

Maple Syrup Digest

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June 2017



Federal Food Safety Rules 2017 Crop Reports



The Newsletter of the North American Maple Syrup Council



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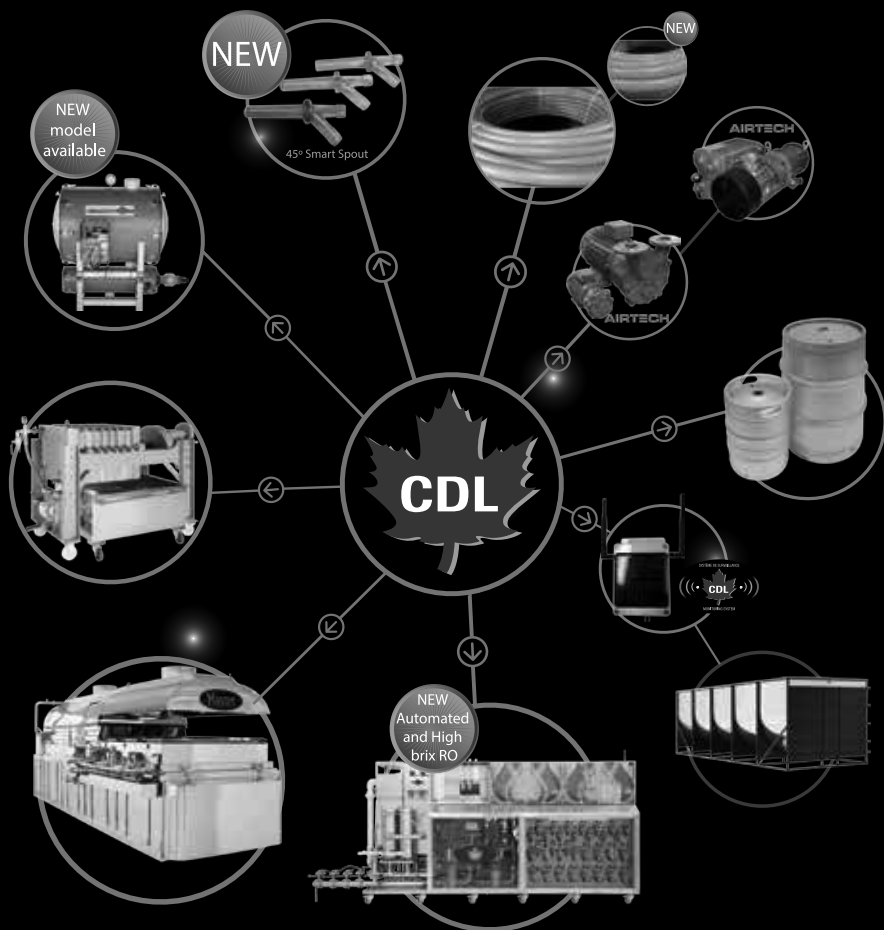
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Greetings from your President



As I attempt to organize my thoughts in preparation of these messages it is easy to reflect on maple seasons just completed or to ponder those we expect in the future. But in preparation for this message I thought it best to suggest a short list of growing concerns and issues we as maple producers face:

1) The initial crop reports presented here show yet another record or near record production season. While we have seen an uptick in new international sales and markets and modest increases in per capita consumption of maple syrup from some sectors, generally the world-wide consumption of pure maple products has not kept pace with our ability to produce the stuff. The impact of an abundance of syrup reserve has been warned by members of both the Council and IMSI in the past, and it appears that those concerns might very well play out over the next few years.

The tremendous technological advances made in all areas of production, best management practices in forest stewardship, high Brix concentration of sap, and speed to market of product, coupled with nearly unabated addition of taps have contributed to both the blessing and the curse. The last decade and a half has seen unprecedented advancement in scope and process for the industry, now our challenge must be to devel-

op and expand markets and pursue value-added product innovation. I encourage state and province associations to conduct frank discussions with their regional leaders, producer members, research institutions, and departments of agriculture, regarding the dilemma of production exceeding demand. Hopefully, these opportunities and challenges will lead to programs and funding streams capable of enhancing consumer consumption of maple products, or might lead to development of new trade channels for bulk syrup.

2) Soon, each Council delegate will receive an allocation of the "Off-flavor" kits prepared by the UVM Extension Maple Program. During the October Council meetings a presentation and proposal was made relating to these materials. The Council approved funding to provide these educational kits as a benefit of NAMSC membership and as a tool to address growing concerns that less than ideal tasting syrup has been found in the market place. I would encourage every group of producers at all levels of expertise to participate in tasting sessions using this tool. These kits are simple and by no means inclusive of all off flavors. Mark Isselhardt at UVM is to be complimented for development of the kit, and the Council for making them available without cost to a wide member audience. Feedback via your regional delegate would be helpful in planning future initiatives.

3) It is imperative that each of you, especially those in the United States impacted by the new federal food

President: continued on page 7

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safety regulations, spend some time reading over the article on page 8 summarizing a recent teleconference NAMSC’s executive committee had with the FDA. This is an attempt to simplify the massive and very complex set of regulations as they apply to our industry. It would be prudent for every region to have discussions with their own regulating agencies, as it appears that guidance regarding these statutes has been inconsistent across jurisdictions.

4) The education, communication, and outreach agenda for the Council is rapidly expanding. Historically, information transfer in our maple world has followed a Luddite tradition of outreach, and many of us depended on pamphlets, manuals, books, or word of mouth gatherings as our sources. Anyone who watches their children, grandchildren or folks on the street (sadly even some who drive and text!) know that most answers and significant “new knowledge” is gained via electronic devices and this news is delivered in very short segments. Rather than opening

a book we now simply tap a screen or implore Siri to explain! To that end, the Council is supporting several information and technical pieces being professionally developed by industry researchers, tradespeople, producers, and others. Within this *Digest* you will find the first of a series of supplements meant to provide straightforward, how-to advice about production practices for our more than 4,000 readers. Again, your input is critical both with respect to future content, usefulness, and contribution.

My suggestion is that every producer member seize every opportunity to address the challenges of the modern maple industry. As always, your comments are encouraged and welcomed. On behalf of the officers and directors of the North American Maple Syrup Council, I extend my best wishes for a productive growing season and pleasant summer.

Kind regards,
Eric Randall, NAMSC President

Requirements for Sugarmakers Under the New U.S. Food Safety Regulations

Signed into law in 2011, the final rules of the federal Food Safety Modernization Act (FSMA) took several more years to complete. Now that they have been issued, there are new requirements that may apply to many sugarmakers. However, there are also a number of exemptions based on size and type of operation. (The information presented in a *Maple Digest* article from December 2015 remains accurate, but with the enactment of the final rule the information offered here is more complete.) In summary, sugarmakers who sell most of their product directly to consumers have no new responsibilities under the Act, since they qualify as a “retail food establishment” and are not subject to registration. Those that do not qualify for the registration exemption as a retail food establishment but have less than \$1 million in annual sales of human food are subject to modified requirements as “qualified facilities.” The details, of course, are more complex.

Registration

Registration requirements fall under the Public Health Security and Bioterrorism Preparedness and Response Act of 2002. The Act requires that any facility that manufactures, processes, packs or holds food for consumption in the U.S. must register with the FDA. Registrations can be submitted electronically at <http://www.access.fda.gov/>, and must subsequently be renewed between October 1 and December 31 of every even numbered year. There is no charge for registration. There are a number of exemptions to the require-

ments to register, including farms and retail food establishments.

Compliance

For compliance purposes, sugaring falls under the Current Good Manufacturing Practice (CGMP) and Preventive Controls for Human Food rule. The rule spells out requirements for establishing and implementing a food safety plan that includes an analysis of hazards and risk-based preventative controls – essentially highlighting all of the points within a production process where food safety could be compromised, and documenting and implementing steps that will be taken to eliminate those potential problems. Plans for monitoring and verification are key components of the plan, including recordkeeping requirements (goo.gl/W7DsNR) to demonstrate that the plan is being followed. The plans don’t need to be filed or approved, but do need to be in writing and followed, and will be reviewed during inspections. In addition, at least one employee must undergo training or be qualified through job experience to oversee critical safety functions of the operation. There are a number of exemptions with respect to the requirements for hazard analysis and risk-based preventive controls (discussed below). Most facilities that are exempt from those requirements still must comply with the current Good Manufacturing Practice requirements of the rule, which existed prior to FSMA.

Inspections

As for inspections, once a sugarhouse is registered, as above, the operation is

subject to inspection. The law requires that these inspections are made no less than once every three years for “high risk” foods and once every five years for other foods (which would include facilities that only make maple syrup and many other maple products), and in many cases the FDA contracts with state agencies to carry out these inspections. Even if the inspection is only able to occur off-season, inspectors can and will still look for clean, well-maintained facilities, with equipment and supplies being stored in a safe manner that prevents contamination. If a sugarmaker feels that an inspector’s findings are inaccurate or unfair, they may ask to speak to a supervisor or other person in the FDA District Office.

Exemptions

First, it should be noted that these rules are not intended for backyard sugarmakers and hobbyists who make a few gallons for their families and friends. They are intended for those who sell syrup to the general public.

For those that do sell to the public, the Act provides for many exemptions, based on type of operation and size. While farms are exempt from registration (and thus the requirements for hazard analysis and preventive controls), maple syrup production is classified as food manufacturing, so sugarmakers cannot benefit from this exemption. However, those who tap trees, collect sap, and sell it to another operation for syrup production would meet the definition of a farm and qualify for the exemption. Even purchasing bulk syrup in drums, reheating and filtering and bottling it counts as manufacturing.

However, since many sugarmakers sell much of their product directly to consumers, the Retail Food Estab-

lishments exemption may apply. If at least half of the monetary value of your sales of human foods comes from foods sold directly to consumers, rather than to others (for example, sold bulk or wholesale), you meet the definition of a retail food establishment and are exempt from registration (and the requirements for hazard analysis and preventive controls). Sales at farmers

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FSMA FAQs for Sugarmakers

Do I have to register?

If more than half of the annual monetary value of your human food sales are in bulk or wholesale, rather than direct to consumers, you must register your facility with the FDA.

Do I have to create a food safety plan?

You must create a food safety plan if you are required to register, as above, and:

- your sales of human food exceed \$1 million a year, and
- you are manufacturing products that are not on the list of low-risk activity food combinations.

