

A Dendrochronological Analysis of Canadian Prairie Shelterbelts: Murphy Farm



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Abstract

In the summer of 2013, 40 core samples were taken from 20 trees at the Murphy site for the purpose of the four-year Agricultural Greenhouse Gases Program (AGGP), which seeks to determine the carbon sequestration capabilities of shelterbelt trees and their response to climate and climate change. The Mistik Askiwin Dendrochronology Lab at the University of Saskatchewan processed these cores. Dendrochronological techniques were used to identify the age of the trees. At this site, white spruce samples were collected. It was found that the oldest samples were 27-years old with an average age of 20.

Introduction

The Mistik Askiwin Dendrochronology Lab (MAD Lab), located at the University of Saskatchewan, is currently involved in a project for the Agricultural Greenhouse Gases Program (AGGP), which is investigating the capability of shelterbelt trees to store carbon. The carbon storage capability of these trees will inform their ability to off-set carbon emissions and potentially act as carbon credits. The objective of the larger project is to determine the current and future capacity of carbon sequestration in these shelterbelt trees.

In the summer of 2013, samples for this project were collected across most of Saskatchewan. These samples were used as a part of the larger study, looking at shelterbelt tree growth over time since the trees were planted. As a landowner, and therefore a stakeholder in this project, we would like to provide you with the results from our findings on your property.

Site Information

MAD Lab Site Code: 13GL200

Date: June 1, 2013

Site Name: Murphy's Farm

Site Contact Info: Elmer and Loretta
Murphy

Latitude: 52° 54' 07.7"

Longitude: -104° 25' 53.0"

UTM: 0538247 5861537

UTM Zone: 13U

MASL (m above sea level): 473m

Satellites: 12

Precision: ± 5m

Species Common Name: White Spruce

MAD Lab Species Code: 200

Methods

The MAD Lab sampled twenty white spruce trees, using a 5.1 mm increment borer to take two core samples from each tree at approximately breast height. These samples were stored in plastic straws and taken back to the MAD Lab in Saskatoon, Saskatchewan for analysis. The samples were glued into slotted mounting boards and labeled with the appropriate site code. The samples were sanded with progressively finer sandpaper (60 to 600 grit) and then buffed in order to reveal the cell structure of the tree rings. The annual-growth rings were measured under a microscope using a Velmex stage system with a precision of 0.001 mm, ultimately yielding an age for each tree.

Results and Discussion

The oldest tree was found to be 27-years old at breast height, while the average age of all trees at the site was 20. This suggests they were planted in the mid-80's, which is in agreement with the database provided from the Prairie Farm Rehabilitation Association, which indicates that the white spruce were sent there in 1980. The average raw ring-width measurement was determined to be 5.08 mm (see Table 1 for summary).

Table 1. Summary

Site Code	Number of Trees Cored	Oldest Tree	Average Age	Average Ring Width
13GL200	20	27	20	5.08

Conclusion

The results from this analysis help to strengthen our record of white spruce growth over time within Saskatchewan's northeast. The data used from this site will be used in future studies, which will attempt to determine future growth trends and the amount of carbon sequestered by white spruce to determine its potential and viability in carbon sequestration.

This research was conducted at the MAD Lab in Saskatoon, Saskatchewan, and funded through the AGGP. Any questions regarding the findings of this report should be directed to:

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