

## Research

# Annual Meeting Research Presentations

The following are summaries of the research presentations made at the NAMSC/IMSI annual meetings in Wolfville, Nova Scotia.

### Centre Acer Maple Research Update

*Dr. Luc Lagacé, research scientist and team leader for the Maple product and processes division*

Centre Acer has been studying the Maxflow sanitizing cap, manufactured by CDL. This cap surrounds the entire spout, rather than just covering the opening, and leaves space to allow the outside of the spout to come in contact with sanitizing solution during tubing cleaning. Other caps don't wash the

outside of the spout, leaving contaminants on parts of the spouts that will later be inserted into tapholes. The Center's research found that spouts cleaned using the Maxiflow cap did eliminate contamination, and that sap yield was comparable to new spouts after just one year of study, and testing will continue to better determine efficacy.

Prior to the 2014 season, Acer published a guide to the use of isopropyl alcohol (IPA) in cleaning tubing. The guide included a significant amount of safety information, since IPA is flammable. The use of IPA for cleaning maple equipment is currently legal in Canada, but not in the United States.



## CDL Michigan

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Acer has also developed an energy efficiency calculator for evaporators. Users can input information about their specific unit and the tool will return information about its efficiency.

Finally, Acer has also released a number of extension products in the last year, including a guide to sugar-bush health and a record keeping book for sugar makers to retain their production records. Prior to the 2015 sugaring season, they will release a smartphone app tailored for sugar makers to carry out a range of calculations specific to maple production, such as sap conversion, volume of tubing, and other formulas.

### **Fungi Contaminating Bottled Maple Syrup**

*Seanna Annis, Associate Professor of Mycology, University of Maine*  
*Kathryn Hopkins, Extension Professor, University of Maine Cooperative Extension*

Fungi were identified in more than 50 samples of contaminated maple syrup, some with the potential to produce heat tolerant mycotoxins. The researchers found that syrup cools rapidly in small bottles or bottles with large surface area to volume ratios, and so have tested a range of bottling methods to prevent fungal contamination of syrup. Further details of the research findings were published in the June 2014 issue of the *Maple Syrup Digest*.

### **Cornell University Maple Research and Extension Program**

*Dr. Michael Farrell, Director, Uihlein Forest*

The Cornell program has conducted a range of projects over the past year, and Dr. Farrell recapped their findings:

Research into washing tubing and spouts has found that using detergent, chlorine, hydrogen peroxide all at long contact times can indeed clean tubing so that it does not reduce production significantly. The time and expense of such cleaning processes is significant, however.

Research into spouts with embedded silver that is meant to destroy bacteria and yeasts discovered that the spouts do improve production in both gravity and vacuum systems. These spouts are more expensive than disposable spouts, but can be re-used for several years.

Research found that gravity systems using 3/16" tubing can generate significant natural vacuum, particularly on steep slopes. Further details about this research can be found in the October 2014 issue of the *Maple Syrup Digest*.

Farrell is continuing his research into birch syrup production, conducting trials examining vacuum and gravity systems, the yields of different birch species, shelf life, and consumer interest. The first ever conference for birch syrup producers will be held June 12-14, 2015 at Paul Smiths College.

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Working with the International Maple Syrup Institute's market study group, Farrell gathered data from Nielsen research about pancake syrup trends. Pure maple syrup commands only 22% of the syrup market by value — 9% by volume — and is dwarfed by sales of imitation maple syrups. But while sales of pourable syrups overall is declining, sales of pure maple syrup were up by 4.7% from 2012-13, showing that these products are growing in market share in a shrinking market, as fewer people eat pancakes and waffles. This data points to the need to educate consumers about the wide range of uses for maple syrup.

**Proctor Maple Research Center,  
University of Vermont**

*Dr. Abby van den Berg, Research Assistant Professor*

Dr. van den Berg offered an overview of recent research at the Proctor Center:

The Center's extensive research into tubing cleaning practices has compared results from a range of methods, with the goal of determining which were most effective at reducing microbial contamination. A range of experiments helped narrow the methods down to a calcium based bleach solution, a blend of hydrogen peroxide and peroxyacetic acid, and 70% isopropyl alcohol. All methods of cleaning and/or replacing various parts of the tubing system show an improvement in sap yield relative to not replacing or cleaning anything, and additional analysis will determine which is most cost effective, comparing the expense of the manage-

ment practice with the potential additional sap yield.

Research into the profitability of birch syrup found that birch syrup can be produced profitably by maple operations in the Northern Forest, and that this can be a way to increase the revenues of existing maple operations. A range of variables for producers to consider include labor costs, number of available taps, and market demand. Detailed results of the research can be found at: <http://goo.gl/fuJSfA>. The Proctor Center is also beginning a project on developing sustainable tapping guidelines for birch trees.

The Center is continuing its work on sap collection from saplings, conducting an economic analysis, developing standard practices, and developing cap systems for sap extraction.

As work begins on a revision to the *North American Maple Syrup Producers Manual*, Proctor Center researchers are focusing on updating the chapters related to sap extraction, syrup production, and syrup filtration, grading, packaging, and storage.

The Center is beginning a ten-year study on the effects of tapping and sap extraction on tree growth. The research seeks to determine whether conservative tapping guidelines are sustainable from the perspective of long-term growth and health of maple trees. As new production practices have more than doubled the amount of sap sugarmakers are extracting from trees, this research is needed to determine wheth-

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er the carbohydrates lost from sap collection is impacting the trees.

### **Insect Outbreaks in a Changing Climate: Implications for the Maple Syrup Industry**

*Dr. Rob Johns, Canadian Forest Service*

Dr. Johns spoke about the potential impact of climate change on the maple sugaring industry. Warming conditions in the sugaring regions are expected to influence the range, frequency and intensity of insect outbreaks, causing defoliation and, in some cases, death of trees. At the same time, as shifts in climate become more dramatic, trees are stressed and weakened, making them more susceptible to damage from secondary stressors, such as insect damage or drought. Johns said that the ‘good news’ is that these projected changes are likely to happen over the long term, and so there is time for gradual changes to management practices to help protect sustainability of sugarbushes.

### **Research and Innovation from the Bottom Up: Maple Production Informatics**

*Dr. Rajasekaran R. Lada, Chair, Department of Environmental Science, Dalhousie University*

The Maple Research Program at Dalhousie University in Nova Scotia was established in 2012 in partnership with the Maple Producers Association of Nova Scotia. The Program’s approaches involve: a detailed survey of producers, their production, tapping, processing and marketing practices; identifying issues; establishing research priorities; and deciphering the potential causes for lower sap yield and certain production related issues.

### **Sap Exudation in Maple Trees**

*Dr. Isabell Graff, Department of Mathematics, Simon Fraser University*

See the article on this research on page 15 in this issue of the *Maple Syrup Digest*.

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