Will I be inspected?

If you are required to register, as above, you are subject to an inspection at least every five years if you are producing only maple products, and more frequently if you also produce foods classified as high-risk or if your state requires it.

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markets, farm stands, and through CSAs count as direct sales, as do sales of non-maple food products produced on your farm and maple and other food products you purchase wholesale and re-sell in your store. Direct sales also include on-site retail sales of ready-to-eat items directly to consumers, such as cotton candy, ice cream, or breakfasts served in a restaurant. If you qualify for the Retail Food Establishment exemption, you do not need to register your operation under FSMA or comply with the Preventive Controls rule, and no new inspections will be required.

Note that even if you do qualify for an exemption, some wholesale purchasers are requiring that their vendors comply with FSMA, regardless of FDA exemptions.

If you do not sell product direct to consumers, or if less than half of your food sales are directly to consumers, and you must register, you may still be eligible as a very small business for the Qualified Facility exemption to the requirements for hazard analysis and preventive controls, as long as you have less than \$1 million in annual sales of human food (adjusted for inflation and averaged over 3 years, [https://](#)



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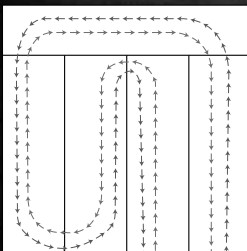
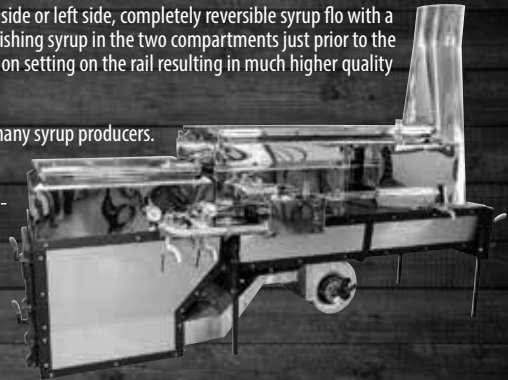
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goo.gl/4QEztT). Under this exemption you must still register your operation, but you are not subject to the hazard analysis or preventive control plans required by FSMA. However, there are some modified requirements (<https://goo.gl/syXB7t>) that mean having to attest to the aspects of your operation that qualify you for the exemption and to the fact that you have identified hazards and implemented preventive controls or that you are in compliance with a non-Federal food safety law. You are still subject to inspections, and your operation will be expected to be compliant with the federal Current Good Manufacturing Practices (CGMPs) (<https://goo.gl/NaV26H>). These outline basic standards and practices for every element of food manufacture, from equipment specifications to cleaning practices to sanitation, and are generally regarded as the minimum requirements for producing safe food. Many states have developed their own guidelines, some of them called Best Management Practices (BMPs), which are comparable to or more stringent than the CGMPs, and set the standards for compliance in those states.

If you qualify as a small or very small business and your products are solely maple products produced on your farm you can still be exempt from many of FSMA's requirements due to maple syrup, candy, and cream being classified as 'low risk' activity/food combinations. You still have to register and be inspected, but do not have to follow requirements of sub-part C (Hazard Analysis and Risk-Based Preventive Controls) or G (Supply-Chain Program). This only applies if your manufacturing involves only maple syrup or other items on the low-risk list (<https://goo.gl/b6L3CX>). If you are adding other ingredients to make products

that are not on the low-risk activity/food list, such as barbecue sauce or salad dressing, you are not eligible for this exemption. Note that if your overall operation produces products that are not exempt, all products – including maple – would be subject to the Preventive Controls requirements and inspections targeted to those requirements.

The FDA has not developed guidance for their inspectors or for sugarmakers that is specific to maple syrup. The agency's priority right now is to focus on general guidance and on guidance for high risk products. There are many resources available online at www.fda.gov/fsma, including "Draft Guidance for Industry: Hazard Analysis and Risk-Based Preventive Controls for Human Food," and sugarmakers can also fill out a web form at that site to submit questions. Extension specialists in many states can answer questions and provide guidance as well.

Finally, it is very important to note that all of these regulations are federal, and that your state or municipality may have other requirements that you should be familiar with and adhere to.

With growing concerns about food safety, these regulations have been put in place to protect public health. While pure maple products and the processes of making them may not pose the same potential hazards as other foods, they need to be held to the same standards of production and handling as other foods so that the public will trust our industry's commitment to safety. Even those sugarmakers who are exempt from some or all of the new regulations should be familiar with them, and should strive to employ practices that eliminate opportunities for contamination or other safety hazards.

Maple Food Safety Plans – Do You Need One?

Kathryn Hopkins, University of Maine Cooperative Extension

Creating a food safety plan can help maintain high quality production and is a useful tool when training new employees and volunteers. A food safety plan for maple should be based on the recommendations made in the U.S. Food and Drug Administration's Guide to Minimize Microbial Food Safety Hazards for Fresh Fruits and Vegetables, the 2011 Food Safety Modernization Act (FSMA) requirements, and industry-recognized maple food safety practices.

The Food Safety Modernization Act (FSMA) was passed in 2011 and the Final Rule went into effect in January 2016. The US Food and Drug Administration (FDA) facility registration requirements were passed in 2003 and preceded the Food Safety Modernization Act. Foreign and domestic facilities that manufacture, process, pack or hold food for human consumption are required to register with the FDA. However, farms, retail food establishments, meat, poultry and egg facilities were and are considered exempt from registration. For maple producers, different states have interpreted the registration requirement differently since the industry can be considered both a "farm" (gathering sap is harvesting) and therefore exempt and a "processor" (heating maple sap to concentrate it is manufacturing or processing) and not exempt from registration. Producers should contact the state FDA office or state department of health in to determine whether they are required to register.

Although maple producers are both

"growers" and "processors" and exempt from some FSMA requirements, maple producers must still follow both GAP or Good Agricultural Practices and cGMP or Current Good Manufacturing Practices. Following these regulations is required of all food producers. Both GAP and cGMP have been updated with the implementation of FSMA. The FSMA final rule for Preventive Controls, revised Current Good Manufacturing Practices, and hazard analysis supporting material can be found at <http://www.fda.gov/Food/Guidance-Regulation/FSMA/ucm334115.htm>

Whether an operation is registered or not or considered exempt or not, many operations may require some amount of record keeping or written documentation to show they are producing safe food products. Maple sap must be extensively boiled to produce syrup. This boiling creates a product with a reduced water activity of 0.83-0.86 and high sugar content which acts as an inherent preventive control for most foodborne potential pathogens. The process of making maple syrup, cream and candy is considered low risk by the FDA. Because of this, some simple written documentation can help protect an operation in an event of a food safety or contamination allegation.

Are you required to have a written food safety plan? Maybe, but it depends on your size of operation and to whom and where you sell your maple products. Would a written plan be a good idea? If your state does not license or inspect your maple operation, it may

be a good idea to develop a written plan that gives a clear picture of your safe food practices. Written food safety plans should describe day-to-day activities required to control potential food safety hazards. Plans detail who, when, and what or how preventive and corrective actions are performed and recorded. cGMP practices should be reviewed annually to ensure they remain up-to-date and continue to prevent food contamination. If your operation is large enough and/or sells across state lines, it may require a HACCP (Hazard Analysis and Critical Control Points) plan. In that case, you will need to do more analysis and documentation than the online plan below offers. FDA has made available an online, Small Entity Compliance Guide, that may help in understanding the requirements of Risk-Based Preventive Controls for Human food and cGMP. You can find the guide and resources at <http://bit.ly/2oOZcjJ>.

Do you want an easy way to create a plan? There is a food safety plan prepared for maple producers located at <https://extension.umaine.edu/programs/natural-resources/maple-syrup-production/maple-food-safety-plans/> If you want to begin creating documentation that you are producing a safe food product for the public, go to this site, download and fill in the forms that apply to your operation. Having a written food safety plan as well as GAP or FSMA certification may enable you to sell your products to larger wholesale buyers and may protect you if a customer ever claims that your food products made them sick. You can print the forms, fill them in, and keep a hard copy or a computer file as evidence of your dedication to providing the safest food possible for the public and evidence that you are maintaining

the reputation and quality image of the maple industry.

This work was supported by the USDA National Institute of Food and Agriculture, RREA project 228285.



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Magnetic Induction-Powered Evaporation: An Experimental Design

Francesco Aimone and George Sadler, PhD, co-founders, Induction Food Systems, Inc.

Reducing production costs is a principal concern for maple syrup producers. Major groups conducting research in the maple industry, such as Proctor Maple Research Center, and Centre ACER, have identified advances in energy efficiency as a priority research area due to its a substantial financial impact on sugarmakers. Increasing energy efficiency ultimately results in lower production costs and cost savings for the sugarmaker. A 10% increase in an evaporator's energy efficiency of should translate into "a gain of at least 13% on the cost of producing one mass unit of maple syrup (\$/pound of maple syrup)." Assuming an oil price of \$1.25 per litre, a 20% increase in evaporator efficiency with 8° Brix sap concentrate would translate into \$0.10 per pound of syrup or \$40 per barrel.¹ Despite this focus on efficiency, the mainstream evaporator's fundamental design has remained largely unchanged since it was first patented by G. H. Grimm in 1884.²

Evaporators lose energy efficiency in two principle ways: by indirectly heating the flue plan and by incompletely combusting its fuel source. A typical evaporator combusts a fuel in the arch and the resulting heat is passed to the sap/syrup pans as the heat rises through the flue stack. Despite brick-ing and insulating the arch and fire-box, only 70% of the heat from burning wood or oil/gas is transferred to the flue pans, the rest is lost through either the arch walls, up the flue stack, or into the sugarhouse.³

The combustion process itself is inefficient. The Centre ACER-issued fact-sheet on oil-fired evaporators cites the reference value for combustion in an optimized environment at only 75%-85%. As such, 25% of the fuel's potential energy is expected to be lost.⁴ Efficiency is further decreased by the amount of non-productive fuel burned in order to bring the evaporator up to temperature (warming up) and the heat wasted at the end of a run (cool-down). Therefore the system's overall efficiency would be theoretically approximated as 0.70 retained energy fraction x 0.8 combustion efficiency x 0.9 fraction non-standing heat delivery, or approximately 50% efficiency in transferring energy from fuel to in-the-sap heat. The actual numbers in field tests would likely be less.

