be the oldest red oak in Price Edward Island.

INTRODUCTION

The Mount Allison Dendrochronology Lab (MAD Lab) was contacted to process a tree stump that was collected by the Department of Environment, Energy and Forestry in Prince Edward Island. The sample came from a location in East Royalty, PEI (Lat. 46.2683672 N, Long. 63.1106076 W), just outside of Charlottetown. The tree blew down in a winter storm in January of 1989 and a stump sample was cut from the base of the bole in the late spring, early summer of 1989. The tree was reported to be one of the largest and most sound red oak (*Quercus rubra*) individuals known on the island. Because of this fact, it is also considered to be a sample of one of the oldest red oak trees on PEI, a species which is of great interest, but who's ring pattern has very little known about it in the region.

For this reason, the MAD Lab processed the sample using standard dendrochronological methods to determine the age and ring measurements for the sample. The process was broken into three steps, 1) surfacing the sample, 2) extracting a ring pattern of radial growth for the sample, and 3) if possible pattern matching (crossdating) the sample's ring record into an existing base chronology for the region.

SAMPLE PREPARATION AND ANALYSIS

The large sample arrived at the MAD Lab from the Department of Environment, Energy and Forestry in Prince Edward Island, and was assigned the MAD Lab sample number 06AA001. The sample was of sufficient size that only a small path of the disk was prepared. Although thoroughly dry, the sample was in great condition, with only minor amounts of surface checking visible.

To prepare the sample for ring measurement, the disc was sanded flat with progressively finer sanding paper until a smooth polished finish was obtained. The sample was then buffed to remove any sanding dust and a final polish was applied to prepare the sample for tracing. Because of the shear size and weight of the disk sample, a tracing method was designed to transfer the ring pattern to a series of papers to be further analyzed in the MAD Lab.

RING MEASUREMENTS

The paper trace and accompanying notes were then scanned into the WinDendro™ program and an analysis was conducted. Although the WinDendro™ system is capably of measurements up to 0.001 mm, the extra step of developing the trace probably limits ring measurement resolution to 0.01 mm. Even with this loss of resolution, the rings are so relatively large, that any margin of error would be very small.

Two paths were measured and pattern matched with each other to determine if the ring widths were showing the same general configuration within the sample. The analysis established that they were almost nearly identical and so average measurements were created for each year. The sample was then deemed robust enough to attempt crossdating with a living chronology if one could be found from within the region. An end date of 1988 was given to the chronology as no radial growth from the 1989 year was found.

RESULTS

Figure 1 displays the results of the analysis. Growth is typical of trees growing in an open meadow location or in an environment where little competition is present. Apical growth on the stump sample initiated in 1862 with large rings being produced in the early years of the trees life. A general reduction in the width of the radial-growth rings of the tree follows a typical negative exponential growing trend.

