

## Summaries of Research Presentations from 2016 NAMSC Annual Meeting

### **Managing For A Healthy Sugarbush In A Changing Climate.**

Jared Nunery, Orleans, VT County Forester.

In a changing climate our forests are under a multitude of stressors which can be baffling and overwhelming to a land owner. Understanding these stressors and incorporating adaptive management strategies into forest management planning will help mitigate negative impacts of a changing climate to our forests. This talk discussed these stressors and management strategies for maintaining a resilient forest.

### **Maple Profitability Past, Present and Future.**

Mark Cannella, Farm Business Specialist and Assistant Professor of Extension at the University of Vermont.

Agricultural enterprises provide equal opportunity for profits or losses. In 2013 the Vermont Maple Business Benchmark project began conducting cost of production analysis with maple producers to advance information based decision making and support industry development. This presentation discussed the difference between financial success in one year and economic viability over the numerous years of a maple enterprise. Several key business topics facing producers and the broader industry were identified and discussed. The session drew on data from financial benchmarking with commercial producers in Vermont, market trends, industry considerations and strategic business planning themes coming from maple business owners.

### **Study On Plastic Residue Following Sanitation With Isopropyl Alcohol - Final Results.**

Luc Lagacé, Ph. D. – Centre ACER, Maple products and processes division, and Mustapha Sadiki, Ph. D. – Centre ACER, Analytical services division.

The use of commercial solutions of isopropyl alcohol (IPA) to sanitize the sap collection system has raised some questions since its adoption by maple producers. One of them concerns the possible leaching of chemical components of plastic material coming in contact with IPA. The main objective of this project was to provide research results from plastic residues testing to assess the possibility of finding such contamination in maple sap and syrup. These results on many samples of sap and syrup collected in 2014 and 2015 from sanitized and non-sanitized systems will be presented. This project was financed in part by the North American Maple Syrup Council Research Fund, the National Research Council of Canada, and Centre ACER.

### **It's Electric! Maple Evaporation Using Magnetic Induction Heating.**

Francesco Aimone, Acerbev, LLC.

Magnetic induction (MI) is a heating method with potential to maximize the amount of raw energy captured as in-the-sap heat in maple evaporation. In other applications, MI heating achieves 95% efficiency in capturing energy to heating a food stream. This study evaluates a lab-scale magnetic heating system's ability to concentrate

*Research continued on page 33*

**Research: continued from page 31**

maple sap using a hyper-efficient, electric powered magnetic induction coil and shell-in-tube heat exchanger, along with various energy recapture methods. We describe the trial evaporator's design and suggest areas of improvement. The study's results of energy transfer efficiency are presented against theoretical baselines and current industry standards.

**Flavor of Syrup From Ultra-High Reverse Osmosis Processing.**

Abby van den Berg, Ph.D. Research Assistant Professor, University of VT.

Recently, new reverse osmosis systems capable of concentrating sap to very high levels, >30 °Brix, have been introduced. This technology has the potential to provide significant additional gains in processing efficiency and profitability, but the potential impacts on syrup flavor are currently unknown. Results of research conducted to address this question and investigate the flavor of syrup produced from sap concentrated to high levels by reverse osmosis will be presented.

**Continued 3/16" Tubing Research.**

Tim Wilmot, Researcher for Dominion and Grimm Inc. and retired University of VT Extension Maple Specialist.

Research with sap collection systems using 3/16" tubing has shown that the smaller diameter tubing can outperform standard 5/16" tubing in many arrangements that take advantage of natural vacuum generated on sloping land. Recent research has also shown that 3/16" tubing may provide some advantages over 5/16" systems in pumped systems. This presentation reviewed some of the more recent experiments related to these new sap collection systems.

**Environmental and Biological Controls on Sap Sugar Content and Yield from Maple Stems.**

Timothy D. Perkins, Ph.D. – Research Professor & Director, University of Vermont Proctor Maple Research Center.

Sap sugar content (SSC) and sap yield (SY) vary considerably from year-to-year. Although we understand in good detail how daily freeze-thaw conditions produce sap flow, how longer-term (monthly, seasonal and annual) climatic factors and biological factors (vigor, growth, masting) affect total SY and SSC over a season are far less understood. This project explored several factors thought to be influential in determining a good production season to assess which variables are most related to SY and SSC and which are not.