Magnetic induction heating (MI) is a highly efficient and novel means of heating food products. In other applications, magnetic induction heating can provide greater than 95% efficiency in converting electric energy into heat captured in the end target.⁵ Induction uses an alternating magnetic field to excite electrons in conductive metals to create heat.

Methods

This project investigated the potential for using magnetic induction to improve the efficiency of evaporation in the maple industry. Testing and analysis took place between January 4, 2016 and September 1, 2016 at PROVE IT, LLC's laboratory in Geneva, Illinois where the researchers theorized the ex-

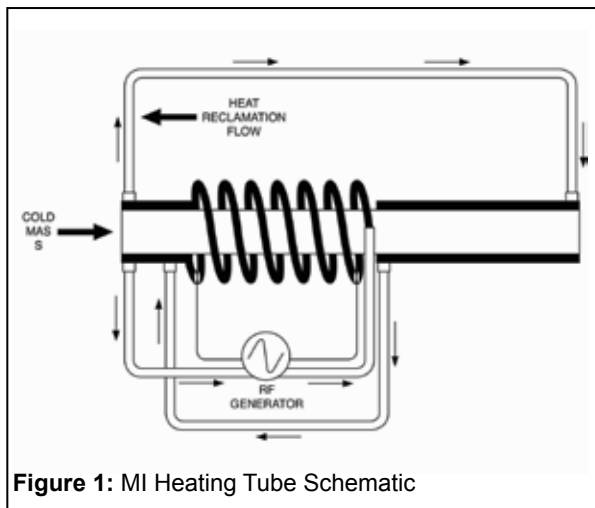
perimental MI evaporator and tested various configurations to test the idea at the lab scale. Researchers trialed multiple configurations of the experimental MI evaporator before settling on a final configuration for testing.

The final configuration consisted of a continuous flow MI heat exchanger (Figure 1), vacuum-assisted steam draw-off using a 5hp compressor and makeshift ballast tank, plate heat exchanger, a ‘saxophone’ fitting, small pump, reclamation bucket for holding condensed product, and a reservoir of raw material (55 gallon drum).

In this configuration, raw material was pumped out of the reservoir through one side of a plate heat exchanger. Low-pressure steam, generated from the main heating process, was pumped through the other side of the plate heat exchanger in an attempt to pre-heat the product, similar to many sugarmakers’ processes. From there the raw material was pumped through to the main heating tube that consisted of a 2” diameter stainless steel tube with a customized metal workpiece nested inside. The heating tube was wrapped in

a copper coil that provided the magnetic flux to the workpiece inside the tube. The raw material was then pumped vertically through a “Y” or saxophone-shaped fitting that allowed condensed product to bubble over the lower end and flow to the reclamation bucket and steam to escape through the top end. The steam-end of the saxophone fitting was connected to a 5hp compressor that pulled a small vacuum to assist with piping the steam through the system, including the plate heat exchanger and a makeshift PVC plastic ballast tank to hold the steam condensate.

We conducted three trials using a single pass through the experimental equipment: with water, with lab-prepared red-dyed sugar water solution of 4.3° Brix, and with maple sap of 2.4° Brix sourced from ‘The Maple Dude’ in Wausau, Wisconsin. Internal temperature readings were recorded with temperature probes, and Brix readings were taken with a heat-adjusted refractometer. We calculated flow rate via timed volume collection in a graduated cylinder, taking the average of three readings to control for inaccuracies of this manual method.



The evaporation rate of a theoretically perfect 10 kW MI evaporation system was calculated at 3.10 gallons/minute. This calculation assumed 10 kW of power, a ΔT of 83° C, 0% regeneration, and 100% efficiency. To establish a target we also calculated the amount of energy needed to turn maple sap into syrup, assuming a perfect evaporative process. Assuming 100% evaporative efficiency, raw sap at 2° Brix

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requires approximately 218,000 J/100g to condense sap into syrup.

Results

Water trials helped researchers analyze the system's configuration.

Trials of red dyed sugar water lasted approximately 35 minutes. The input product had a light red hue given to it via red food coloring commercially available in grocery retail stores (McCormick Brand red food coloring) and was also mixed with table sugar (generic store brand) to produce 4.3° Brix solution. The system reached equilibrium after 1.8 minutes of warm-up time. At equilibrium the system was supplying 10,763 J/second with a flow rate of 1.0 lbs/minute. The product collected in the reclamation bucket during this trial appeared to be a more concentrated red than that of the input solution. Hydrometer readings corroborated the visual evidence. The product collected at the end of the process yielded hydrometer readings of 14° Brix. Based on the total energy put into the system and

the overall change in concentration, we calculated that 9,880 J/sec were used to heat the red dyed solution and 883 J/sec were lost. Using these values we estimate the system achieved an overall energy capture efficiency of 91.8%.

The second trial was conducted with an identical equipment setup and calculation method. We used 2.4° Brix maple sap as the raw input. The flow rate was 0.52 lbs/minute. For this trial we did not calculate the time to equilibrium. At equilibrium the system retained 9,400 J/sec of the total supplied 10,763 J/sec, an efficiency of 87.4% of electric energy to captured heating. The one-pass system concentrated the maple sap to 8.5° Brix as determined by hydrometer readings of the end product.

Discussion

Maple sap testing demonstrated the equipment's capacity to produce 0.120 gallons of syrup/hr when using steam regeneration and 0.072 gallons of syrup/hr without steam regeneration. While these volumes are not commercially significant, they represent a

strong showing for system efficiency. Even without regeneration, our un-optimized system was able to achieve efficiency on par with industry standards. Without regeneration, the experimental MI evaporator was 63% efficient. In comparison, the Centre Acer calculated the reference value for oil-fired evaporators as being 64.5% efficient

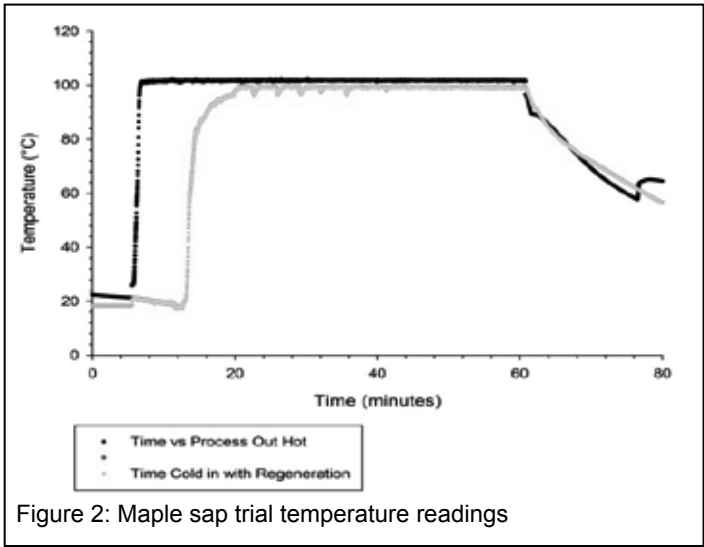


Figure 2: Maple sap trial temperature readings

in turning fuel oil into evaporative heating.

$$\text{regen eff} = \frac{400 \frac{\text{g}}{\text{min}} \cdot 83^{\circ}\text{C} \cdot \Delta T \cdot 4.2 \frac{\text{J}}{\text{g} \cdot ^{\circ}\text{C}}}{195 \frac{\text{g}}{\text{min}} \cdot 2268 \frac{\text{J}}{\text{g}}} \cdot 100 = 31.5\%$$

Equation 1: Effect of regeneration on efficiency

Nearly a third of the efficiency in the maple sap trial was due to capturing energy from steam back into the system, as calculated by Equation 1.

Along with meeting industry-standard efficiency levels, the experimental MI evaporator also met industry standard for processing costs. The lab in Geneva, Illinois receives its electrical service from a local utility at a rate of \$0.09 / kW. Given these rates, we calculate that our test system evaporated maple sap at a rate of 11.73 litres /hour (or 3.1 US gallons/hour) at a cost of \$.076 USD /1 litre of evaporated water. The cost per litre of our system is consistent with cost estimates published by the Acer Centre for an optimized oil-powered evaporator (\$.075 / 1 litre).⁶

Conclusions

MI heating is a promising avenue for future research to drastically improve the energy efficiency of maple evaporators. As a technology, MI heating produces no on-site emissions and is more flexible in terms of footprint and location than combustion heating. For sugarmakers accessing electric grid power, a MI evaporator would eliminate the need for fuel transport, storage, and piping/pumping, as well as on-site CO2 emissions.

The experimental MI evaporator tested here used an un-optimized vertical design that greatly limited the evaporative surface area of the liquid we were heating, capping our evaporative efficiency and throughput. Even

with these limitations (and a faulty pump that affected our flow rate) our system achieved performance at industry benchmarks.

Syrup production trials using the MI system were scheduled for April, 2016. However, equipment malfunctions prevented these tests from being completed. In these tests we hoped to perform multiple passes through our heating system to turn raw sap into syrup. Final product samples would have allowed for sensory testing. Sensory testing, along with optimized design, are the next research and development steps for a MI evaporator.

Acknowledgments

The authors want to acknowledge the NAMSC Research Fund, and NAMSC and its delegates for supporting our research and hosting our technical presentation at NAMSC's conference in October, 2016.

¹Centre Acer. Energy Efficiency of Oil-Fired Evaporators Used In Sugarhouses. Presentation given in Bar Harbor, Maine: Centre Acer, Oct 22-25, 2009.

²Proctor Maple Research Center. "Energy Use in Maple Operations." White Paper. 2008

³University of Vermont *Maple History Timeline*. <<http://library.uvm.edu/maple/history/timeline.php>> Accessed June, 2015

⁴Centre Acer, 2009.

