



Maple Research Programme Newsletter

July 2013

To Provide Research, Development, Innovation, Education and Training

IN THIS ISSUE

Maple Research Programme

by Dr. Raj Lada and Karen Nelson

The Maple Research Programme was established in 2012 at Dalhousie University, in partnership with the Maple Producers Association of Nova Scotia (MPANS) to provide Research, Development, Innovation, Education and Training.

PHASE I: Identifying Research Priorities

At the Annual General Body Meeting on Jan. 19, 2013, a panel discussion and a workshop were conducted. The Workshop has identified the following areas as research priority:

Tree Physiology: The quality and quantity of syrup and tree productivity are all linked to the tree's ability to photosynthesize, its sink activity, sink capacity and storage, and root activity. Understanding the tree's physiology and its ability to adapt to environmental stresses, to resist pests and diseases would provide us with tools to manipulate the trees for high yield, quality and adaptability to challenging environment.

Maple Production: Sugar and syrup quantity and quality are determined by genetic, environmental and management practices. Identifying the "Best Management Practices" and developing environmentally, ecologically and economically sustainable technologies would help to move the industry forward. This platform would address tree health, nutrition, soil fertility, competition, tapping intensity, tapping systems, processing techniques and so on.



Maple Research Programme

Page 1



AGM held on Jan 19, 2013

The Maple Research Programme is led by Dr. Raj Lada from Dalhousie University, and is supported by the Maple Research Programme Steering Committee. The committee consists of Dr. Raj Lada and Robert Frame as co-chairs and Dale McIsaac as the Secretary, William Allaway of Acadian Maple, and producers Kevin McCormick and Matthew Harrison.



Maple Study Trip

Page 3

Food Safety and Quality: There is growing concern among consumers and demand for food safety. The maple industry can remain competitive if we adopt high standards in food safety and quality. Food safety issues relate to identifying areas of concern from "Taps to Transport" and "Sap to Shelf". This platform would also identify and develop standards and technologies for monitoring food safety and ensuring the quality of maple products.

Market: We might have a wonderful product and perhaps adopt wonderful practices, but if it is not branded properly or if the products are not marketed properly, the product will lose its value. Identifying market opportunities and the constraints are important to removing the barriers in marketing. The marketing practices, opportunities, informatics, and logistics would help the product's appeal, fetch higher prices and profits. This platform would address the above.

Innovative Maple Products: Currently, our producers are focused on very few maple products. If the industry is to move forward, research must be in place to constantly develop innovative products to meet the consumer demand. If we want to be competitive our focus needs to move towards high value-chain, opportunity areas. This research platform will engage in identifying innovative, high-value products that will position the industry well for Nova Scotia.

PHASE II: Maple Production Informatics and Comparative Syrup Chemistry Analysis

Principle Investigator: Dr. R. Lada

Research Assistant: Karen Nelson

Funding Agency: NSERC (Engage)

The first key step in research is to understand the influence of tree management, plantation operational and bio-climatic factors on sap and syrup yield and quality in various maple production regions in NS. In addition to identifying the uniqueness of maple syrup, we will not only position our industry in a competitive place in Canada and in the World but also will help us to identify key issues with syrup quality and characteristics so that research strategies can be developed to improve the quality of

sap and the syrup for high value. The objectives of this project are to i) develop maple production informatics (MPI); and ii) conduct a comparative syrup chemistry study to identify the uniqueness of NS maple syrup.

Our first task at hand was to visit producers throughout Nova Scotia to collect information regarding sugarbush management, maple sap collection, and methods of sap processing. Karen Nelson has met one-on-one with many producers throughout Nova Scotia during the months of June/July to collect this baseline information as well as maple syrup samples. We would like to thank all the producers for opening your homes to us to conduct this survey and for all the information you were willing to provide.

During the next month or so we will be conducting chemical analysis of the maple syrup to compare it to other maple productions areas such as Quebec, New Brunswick, Vermont and New York State. We are very excited to see the uniqueness of Nova Scotia's maple syrup.

We are aiming to have a report summarizing our findings from these first phases of the research programme to all the maple producers by the end of October/early November. We would like to once again thank all the producers who took the time to participate in the survey and donate maple syrup for analysis, as well as Dale McIsaac for all his help and guidance.

PHASE III: Climate Change Impacts on Maple Sap Flow and Yield

Principal Investigator: Dr. R. Lada

Funding Agency: Climate Change Action Fund (CCAF)

Maple sap flow is still a mystery. While in NS the number of taps has increased four folds from around 75,000 taps in 1973-74, to over 374,000 in 2012, the average sap yield declined from 0.437 to 0.325L/tap. While the reasons for low average tap yield is unknown, it is speculated that one of the participating factors may be climate change. This project



is aimed to i) understand and uncover the linkage between climate change and tree growth, sap and syrup yield; and ii) to develop climate-based multiple regression and artificial neural network(ANN) models, which will be used to develop digital tools to predict sap flow based on climatic factors.

Funding for this project has just been announced.