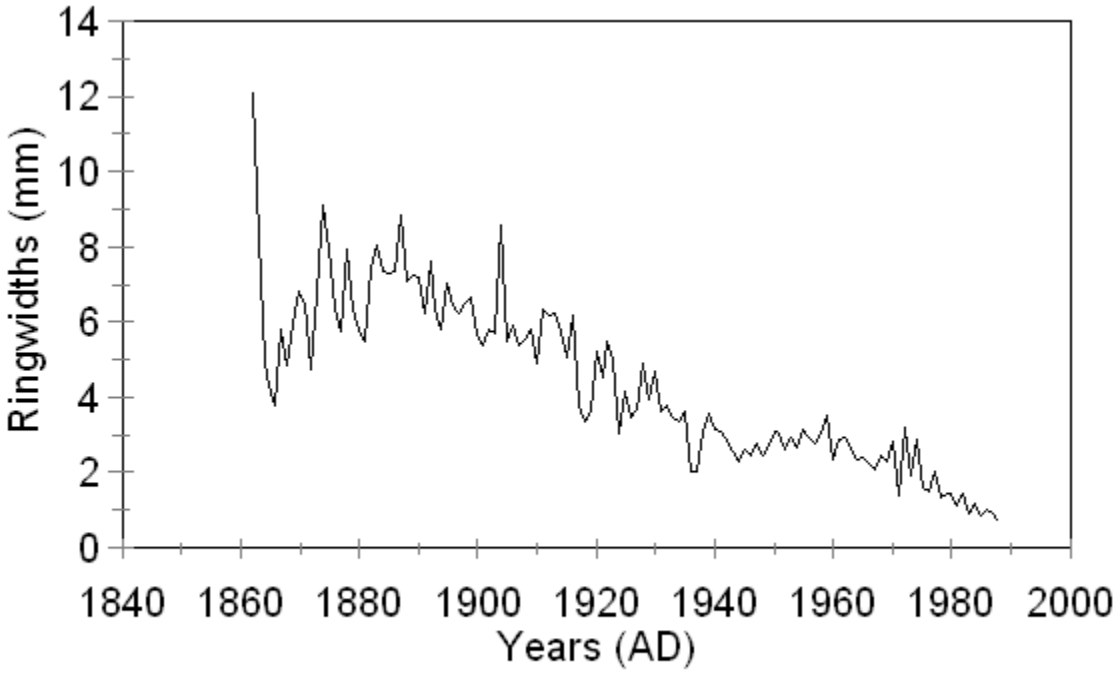

Figure 1 - Ring measurements of MAD Lab sample 06AA001, a series of red oak data from East Royalty, PEI. The series spans a time frame from 1862 to1988.

Cross-dating

Although a search of databases that may have contained growing records of other red oak in PEI was conducted, no red oak chronologies were found. At this time, the sample provides the first recorded growth record and until such time that others samples can be found, the data will be archived in the MAD Lab as well as shared with the client to wait until it may be used in the future.

CONCLUSION

Although no other ring measurement patterns for red oak could be found in the region to verify the ring patterns through crossdating, it is believed that no missing rings are present in the sample. The tree is believed to be the oldest red oak in Price Edward Island, and is clearly the first to be measured and archived in any dendrochronological database in the Maritimes of Canada. It is hoped that in the future more samples can be located in the province through various methods to expand the red oak record.

APPENDIX A

Raw ring measurements in mm.

Red oak

1862	12.0700	1891	6.2500	1920	5.2200	1951	3.0200	1980	1.4400
1863	8.2800	1892	7.6300	1921	4.5500	1952	2.6000	1981	1.1000
1864	4.9800	1893	6.3600	1922	5.4800	1953	2.9300	1982	1.4300
1865	4.3000	1894	5.8100	1923	4.9900	1954	2.6700	1983	.9300
1866	3.7900	1895	7.0500	1924	3.0400	1955	3.1500	1984	1.1800
1867	5.8100	1896	6.4400	1925	4.1400	1956	2.9100	1985	.8400
1868	4.8700	1897	6.2400	1926	3.4500	1957	2.7500	1986	1.0100
1869	6.0000	1898	6.5200	1927	3.6700	1958	3.0200	1987	.9300
1870	6.8100	1899	6.6600	1928	4.8900	1959	3.5300	1988	.6700
1871	6.4900	1900	5.6600	1929	3.9300	1960	2.3600		
1872	4.7300	1901	5.3800	1930	4.6800	1961	2.8600		
1873	6.7500	1902	5.7900	1931	3.6000	1962	2.9300		
1874	9.1200	1903	5.7000	1932	3.7700	1963	2.6500		
1875	7.9400	1904	8.5800	1933	3.4500	1964	2.3300		
1876	6.4200	1905	5.4800	1934	3.3800	1965	2.3900		
1877	5.7400	1906	5.9100	1935	3.6300	1966	2.2200		
1878	7.9200	1907	5.4100	1936	2.0200	1967	2.0800		
1879	6.3200	1908	5.5700	1937	2.0200	1968	2.4700		
1880	5.8100	1909	5.8300	1938	3.1200	1969	2.3100		
1881	5.5000	1910	4.9000	1939	3.5800	1970	2.8200		
1882	7.3900	1911	6.3400	1940	3.1500	1971	1.4100		
1883	8.0400	1912	6.1700	1941	3.0800	1972	3.2300		
1884	7.3500	1913	6.2500	1942	2.8800	1973	1.9100		
1885	7.3300	1914	5.7500	1943	2.5400	1974	2.9000		
1886	7.3700	1915	5.0700	1944	2.2900	1975	1.6000		
1887	8.8500	1916	6.1700	1945	2.6400	1976	1.5100		
1888	7.1000	1917	3.8000	1946	2.4400	1977	2.0100		
1889	7.2700	1918	3.3600	1947	2.8000	1978	1.3400		
1890	7.1800	1919	3.6100	1948	2.4700	1979	1.4300		
				1949	2.7300				
				1950	3.0800				