⁵Rudinev, et al. *The Handbook of Induction Heating*. New York, NY. Mecer Dekker, Inc. 2003

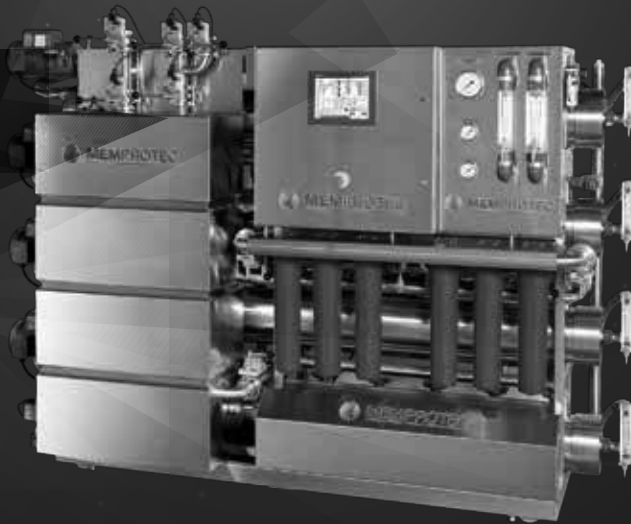
⁶*Qualifying the energy efficiency of oil-fired evaporators used in sugarbushes*. Centre ACER. St-Norbert d'Arthabaska, Quebec. Centre de Recherche, de developpement ed de transfert technologique acericole inc. 2009



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Research: Climate impact

Maple Watch Continues Biochemical Research in New Hampshire

Maple Watch, University of New Hampshire

Research at the University of New Hampshire continues this year as a team of scientists and two dozen New Hampshire sugar producers, members of the NH Maple Producers Association, look for biochemical answers as to why syrup was darker than usual in the 2017 season.

The Maple Watch project began in 2009 with a consultation about dark maple syrup from early sap runs that usually yield light syrup. The question was whether this phenomenon could be related to environmental stress resulting from a changing climate. U.S. Forest Service models indicate changing precipitation patterns and a warming climate will hit sugar maples hard. Could stress from a severe drought year in 2008 influence sap collected in 2009 that yielded dark syrup?

This year seemed an ideal year to continue asking the same question since 2016's growing season was marked by severe drought in southern New Hampshire and the central Lakes Region of New Hampshire. The question may help scientists learn whether maple sap chemistry can be used to monitor tree health.

To answer this question and develop a protocol for testing sap chemistry, a working group was formed in 2009 by Walter C. Shortle, Senior Research Plant Pathologist, USDA, Forest Service, Northern Research Station, two UNH professors, Dr. Barrett Rock, Professor Emeritus of Forestry/ Botany/ Remote Sensing, Institute for the Study of Earth, Oceans and Space and Department of

Natural Resources, and Dr. Sterling A. Tomellini, Professor of Chemistry.

The original team also included two doctoral students, Martha Carlson and Elizabeth A. Brady. Carlson, a former journalist and educator, obtained her PhD in Natural Resources and Environmental Studies in 2013, capping a six-year investigation identifying stress factors in sugar maples. A sugar producer who lives on an American Tree Farm on the edge of the White Mountain National Forest, Dr. Carlson first brought the dark syrup of 2009 to her colleagues' attention in 2009. Brady also obtained her PhD and is now using her analytical skills at a laboratory focused on food and drug safety. As Maple Watch began in 2009, Carlson researched the literature for previous studies that would help her team's research. She found a 1988 paper by Dr. Maria Franca Morselli, an Italian biochemist whom both Shortle and Rock had met at the University of Vermont. In a report to the North American Maple Syrup Council, published in the *Maple Syrup Digest* 30 years earlier, Morselli predicted that heavy stress might cause dark syrup early in the sap season:

"If long-term environmental and climatic changes occur and abiotic stresses continue, by the year 2000 it is likely that maple syrup color and flavor will be affected, and that maple syrup production will decrease because of fewer freeze-thaw cycles, shorter sap seasons, and/or less maples available to be tapped."

Maple Watch: continued on page 20

Maple Watch: continued from page 19

The Council apparently did not fund Morselli's prescient request for a grant. She was saying the unthinkable.

The Maple Watch study, examining trees, sap and syrup, may be able to prove such hypotheses and learn more about the resilience of sugar maples and their limits under repeated stress.

This year, with growing interest in the project and increasing concern about changing seasonal patterns in their sugar bushes, three times the original number of producers joined the study. The 24 citizen scientists collected sap samples from the first runs on farms across the State.

The sap samples were frozen immediately so they can be stored for biochemical analysis in the Shortle and Tomellini labs in Durham.

The sugar producers are also prov-

ing to be valuable observers of conditions in the sugarbush and in the sugarcrook. In the sugarbush, numerous producers noticed that volume was low or moderate on some sites and normal on others. Were the differences explained by age of trees, slope, aspect or groundwater and surface water?

In the sugarcrook, many producers noticed that sap "filtered hard," clogging pre-evaporator filters even though the sap looked as clear as usual. Others noticed black granular or crusty deposits in the sap pans. And some found unusually thick black niter in final syrup filters. One of two of the dozen producers produced very light syrup but most produced dark robust or Grade B, even early in the season.

The Maple Watch laboratories have yet to find any clues as to what these observations mean. But data collected over many seasons may correlate, at some point, with laboratory findings.



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During her initial research, Dr. Brady worked with sap samples collected by seven sugar producers. Dr. Brady developed a protocol for testing the raw sap in Tomellini's high-performance liquid chromatography equipment. Generally, High Pressure Liquid Chromatography (HPLC) instruments are used only to test pre-made standard chemicals rather than untreated liquids taken straight from natural sources, such as maple trees. Brady tested the sap for the presence of 10 different phenolics, biochemicals which protect plants from stress.

The team hypothesized that highly stressed trees might produce additional or higher levels of biochemicals. Those chemicals might be retained in the tree over winter and explain the dark syrup.

Eight of the 10 phenolics were either not present in the samples or were present in such minute quantities, they were considered below the level of detection or quantification.

Brady did find clear evidence of vanillin. Vanillin is present in sap early in the sugar season. It explains the delicious fragrance of boiling sap. It counteracts the effect of the growth hormone, auxin, and explains why buds do not open early, even when a sap season may be unusually warm. The levels of vanillin decline in sap as the season comes to an end and sap grows buddy.

At the same time, Shortle and Carlson developed protocols and tested sap samples for pH, BRIX, elemental compounds, and total phenolics. These tests continue this year with new graduate students in the Tomellini lab.

Phenolics are secondary biochemical products or metabolites within the tree. They are not primary, and not essential as chlorophyll or cellulose are to

the tree. They are secondary, products the tree will spin out of sugar if it has enough reserves of sugar. That would explain, Carlson thinks, why one producer's trees on Bald Mountain, West Campton, NH, were so heavily preyed upon in 2011 by insects and fungi. Those maples were defoliated in 2010 by either a very late frost or air pollution borne on winds from forest fires in Northern Quebec. The maples refoliated that summer but were able to make enough sugar with their damaged and second flush leaves to do more than prepare buds for the coming year.

Although the dark syrup has yet to be explained, Maple Watch is proud of several accomplishments.

In 2016, UNH chemistry student Tiffany Hatstat built on Brady's research to develop a program for the high school laboratory complete with classroom materials that meet all curricular and safety required standards. Ms. Hatstat trialed the pilot program successfully into three NH high schools. She is now teaching high school science.

Students and their teachers can now use Hatstat's lab protocols to test maple sap from their own trees for the presence of vanillin. Their school chemistry labs borrow HPLC instruments from the Leitzel Center, a UNH educational outreach center. About a dozen schools in New Hampshire, including several elementary schools, have their own sugarhouses and make maple syrup every year from trees in the school yard.

"This research program is a fine example of how Forest Service research and development, working jointly with university cooperators, forest product producers, and high school STEM educators can meet the Forest Service mis-

Maple Watch: continued on page 22

Maple Watch: continued from page 21
sion,” Shortle reported recently.

Educational outreach is also a key interest to the UNH members of the team. Dr. Rock founded Forest Watch, a model for the educational outreach component of Maple Watch. In Forest Watch, children across New England monitored schoolyard pines to assess the severity of ozone, an air pollutant that causes visible damage to conifer foliage. In the mid-1990s, as the U.S. Clean Air Act took effect, 20,000 children saw clear evidence that as ozone levels fell, white pine health soared.

During her PhD studies, Dr. Carlson worked closely with Dr. Rock as well as with Dr. Ann Diller, Professor Emeritus of Educational Philosophy at UNH. Carlson developed simple methods by which children, teachers and sugar producers can assess tree health.

This spring sugar maples across New Hampshire flowered, an event that occurs only once every 7 to 11 years. Carlson wonders if the flowering was a normal event or whether it was a response to the stress of 2016’s drought. She will ask her citizen scientist sugar producers to monitor tree foliage this year. The longevity of green chlorophyll, the amount of predation on leaves, and the size, color and texture of leaves all will help document the health of the maples.

“I think the flowers are sure proof of the remarkable resilience *Acer saccharum* has in her genes,” Dr. Carlson says. “The best of the best will produce viable seeds over this summer. I plan to collect seeds from various producers’ best trees and plant a little nursery of them in my sugarbush. We’ve been monitoring some of the trees on a dozen farms across the state since I began



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my studies in 2008. We'll select from the sweetest trees that have the finest seeds."

Again, the citizen scientists' observations may eventually correlate with laboratory analysis of the sugar maple sap. If substantial findings are made, the experiment might be a model of field and laboratory monitoring of sugar maples all across the *Acer saccharum* range.

A journal publication derived from Brady's PhD dissertation and series of abstracts from presentations at scientific meetings are in final stages of preparation, and once submitted will be followed by the publication of the findings derived from the 2011-2013 baseline data by Shortle.

Writing for a different audience, Dr. Carlson prepared a trade book version of her PhD dissertation for the general public. *Farewell, Sugar Maple* is now available as an e-book online on Amazon.com. The book traces Carlson's study and observations of climate change and her ideas about how changing weather and climate will impact not only sugar maples but their entire forest ecosystem.

The 2017 sap samples are now in the Tomellini laboratory. Improved methods of chemical analysis will be applied to this new collection of samples during the sum-

mer. Proposals seeking funding to build on joint research and education efforts with USFS and UNH are being prepared.

"Imagine taking a sap sample and assessing a maple tree's health, just as we use blood samples to assess human health," Dr. Carlson said. "That's our ultimate goal: to help sugar maples build resilience in a changing environment. New Hampshire's citizen scientists are pioneers in a new frontier."