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[Facebook.com/Maple Research Programme](https://www.facebook.com/MapleResearchProgramme)

Maple Study Trip

by Dale McIsaac and notes by Robert Frame

Dr. Raj Lada, Robert Frame, Ron Young, and Dale McIsaac participated in a study trip from June 25-28, 2013 to learn more about the maple research programs in New York state and Vermont.

Our first stop was at the Uihlein Maple Field Station administered by the Department of Natural Resources, which is part of Cornell University. The Field Station was established in 1965 with the aid of generous support from Mr. and Mrs. Henry Uihlein II of Lake Placid, New York. Here we met the Director, Mike Farrell, and discussed the activities at the Uihlein station. There is strong emphasis on extension and outreach. Research work tends to concentrate on applied research. The results of their work are published in The Maple News and/or the Maple Digest. They are also available online at:

<http://maple.dnr.cornell.edu/pubs/index.htm>

The second stop was at South Meadow Farm near Lake Placid, owned by Tony and Nancy Corwin. The farm consists of a lodge (bed & breakfast) and a maple sugarworks. The maple operation has 10,500 taps at 3 separate sites. The farthest sugarbush is 16 km away. Elevation differences in the 3 sugarbushes affect timing of sap flow, with the highest elevation around 2,400 feet. Sales at the sugarhouse are on the honour system as the retail area is unstaffed. If customers want to use a credit card, they fill out a form (similar to mail order) and place it in a secure box. There are very few losses. They have video surveillance on site. The retail shop includes a whole line of value-added products. The complete line of value-added products is out-sourced. The first year the Corwins advertised their operation in a local tourism booklet, sales increased by 40%.



South Meadow Farm, Lake Placid

Drop lines are replaced every 3-4 years. Spouts are clear poly carbonate check valves and are replaced every year at a current cost of 45¢ each. The tubing is not washed/flushed. The vacuum system completely cleans the sap from the lines following the season. The vacuum system currently runs at ~20-22 pounds, but they would like to get that to 26 pounds. The evaporator is oil fired. They would never consider using wood. The R/O system takes the sap to 21-22 % sugar. A U/V system is used (after sap concentrate comes out of the R/O) to preserve sap and enhance sap quality. Work done at Proctor Maple Research Station in Vermont is watched and the recommendations are followed closely. This is an impressive operation. Maple production and marketing is a profitable industry if done properly and the producer is willing to adopt new technology to save costs and increase yields. Their websites are <http://www.maplesyrup.net/> and www.southmeadow.com.



The third stop of the day was at the Cornell Maple Boot Camp. This is the third year for the Cornell Maple Boot Camp, and the first year that it has been held in the Lake Placid/Saranac Lake area. The boot camp runs over a 4 day period and is limited to 50 participants. Participants range from the novice to commercial producer. The course costs \$150 and includes all course materials including a copy of the North American Maple Producers Manual, instruction, and meals. We attended the opening supper at the Maple Boot Camp on June 26th and the first session which was on Sugarbush Measurements and Tree Quality Evaluation. <http://blogs.cornell.edu/cceclintoncounty/2013/05/06/2013-cornell-maple-boot-camp/>

On Thursday, June 27, we travelled to Proctor Maple Research Center in Underhill Center Vermont. We met with Timothy

Perkins, Director; Tim Wilmot, Maple Extension Specialist; and Abby van den Berg, Research Assistant Professor.



Uihlein Maple Research Center, Cornell Univ.

The Center's staff spends on average 50% of their time on research and 50% on extension and education. They have 5 full time staff and are funded by the University of Vermont. Buildings include a main building with offices, labs, a large meeting room; a separate production lab with 4 evaporators for replication purposes; a sugarhouse where the commercial part of the production of syrup occurs; and other supporting buildings. They have 3,000 taps. Syrup from 2,500 or 2,600 taps is sold while syrup from the other taps is used for research. Syrup density is measured by a hydrometer in a cup that has a temperature gauge. The hydrometer reading is adjusted according to the temperature of the syrup. These accu-cups are available from 'The Maple Guys'. At Proctor, they do not flush their lines. They use their vacuum system to completely empty the lines at the end of the season. They do not use and do not recommend the use of Isopropyl alcohol to sanitize tubing systems. The state average yield for Vermont over the past several years is 0.31 US gallons (~1.17 litres) per tap. The target yield for the state is 0.5 US gallon/tap (1.9 litres/tap), and a number of producers already achieve that yield. Proctor Research Center's yield over the past several years is 0.61 US gallons (2.31) per tap. They encouraged us to apply existing knowledge to deliver workshops to producers on 'Best Management Practices'. They also invited us to send a representative(s) to one of their three January workshops held in different parts of Vermont. The total attendance at the 3 workshops is ~800. They get producers with various size operations and having varying degrees of experience. They would be willing to come to Nova Scotia to help with a workshop if the timing works <http://www.uvm.edu/~pmrc/>.

We would like to thank all those that we met on the trip as they were very forthcoming and very willing to help us.