**How Will Climate Change Affect The Maple Industry?**

Timothy D. Perkins, Ph.D. – Research Professor & Director, University of Vermont Proctor Maple Research Center.

Because maple sap flows are dictated by daily fluctuations in temperature, any change in climate is likely to have significant effects on the timing and duration as well as on syrup yield from maple producing areas. This presentation examined the trends in timing and length of the maple season over the past 50 years, and discuss possible future scenarios for sap flow and syrup production.

**Rapid Cooling Maple Syrup When Making Maple Candy and Cream Using Vacuum.**

Steve Childs, New York State Maple Specialist, Cornell University.

This session presented new data on using vacuum to rapidly cool syrups that have been cooked to high tem-

*Research: continued on page 35*

**Research: continued from page 33**

peratures for the production of maple candy and maple cream. The cooling is uniform so the batch does not have the issues of being hotter in the center but cool on the edges. Issues of the batch forming crystals during the cooling period are eliminated or significantly reduced. Methods of creating the vacuum and protecting the vacuum pump from the steam were examined and the resulting product quality was demonstrated.

**Exploring the Influence Of Acid Rain On Sugar Maple Health And Productivity.**

Paul Schaberg, USDA Forest Service, Northern Research Station.

Pollutant inputs of sulfur and nitrogen cause acid rain that leaches nutrients (especially calcium) from re-

gional forests. This nutrient depletion reduces the tolerance of sugar maple to stress (e.g., insect defoliation, drought, etc.) and predisposes trees to reduced woody growth and increased crown dieback. Paul summarized research that has helped to identify the causes and consequences of acid rain's impact on sugar maple biology, and presented a computer model that may help identify locations where sugar maple health and productivity are at greatest risk.

**Do Invasive Earthworms Affect Sugar Maple Regeneration?**

Josef Gorres, Ph.D. Associate Professor of Plant and Soil Sciences, University of Vermont.

Most earthworms in the northeastern USA are exotic species. Some of these are also invasive. They are regard-

*Research: continued on page 37*

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**Research: continued from page 35**

ed as positive influences on soil quality in agricultural soils. Yet, they are destructive in northern hardwood forests as they modify the humus structure of the forest floor and thus the seedbank for many species typically browsed by deer. In doing so they increase the browsing pressure on tree saplings, potentially reducing the regeneration of Sugar Maple forests. The presence of several species of earthworms are being shown to be especially detrimental to regeneration. These are species in

the genus *Amyntas* and *L. terrestris*. In Vermont Sugar Maple regeneration was negatively affected by these species. While first year saplings were frequently found in these forests, older saplings were frequently not present. Generally in our surveys, earthworm presence was associated with less biodiversity in sugar bush. These findings on the association of earthworms and decline of biodiversity in forest vegetation are similar to those of other studies in the northern, formerly glaciated tier of the USA.

**Dear maple syrup producers, are you concerned about climate change?**

The research consortium Ouranos, the SUNY ESF, the Proctor Maple Research Center and extension of the University of Vermont and the Federation of Quebec Maple Syrup Producers are working together to document the American and Canadian maple syrup producers' perceptions and concerns regarding climate change. A document presenting a synthesis of the results and a review of the knowledge surrounding the impacts of climate change on maple syrup production will be released in 2017.

To share your opinion, take an easy 15 minutes web-based survey by following this link: [goo.gl/ntAM6E](https://goo.gl/ntAM6E)

**News Round-Up**

**New Brunswick:** The governments of Canada and New Brunswick delivered good news for maple syrup producers in the Madawaska and Restigouche regions by announcing total investments of more than \$10 million to complete 25 projects. <https://goo.gl/RVr5K3>

**California:** Another lawsuit has been filed against a company that falsely names its products, suggesting that they contain premium ingredients, including maple syrup. <https://goo.gl/DvGjpp>

**Quebec:** Guilty verdicts in trial of men accused of stealing millions of dollars of syrup in 2012. <https://goo.gl/RLi7UW>

**Quebec:** The government of Canada announced grants of more than \$1.2 million to help the maple syrup industry promote the properties and benefits of maple products on the domestic and international markets. <https://goo.gl/wofotL>

**Canada:** H2O Innovation has received a patent for its system to produce a high concentration maple sap process. <https://goo.gl/jkuOav>