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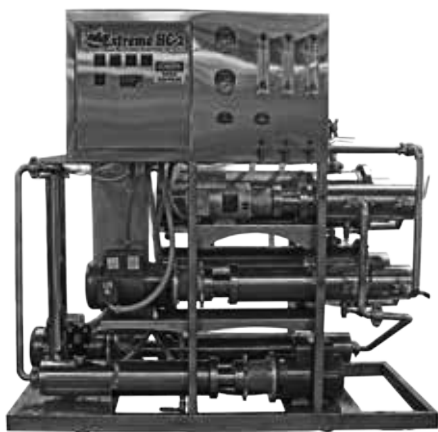
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Ask Proctor



How long can I store sap?

During the season, producers often wonder how long they can store maple sap and still make good syrup. The answer to this question is, "it depends." Sap is a highly perishable natural product. Unfortunately it doesn't come with an expiration date stamped on it.

Within the tree, sap it is essentially sterile. Once it comes out of the tap-hole, it is subject to contamination by a variety of microorganisms found in the woods and in the tubing system such as bacteria, yeasts, fungi, and molds. These microbes feed upon the predominant sugar in sap, sucrose, a large 12-carbon molecule. In doing so, they cleave the sugar into two 6-carbon sugars, fructose and glucose, which are called "invert" sugars. Invert sugars are very reactive in Maillard reactions during storage and in caramelization processes during boiling, developing strong flavor and color during these changes. It takes only a small amount of invert sugars for color/flavor formation to occur. All this to say that during sap storage, sap degradation occurs. This means there will be more microbes and therefore less sugar in your sap, and the longer the sap sits and the warmer it becomes, the darker and stronger in flavor the syrup you make.

If you need to store sap, the basic rule is to treat it as if it were milk.

Keep it cold and keep it clean. The best way to do this is to do a good job filtering your sap before or while it goes into the storage tank and then keep the sap as cold as possible. Filtering or UV treatment can help reduce the starting microbial load in the sap and delay or slow sap spoilage. Use clean filters and change them frequently.

The warmer the sap, the faster the microbes will reproduce and "eat" your sugar and make your syrup end up darker. Producers can keep sap cold and clean by storing it in clean, open-top, stainless steel tanks on the northern or shady sides of the sugarhouse or in a ventilated sap shed. Why stainless steel? Because plastic tanks are slightly permeable, and microbes can colonize the surface and become very difficult to clean off. Poly tanks are also notoriously difficult to drain completely. Any microbes in the walls of your poly tank or in sap remaining in the tank will inoculate the next batch of sap going in the tank and kick-start the spoilage process. In addition, many poly tanks are closed and allow in light, creating a nice and cozy greenhouse-like incubator for microbes to enjoy. One approach is to bank up snow around the tank to keep the sap cold. Alternatively, some producers will freeze sap and place it back into the tank like large ice cubes.

If you're using an RO, concentrate is even more perishable as the higher sugar content is nice high-quality food

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for microbes, which will then multiply very quickly. Recirculating sap through an RO warms the liquid due to the action of the pumps, making it an even more hospitable place for microbes to grow as the sap gets sweeter and sweeter and warmer and warmer.

As the season progresses and the temperatures get warmer, keeping sap cold and tanks clean becomes more difficult, requiring rapid processing of sap to make high quality syrup. It is also important at this point to clean tanks regularly to keep microbial growth to a minimum.

Besides making darker syrup, another possible effect of sap spoilage is stringy or ropey sap. If you've ever had this problem you understand when I say that you don't ever want to deal with that again. The sap gets so filled with microbial slime that it is difficult to boil, hard to get to proper density, nearly impossible to filter, and not pleasant to consume. Dumping of any affected product and a thorough cleaning of your entire operation is required to keep this problem from recurring.

If you have stored sap and aren't sure of its quality when you're ready to boil, just take a little bit and boil it in a saucepan until it is reduced to near syrup and give it a taste (you can do the same thing to test if the sap is buddy). If it's OK, then go ahead and process it. If not, dump the sap, clean the filters and tanks, and wait for the next sap run.

Strangely enough, sometimes you'll boil sap that has sat around for a while and find that you made what seems to be really light syrup, but with a bad taste. This can happen when you have "sour sap" that fermented during storage, or fermented while sitting in the

sap lines between runs on a hot day. It can seem "fizzy" or very tart tasting and unpleasant. But why is it so light? Sap typically has a neutral pH or is slightly acidic. When sap boils, the pH goes up, forming niter, which precipitates out, and the pH drops again. During the time that sap is above pH 7, it goes through what is called the "alkaline degradation phase" where lots of natural chemical reactions occur, some of which result in flavor and color (and niter) formation. When heavily fermented, sap starts out at a very low pH. When this sap is boiled, it may never get to a high enough pH to enter this phase (or it may get there only briefly). This is also why sometimes you find less niter being formed at the end of the season, and why dark syrup sometimes is a bit tart in flavor.

Despite all these possible problems, with some care it is possible to delay the spoilage of sap and to make good quality syrup even if you can't boil right away. Sap spoilage processes can be hard to predict given all the variables involved and the diversity of sugaring operations. With a little bit of experimentation and testing, you'll determine what is acceptable for your operation and taste buds.

*Timothy Perkins, Ph.D., Director
University of Vermont Proctor Maple
Research Center*

Ask Proctor is a feature in the Maple Syrup Digest, where researchers from the University of Vermont's Proctor Maple Research Center will answer questions about sugaring. If you have questions you'd like to submit for consideration for use in this column, please send them to editor@maplesyrupdigest.org.

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John Henderson

John Henderson has made many important contributions to the maple industry over the course of his career and retirement. John started working with the Ontario Ministry of Agriculture in 1973 when he was 23 and fresh out of the University of Guelph with a degree in Resources Management. In 1989 he began working at the Brighton office of the Ontario Ministry of Agriculture and Food (OMAF) where he worked as the Eastern Ontario Manager and Quality Assurance/Risk Management Specialist until his retirement in 2011.

A primary focus of his work while with OMAF was education and regulatory support for the maple syrup industry. He was very active helping Ontario's maple industry place increased emphasis on best management practices and was a strong advocate for quality assurance throughout his career. While working for OMAF, he co-authored a comprehensive Best Management Practices Manual.

John understood the challenges of farming, the hard work and the unknowns of weather and crop prices. Consequently, he was quick to empathize with farmers. He understood the value of awareness and education as well as, from time to time, financial incentives to help maple producers work to improve their operations and support their collective aim of producing

high quality maple products. He was one of what seems to be a vanishing breed of government advisors who exercised their regulatory authority as a last resort. In fact, John did not enjoy the regulatory side of his job. He understood that maple producers wanted to do the right thing and simply needed a helping hand. He had a way of getting across regulatory messages in a helpful, respectful way and his education methods were widely received by producers in a positive way.



In about 1999, John became active in supporting the maple industry at the North American level and has been serving as a consultant to the IMSI for 16 years on quality assurance and regulatory aspects of maple operations. He has always shared information freely with his colleagues and counterparts in other jurisdictions and provided

advice in helping address issues of concern to the North American maple industry. John served as a member of the IMSI Maple Grades Standardization Committee from 2002 until the new grading and syrup classification system was implemented in the United States and Canada. Over the years he has contributed to the development and review of a number of publications, and he continues to serve as a volunteer Consultant to the IMSI.

Tom McCrumm

Tom McCrumm has been active in the maple industry since 1970. He first started sugaring helping a friend in Vermont where they gathered from buckets using a team of horses. Later he moved to the mountains on the Virginia/West Virginia border and was surprised to find himself in a major maple producing area. There he helped some friends with their 1200-tap operation and tapped some trees on his own property, boiling on a wood cook stove in his kitchen.

In 1984 Tom moved to Ashfield, Massachusetts. Now back to his New England sugaring roots, Tom and his wife Judy purchased Linwood Lesure's sugarbush which included a 2,000+ tap sugarbush, sugarhouse and seasonal restaurant which served the public through the 2016 season. For the 1985 maple season, he was a research assistant working with Lew Staats at the Cornell Maple Research facility in Lake Placid, NY. Lew remained Tom's long time mentor, assuring that Tom's syrup production practices were based on good research and scientific results.

He became a member of the Massachusetts Maple Producers Associations (MMPA) early on. Tom served on the board of directors, served as its Coordinator for nearly twenty years, and continues to serve on its board. The Mass Maple Association is a very

active organization which represents 260 members and is active in the North American maple industry. While Coordinator, Tom oversaw many significant projects such as development of a Quality Control Manual for producers, a teachers packet for use in schools, the first state maple association website, an instructional video on making maple candy and cream, and a great deal of outreach and educational efforts that strengthened the state's industry.



Tom has been involved on the national and international level since 1990, and his involvement has greatly benefited the maple industry. He served as Massachusetts delegate to the North American Maple Syrup Council, and as vice president and president of the Council. Tom has also served on several many NAMSC committees and presently serves on the NAMSC Research

Fund Committee. He was also an instrumental contributor to the *North American Maple Syrup Producers Manual*.

For many years Tom has participated in maple events and gatherings sponsored by maple state and provincial associations and he continues to be involved within the maple community. He is a maple antique enthusiast and has extensive collections of syrup tins, spiles and tin sugar molds which he displays at maple events.

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Cornell's Michael Farrell Departs

Director of Cornell's Uihlein Forest since January 2005, Michael Farrell has announced his resignation:

"I have truly enjoyed the time spent at Cornell and my opportunity to serve maple producers. However, all good things eventually come to an end, and though it was a very difficult decision, I have decided to move on to a new opportunity.

As of July 1, 2017, I will be stepping down from my role at Cornell and starting as CEO of Adirondack Management, a recently formed company focusing on sustainable investments in the forestry sector in the Northeast. The company is a partnership between myself and two successful businessmen who share our passion for the maple industry. Although the name was chosen

based on the primary focus area in the Adirondacks, we will work throughout the maple belt. The overall objective of the company is to acquire forestland and manage it for sustainable yields of multiple forest products, in particular maple and birch sap/syrup.

We will be focusing on both production and marketing, with the goal of developing new markets for maple and birch products. Although we will have some sales to traditional markets in the Northeast, our primary focus is in developing new markets for sap and syrup outside of the maple belt, both nationally and internationally. We are optimistic about the future of the industry, and I look forward to continuing to develop the maple resource, now from the private sector."

Thank you to our Research Alliance Partners

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International Maple Syrup Institute News

Dave Chapeskie R.P.F. Executive Director, IMSI

The Board of Directors of the International Maple Syrup Institute (IMSI) met on Friday, May 12, 2017 at the American Maple Museum in Croghan, New York.

Supply, Demand and Pricing of Maple Syrup

It was reported that the demand for maple syrup continues to grow in the international marketplace. At the same time there is concern regarding whether or not increases in demand will be able to keep up with production increases over the next few years. This points to the importance of continuing to develop new markets for maple syrup both in North America and overseas.

Retail prices are stable and sales remain very good in most market areas.

Labeling and Nutritional Fact Panel(s)

In Canada, the IMSI has provided input to Health Canada (HC) regarding Front of Package (FOP) labeling and the Canadian Food Inspection Agency (CFIA) regarding other aspects of labeling, including the need to eliminate maple misrepresentation in the marketplace. The IMSI has also been in communication with the U.S. Food and Drug Administration (FDA) regarding the Added Sugar line requirement on the new FDA Nutritional Facts Panel (NFP). An update regarding the status of dialogue with FDA regarding the NFP and the added sugar issue is

published separately from this report in this issue of the *Digest*. Response has been slow due to ongoing consultations and the amount of overall agricultural commodity feedback to the respective agencies. IMSI will be requesting an extension for implementation and enforcement of the requirements to at least 2019.

The IMSI is now pursuing an expanded list of beneficial minerals/vitamins to the standardized NFP in addition to the mandatory nutrients currently included in the standardized NFP for maple syrup prepared earlier by a team of quality assurance specialists and maple researchers working under the auspices of the IMSI. The IMSI has also asked the technical working group of quality assurance experts from the packing/packing industry to begin the parallel NFP for maple sugar. Given the increased demand and interest in maple sugar, the board viewed this as an essential and proactive move. The group has accepted the task and is working on that now.

Lead reduction update: CA Prop 65

The agreed upon timeline of achieving complete lead elimination in maple syrup under the California Proposition 65 agreement with maple packers and processors is 2020. Major packers have been communicating with their syrup suppliers on the appropriate quality standards that will be accepted. It is incumbent on all producers to work to-



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ward total lead elimination regardless of sales points or commercial status.

IMSI Marketing Slogan Development and Messaging

An IMSI Task Team is continuing work on the development of a generic marketing slogan for maple syrup and the selection of marketing themes. IMSI directors, members, and others will be consulted before a slogan is selected and messaging themes are finalized.

Social Media Planning

At the January 2017 IMSI Board meeting in Verona, NY, a task team was formed to begin a social media strategy for the maple syrup industry in North America. Brad Gillilan from Leader Evaporator has agreed to be the task team lead and the team has developed an implementation plan and a set of guidelines for launching messages strategically beginning in September 2017. The implementation plan was endorsed by the IMSI Board of Directors and key monthly messages are presently being refined for implementation. The intent is to share this with all parties interested in promoting maple syrup strategically on a monthly basis and to have timely and consistent messaging for all to follow.

Maple Sap Water

The IMSI plans to make a formal recommendation to FDA that the regulatory body adopt labelling recommendations for maple sap water and other water related products which were developed earlier.

The IMSI has been working to help facilitate financial support for Standard of Identity research for maple sap water.

Upcoming IMSI Meetings:

The next IMSI Board of Directors meeting is scheduled for August 18, 2017 in Ottawa, Ontario.

The fall IMSI Board of Directors meeting and the IMSI's annual Meeting will be held at the Four Points by Sheraton Hotel in Levis, Quebec October 22-23, 2017.

For further information contact Dave Chapeskie, Executive Director, agrofor@ripnet.com.

USDA Loans Available

The USDA's Farm Service Administration's (FSA) Farm Storage Facility Loan (FSFL) program, which provides low-cost financing for producers to build or upgrade on-farm storage, handling facilities, and storage and handling trucks, is open to sugarmakers looking for loans for such equipment. Eligible equipment and handling components may be new or used, portable or permanently affixed, with a useful life of at least the term of the loan, includes, but is not limited to:

- Bottler or filling systems for maple syrup, excluding containers;
- Equipment to improve, maintain, or monitor the quality of stored FSFL commodities;
- Handling and drying equipment; and
- Electrical equipment, such as pumps, lighting, motors, and wiring, integral to the proper operation of the storage and handling equipment, excluding installing electrical service to the electrical meter.

For more information contact your local FSA office or see <https://www.fsa.usda.gov/programs-and-services/price-support/facility-loans/farm-storage/>.

New Video Resources

The University of Vermont Extension has added two new videos to its series on grading fundamentals. The "Color" and "Clarity" are now available at http://www.uvm.edu/extension/agriculture/maple_publications_media. NAMSC is supporting these videos with a grant.

Each video features a presentation from Maple Specialist Mark Isselhardt offering practical information about how to properly evaluate and grade maple syrup.



Research Grants Available from NAMSC

The North American Maple Syrup Council, Inc. Research Fund (NAMSC-RF) is pleased to announce its annual Request for Maple Research Proposals (RFP). Qualified research institutions, state/provincial governmental research professionals and privately held research and development organizations (applicants) are encouraged to apply for funding consideration.

For more information, see <http://namsc.org/index.php/en/namsc-research-fund/proposal-submission-guidelines> or contact NAMSC Research Committee Chair, Winton Pitcoff, at winton@massmaple.org.

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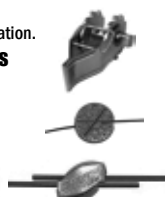
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Federal Labeling Requirements Update

International Maple Syrup Institute

In 2016, maple industry leaders expressed concern regarding the new generic Nutritional Facts Panel (NFP) requirement of the United States Food and Drug Administration (FDA) with a compliance deadline of July 2018. Concerns brought forward to the International Maple Syrup Institute (IMSI) included lack of a standardized NFP which would accommodate the new requirement for maple syrup as well as a requirement to include an “Added Sugar” amount for maple syrup on the NFP product label in the United States.

In the summer of 2016, the IMSI established a Task Team comprised of quality assurance specialists and maple researchers for the purpose of establish-

ing a standardized NFP for maple syrup based on the best science available referencing the United States and Canadian information. A standardized label would eliminate confusion regarding the nutritional content of maple syrup and facilitate NFP labelling in North America and overseas. The proposed standardized NFP was finalized in December 2016 and was provided to both FDA and Health Canada for comment at that time. FDA has since provided their support in principle for this effort. A written record of their input has been requested and should be available soon. Government input is seen as important so that the standardized NFP meets regulatory requirements and



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compliance issues do not emerge in the future.

Since the proposed standardized label only included mandatory nutrients, the Task Group is now considering what other beneficial nutrients might be included on the standardized label to add value to the NFP. Development of a standardized NFP for maple sugar will also be undertaken once the standardized NFP for maple syrup has been finalized.

Since FDA had advised IMSI that the added sugar line requirement of the NFP was not negotiable, the IMSI presented FDA with several options designed to clarify the meaning of added sugar on the product label so that consumers are not misled into thinking that sugar is added to maple syrup. The FDA received additional input from the National Honey Board (NHB) on this issue, since they are also affected by this requirement. The FDA has advised both organizations they will be finalizing a proposal to address the issue, which then must go through a public comment period. The date of public consultation has not yet been announced.

The FDA also indicated verbally that the compliance requirement for the NFP would be moved to July 2019 or perhaps later. Maple industry officials met with FDA representatives on May 11 in Washington DC. As follow-up from this meeting, the IMSI will be requesting a 5-year extension to 2022 before the new FDA NFP would become a legal requirement. This extension is important since it will provide time for the maple industry to build a case for exemption of maple syrup from the added sugar requirement as well as time to build awareness regarding the new FDA generic NFP requirements and minimize confusion among consumers.

Since the new FDA requirement has not been finalized, the IMSI is encouraging maple producers and packers to maintain their current NFP labels until the FDA and Health Canada have finalized their generic NFP requirements.

For further information please contact: Dave Chapeskie, Executive Director, IMSI, agrofor@ripnet.com, 613-658-2329; or Emma Marvin, IMSI Project Lead for the NFP file and the added sugar issue, emma@butternutmountainfarm.com, 800-828-2376.

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2017 Crop Reports

Connecticut

Overall, the 2017 season was below average due primarily to poor weather conditions. Unseasonably warm weather in February, low sugar content throughout most of the season and an early spring warm up were the key depressants. Producers at higher elevations (the Northwest and Northeast Hills) on vacuum-assisted tubing did better than those using buckets.

But that is the past! We are now all looking forward to next season with the hope that it will set production records. A kick off to that end will be our membership meeting to be held on November 4, 2017 with two guest speakers; Dr. Abby van den Berg from the University of Vermont, and Ray Bonenberg, past president of the Ontario Maple Syrup Producers Association and current president of the International Maple Syrup Institute.

Indiana

Maple syrup production in the Hoosier state was down from previous years due to very warm weather during the middle of February. The average tapping date was February 5 and the closing date was March 7. This indicates that we had a very short season. Many producers tapped in January, which is unusual, and were done processing during the third week of February. The sugar content was slightly less than 2%, but some producers reported sugar content as high as 3% in some of their sugarbushes.

Buckets and bags continue to be the most used methods of collecting sap, but tubing and the use of vacuum are gaining in popularity. The total number

of taps in Indiana increased by 18% over 2016. Even though it was a short season some producers reported a near normal crop, only a few producers reported an above average crop, and many reported a below average production year. A few producers were not ready for the early start of the season and did not tap.

Maine

Maine saw some of the same early runs that many other States saw, with some producers making syrup in January. This was primarily in the southern part of the State. As the next warm up happened in February many if not most producers were ready and there was much syrup produced across the entire state. For many of the large producers in the North, this was some of the earliest syrup they had ever made.

The entire state then saw a pretty solid freeze up for a good part of March, but mother nature finally released her grip near the end of March so producers could get back under way. For the southern part of the state the season's end was in the first couple weeks of April and the northern part pressed on into the first couple of weeks of May. After talking to many producers I would say Maine saw an average to below average crop year, but still have an ample supply of all four table grades of syrup with great flavor.

Massachusetts

As was the case in much of the maple producing region, Massachusetts experienced a stop-and-go sugaring season. Some who kept an eye on the weather forecasts decided to tap early, and were rewarded with a substantial

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amount of syrup in January. February provided a breather from production but not because it was too cold, but rather too warm for a while. Everyone then froze solid in March, but ended on a high note with a good final few weeks well into April. The season was punctuated by a rare tornado in the western part of the state, which cost one of our members approximately a third of his trees.

Sugarmakers reported very little niter in their pans, and very low sugar content in their sap. Very little golden/light syrup was made. As has been the case for many years, the positive effects of vacuum were quite noticeable, with those relying on buckets and gravity struggling to make an average sized crop through the drawn-out season. More producers experimented with 3/16" tubing to create natural vacuum systems, and most reported favorable results.

The season kickoff event featured our state's commissioner of agriculture tapping the ceremonial first tree, and the reading of a proclamation from the governor declaring March to be Maple Month in Massachusetts. At the same time, legislation was introduced to make maple syrup the official state sweetener, and to codify March as maple month in statute.

Michigan

Southern Lower Michigan started tapping the first week of February. This area had a less than normal harvest. Temperatures were warm during the day with long spans of no freezing nights.

Northern Lower Michigan started tapping the second week of February.

This area had a normal to above normal harvest. Some reported that that had their best season ever.

Upper Peninsula of Michigan started tapping the end of February. Parts of this area also reported having a normal to above normal season.

Minnesota

Minnesota's 2017 syrup season was a true roller coaster ride. The season started earlier than ever – February 16 state wide – before many producers were ready. The short run was followed by a freeze up, and then the consistent season started about a week into March.

Our Minnesota Association spring meeting was in Two Harbors on Lake Superior on May 20. About 70 people attended reporting about 48,200 taps with a crop of 11,000 gallons. Of course many producers weren't able to make the meeting but an estimated 5,000 additional taps and 1,200 gallons were reported from some of the producers who called.

Season reports were mixed depending where the reporting sugarbush was located in the state. The north shore of Lake Superior had average crops, while the east side of Minnesota further south reported between average and poor. Our urban producers in the Minneapolis St. Paul region reported record crops. The western edge near the prairies had one of their worst seasons.

Lots of the results seemed to point to higher yields for those with vacuum systems. Several producers tried the 3/16" tubing and were amazed with the good results.

New Hampshire

The 2017 maple season proved to

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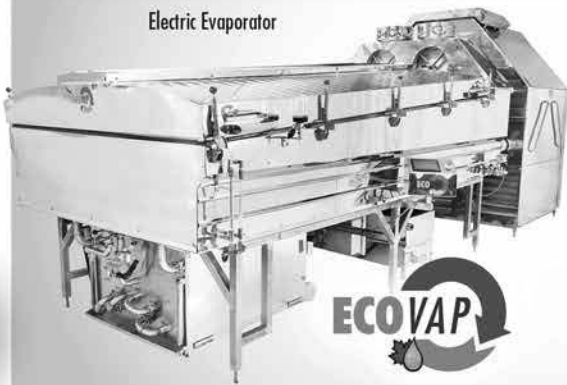


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be a challenge to many sugarmakers. Some producers in the southern part of the state tapped in early January and boiled during the mid-January thaw, ending the first week of April. The northern part of the state had a typical starting date and had finished mid-April. Many reported multiple smaller, high sugar content, continuous sap runs versus the fewer, larger sap runs we have become accustomed to. Yields in the south ranged from 50% of an average crop to an exception who reported a record crop. Many producers using vacuum systems reported 80% of an average crop. The producers with the exceptional year had southern facing sugar bushes and vacuum, while those in the lower yielding group were typically gravity-fed systems. Northern New Hampshire reported normal to slightly lower yields, again referring to the similar continuous sap runs the southern part of the state experienced. The majority of the producers reported making mostly darker syrup with exceptional taste.

New Brunswick

This year's maple syrup production was close to an average year. Many would say they had close to a normal to average crop. However in the southern regions of the province things were not the same.

The southern region of the province saw an average amount of snow cover. Weather this winter was very unstable and we saw many fluctuations in temperatures, with spikes way above freezing on and off all season. The latter part of January the south to northeastern part of the province was hit with a severe ice storm, snapping poles and trees like toothpicks, it left many with-

out power for well over a week. About mid-February the south was hit with three major snowfalls dumping upwards of 100cm on many in the region. Immediately after that, toward the end of February, the temperatures started to climb above freezing for about two weeks. This caught many producers in the south off guard and many missed the few first runs of sap.

Some began to tap a little earlier than normal thinking mother nature was going to be kind and give us another bumper crop, but this was not the case. March rolled in and remained below the freezing point pretty much all month. April crept in giving us some warmer temperatures in the daytime but very little freezing at night. So sap pretty much just came in dribbles with very little in long, big runs. Sugar content of the sap was around 1% to 2%; some producers saw sap as high as 3.5% depending on the area they are in. Most producers in the south got varying degrees of color classifications. Some golden and amber grades were made, with a lot more dark and very dark.

Snow cover in the north was close to average and when the weather warmed up toward the end of February some producers made their first runs. The sap really started flowing in the north around mid to late March. Many producers in the north did very well, receiving close to an average or above average production. Even though the sap was not that sweet (1%-2%), some producers still made between 4 and 5 pounds of syrup per tap. Many saw an even better crop than last season. A lot of lighter and medium grades were made but when the weather warmed in April it turned to dark and very dark,

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with some even reporting “buddy” tasting syrup.

All in all it was an excellent year for production in New Brunswick. With the weather being all over the place and inconsistent it holds true that you have to be ready when mother nature says. Sales have been very good and maple expansion is always ongoing with a number of larger sugar bushes starting up or expanding.

Nova Scotia

Nova Scotia had a relatively mild winter with not a lot of snow and, up to the last of February, not much rain. Some producers started to tap before the fifteenth of February. Then, around the week of the twentieth, two snow storms put a halt to woods work. It then turned mild for a few days. Those producers who had tapped early had several good runs.

March was a disaster – cold windy and stormy, with not much product made. Then April came and it was the opposite – mild up to 20°C. Due to the extreme weather, about an average crop was had. In most cases the product was a little darker than last year.

Some producers stopped boiling when the syrup started to turn darker than normal, those that stayed with the darker grade had a fairly good year, with some boiling up to the 20th of April –late for Nova Scotia. Mother nature once again had the upper hand.

New York

New York State by most accounts produced another record or near record crop. Last year (2016) we reported not only excellent production, but the earliest tapping season and earliest

“first boil” records across most of the state. Syrup was made in January in all but the highest elevation bushes in the Adirondacks, and major quantities of syrup were widely reported as having been made in February elsewhere, which on average is about two to three weeks early for the state. Very little snowpack and near record February warmth negatively impacted the early, low elevation and south facing sugar-bushes.

Nearly every producer contacted regarding the season indicated that vacuum systems, especially at higher elevations, and being tapped early (mid-January) allowed them to produce a decent crop. The reports concerning grade quality indicate that the majority of table grade syrup would be in the amber/dark range, perhaps due in large part to warm temperatures. In all but the north country seasons ended by mid-April. Retail consumer demand remains high and continues to increase, supplies of value-added product are abundant and there appears to be a substantial supply of bulk syrup in the field.

Ohio

You could almost say the 2017 season was a carbon copy of the 2016 season, with a few twists. Ohio maple producers saw a wide variety of weather conditions. It was a year of extremes, with the state constantly exposed to either extended warm or cold weather. February 20 was the beginning of a warm spell that ended on February 24 with temperature of 77 degrees in Cleveland. Many producers felt they could not overcome the record shattering warm spell and decided to end the season, even though it was still February. The first two weeks of March turned cold with minimal sap flow, fol-

lowed by another warm up that ended the season on March 27.

Across Ohio many producers who looked at the weather patterns were tapping in January. Until recently this practice was generally not heard of unless you lived in the southern part of the state. The new standard is to tap in January if you can and producers have done just that, three out of the last five years. Only in 2014 and 2015, the years of the Polar Vortex, was tapping delayed into late February and early March. The biggest disappointment this year was the lack of production in February due to warm weather. As the season progressed, the syrup quality declined quickly due to weather condition and long delays between runs. At the same time the overall low sugar content of the sap declined, contributing to lower per tap syrup yields.

The month of March was a difficult month for production. Producers had to recover from early warm weather and then withstand long periods of below normal temperatures. Can a maple tree rebound after above normal warm weather and a long shutdown due to below normal temperatures? There is no definitive answer to this question. Every maple producing region within the state reacted differently. We can control sanitation but weather impact on the trees is a different matter. Each sugarbush has its own characteristics and will respond differently to environmental conditions. The last decade has shown producers that you can never duplicate the flow of a fresh tap precisely placed at the start of the season. The reality is, you can make a good season better by extending the season, but you cannot make up for the production you have lost as a result of not tapping on time.

Probably the most remarkable statistic coming out of 2017 season was the large volume of syrup that was produced in the month of January. Several NE Ohio Producers went over the 1,000 gallon mark going into the first week of February. Those early runs also contributed to the overall syrup quality, which was very good. A large percentage of the producers were able to produce Golden Delicate and Amber Rich syrup. As a result, Ohio producers that tapped early in 2017 had average to above average seasons, all because they were able to take advantage of the favorable conditions early in the season.

Ontario

Due to the vast expanse of the province, typically the southern regions are finished with sugaring before the northern regions even begin. The February thaw allowed the producers that were already tapped to make 15-20% of their crop in that month. Syrup production ran as late as April 20 in the northern and eastern regions of the province, while southern producers were finished by the first week of April. From the information shared by producers, production was down across the province from last year (a record year), although most are reporting a better than average crop, notwithstanding last year's production records. Those with a tight vacuum system reported 60-100% of an average crop, while those on gravity and bucket collection systems, reported significantly less due to the unpredictable weather swings throughout the season.

Sugar content started low in most regions but did return to normal levels as the season progressed. The quality of syrup produced was excellent through-

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out the province and all grades were produced, with the majority being Amber and Dark.

Pennsylvania

In Pennsylvania we always start the new year off by going to the Pennsylvania Farm Show in Harrisburg. The facility is 25 acres under roof. The Pennsylvania Maple Syrup Producers council sells products on consignment at the ten day show, with booths in the two food courts. The producers volunteer their time to man booths, working a few days at a time, to help at the show.

This year sap season started in January. For those early birds, weather through January brought an early season. Most producers got tapped by the first week in February, not expecting the warmest February on record. This had lots of producers scrambling to get trees tapped and catch up with this weird season. Then came the last week of February with above freezing temps at night and highs of 70 degrees during the day, which had producers wondering what to do to salvage this season. Many vacuum pumps ran non-stop during this time period. Even though it did not freeze at night, the sap ran all week, and medium and dark amber syrup was made. March came in cold, and after it warmed up again the syrup color came back to medium for some producers.

As far as production, some producers said this was the best season ever for them. Some producers had low sugar content and their season was below average. Most producers had a lack luster season. Light, medium and dark syrup was made with most of it being medium due to the warm February. The trees advanced toward bud stage very

fast, but no foul syrup was reported.

Most of the maple weekends in the state were held on March 18 and 19 with the week prior being wintery with no sap to boil for open houses. Most boiled water to show their operations. Attendance and sales for open houses were reported to be good. We had a tree tapping ceremony with the Secretary of Agriculture, Russell Redding, and his staff, and State Representative Martin Causer, along with the presentation of a State Proclamation, declaring the week of March 12 through 19 as Maple Producers Week in Pennsylvania. We had a good attendance for this ceremony. The season for most producers ended the last week in March with warm weather and trees budding. Another weird season for the books.

Quebec (Citadelle, Maple Syrup Producers' Cooperative)

At the end of February maple sap flowed abundantly in the western part of the province, followed by a pause as we waited for ideal harvest conditions. Fluctuating temperatures in March and April resulted in highs and lows in provincial production.

At the time of writing, the central and western regions of Quebec had wound up their seasons. Volumes were variable from one sector to another, and the regional average fully met expectations or did even better and was of high quality. The eastern portion of the province finished by the end of April. We estimate higher volumes than last year for this region.

Quebec (Federation of Quebec Maple Syrup Producers)

Quebec's 13,700 maple syrup producers harvested a record 152.2 million

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pounds of maple syrup from 44.2 million taps.

The sugaring season started in February this year, catching some producers by surprise. Some were ready, others not quite. After an early start, winter set in again for a few weeks. This gave producers the time to adjust their equipment—when the second thaw arrived in late March, all systems were go. Ideal sap flow temperatures continued into early May in the easternmost regions.

It should be noted that only 1.4 million of the 5 million taps awarded in fall 2016 were in production this season. Producers have two years, i.e., until the 2018 season, to put these new taps in operation. This means that by 2018, we should have 48 million taps in production—that's almost 15 million more pounds of maple syrup on the market.

The FPAQ board of directors has decided not to award any taps to producers in the startup and expansion categories for 2018, except for the 40,000 taps awarded to young entrepreneurs every year. This decision was made in light of the data on hand, e.g., regarding the 2017 harvest, maple syrup reserves, and various consultations.

Rhode Island

We've all heard the old adage by Samuel Clemens, a.k.a. Mark Twain: "If you don't like the weather in New England, wait a minute." That quote has been repeated around here for more than a century, and from a sugarmaker's perspective, is relevant to the year-to-year preparations for the making of maple syrup. That is what we've discovered while evaluating the previous three years of crop reports in the pro-

cess of cultivating our 4th crop report of the short existence of our association.

In retrospect, when we looked back at 2014, recall that we had a 2 ½ week long deep freeze, after which our season recovered and the sap flowed freely right into early April. We are two years out from the extremely cold winter of 2015 that forced the association's sugar makers to hold out tapping until March 6th. Then our report from last year reminds us that we were wondering if we were ever going to have a sugaring season.

Now comes 2017. How would the drought of the summer and fall of 2016, the gypsy moth infestation that cleaned out much of the foliage, or the unseasonably warm January and February play a part in our season's totals?

Many decided to tap earlier this year to not leave anything to chance. Our earliest recorded tap date for 2017 was New Year's Day. While much of the country was celebrating the start of a new year, enjoying parades and the company of family and friends, one sugarmaker was out parading into the woods, tapping his trees, and hoping that this year would be better than the last.

In the back of our minds, we wonder: could we be tapping too early or too late? It's like a tap dance trying to figure out when is the best time to begin tapping.

And, sadly, the weather and temperatures aren't the only factors in our totals from year to year. One of our founding association members had to hang up his sugar maker hat this year for personal reasons. Thankfully, he is still an active member of our association and a very important part of the future of our young organization.

Last year our small state recorded 7,415 taps, producing 960 gallons of syrup from 9 of our 10 Rhode Island member sugarhouses. This year all 10 of our sugarhouses reported a total of 8,082 taps producing a total of 1,062 gallons of syrup, mostly dark robust tasting syrup, followed by amber rich syrup. On average, nothing has changed from year to year with the exception of sap sugar content, which was down from an average of 1.3% in 2016 to around 1.0% this year.

Two years in a row we have had no snow base, unlike the excessive snow recorded in 2015 which benefited all of our member sugarhouses. Plus, weather-wise, March and February's temperatures seemed reversed. Though we can never escape the unpredictability of our New England weather, we totally disagree with Carl Reiner, when he said, "A lot of people like snow. I find it to be an unnecessary freezing of water." Man, was he wrong. It is necessary.

Vermont

The 2017 maple season in Vermont will likely be remembered for being long and drawn out, beginning in January for many producers and extending into April. Producers who were tapping during the early January sap run had the season last nearly nine weeks. For those who waited out the first runs of sap the season was more typical in length. It seemed like the month of March behaved more like a cold February than anything else. The 2017 season was good overall. A few producers saw yields above last year's record crop while most operations finished the season around their long-term average. Syrup flavor was excellent for most producers, with only limited reports of off-flavors received (some early season metabolism).

Many producers who routinely make Golden Color with Delicate Taste report that the overwhelming majority of their crop was Amber Color with Rich Taste or darker. Proving that every maple season is unpredictable in its own ways, other producers who generally make dark syrup found themselves making good quality Golden or light amber in 2017.

Sap sweetness reports varied across the state and overall production per tap seemed to be down slightly for most producers. Production in the Champlain Valley seemed to be excellent in 2017, especially for those producers in warmer, lower elevation locations. On the opposite side of the state reports on the season were generally favorable, with production levels near last year's record season. Some northern producers report making upwards of 35% of their crop during the January thaws.

Snowfall was varied across the state and in many areas the winter, while not without snow, will be remembered for lacking significant snowfall. Colder northeastern areas of the state seemed to maintain snow in the sugarbush much later than other areas, reporting two feet of snow on the ground into early April.

West Virginia

Like elsewhere, the season started early in West Virginia, with many producers experiencing heavy sap flows and making syrup by late January. The early season caught many producers off guard and not fully tapped out when things started going. Unfortunately we had an abnormally warm February, with periodic high temperatures in the 70's and the third week of February never falling below freezing.

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North American Maple Syrup Council Research Fund

The NAMSC Research Fund funds research that supports and advances the maple industry. In recent years we have given tens of thousands of dollars to projects that have developed innovative practices and technologies, helped deepen our understanding of the science of sugarmaking, and promoted the products we all make.

You can make a difference!

Concerned about the future of the Maple Industry? Make a contribution to support the maple research we fund. One easy way is to pledge to send \$.01 per container to the NAMSC Research Fund. Grant recipients are announced at NAMSC Convention each October.

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The NAMSC Research Fund is a non-profit, volunteer committee of the North American Maple Syrup Council, Inc.

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Here is where elevation and sanitation management played a big role in producers' success. Some were done by the end of February, while others kept producing through the first week of April. In general our sugar content was below average.

Although production may have been low, sales and enthusiasm remained high. With continued support from our Departments of Agriculture and Tourism, in March we held our second "Mountain State Maple Day," with more producers participating and bigger crowds in our sugar camps. On the educational front, last July West Virginia hosted the Mid-Atlantic Maple Camp, with Mike Farrell and Steve Childs from Cornell. Then in December Abby van den Berg, from the University of Vermont's Proctor Maple Research Center, presented a workshop to members titled "The Science of Sap," focusing on the all-important topic of sanitation.

Wisconsin

The 2017 Wisconsin maple syrup season started for most producers in early February. The entire state saw below average snowfall this winter for a third year in a row but the state did not experience a lack of moisture, with steady rains the entire year including every month during the winter.

The southern half of the state had a slightly below average crop. Very warm weather conditions in early February melted the limited amount of snow cover in this region. The very warm conditions also raised the daytime temperatures into the 60's and 70's with the freezing temperatures few and far between. Production in the southern half

of the state started for most producers the first week of February. Syrup quality was excellent with most of the syrup produced being graded in the Golden category. Production in the southern half of the state concluded for most producers the last week of March with the crop being about 85% of a normal year.

The northern half of the state had an average to slightly below average crop. The production season for most started the second week of February and concluded the first week of April. The early weather conditions were not very favorable for sap flow, with warm temperatures and limited freezing starting the season off very slowly. The season eventually cooled off and the producers were able to see some favorable runs of sap. The syrup quality was excellent with mostly Golden being produced. The production season concluded for most sugarmakers the first week of April.

The overall production year in Wisconsin was slightly below average, with the majority of producers reporting between 80 to 90 percent of a crop. For the second year in a row the region experienced low sugar content for the majority of the sap that was collected. The slightly below average crop was really only reported by the producers with vacuum tubing systems, while the producers that utilize gravity methods of collection had a very poor season.

The Wisconsin Maple Syrup Producers Association is pleased to announce the Wisconsin Maple Institute and Trade Show. This Event will be held January 12 and 13, 2018 at the Plaza Hotel and Suites in Wausau Wisconsin. Yves Bois, the director of Centre Acer, will be the featured speaker.

U.S. Crop Production Report

Released June 9, 2017, by the National Agricultural Statistics Service (NASS), Agricultural Statistics Board, United States Department of Agriculture (USDA).

Maple Syrup Taps, Yield, and Production – States and United States: 2015-2017

State	Number of taps			Yield per tap			Production		
	2015	2016	2017	2015	2016	2017	2015	2016	2017
Connecticut	(1,000 taps) 85	(1,000 taps) 85	(1,000 taps) 86	(gallons) 0.224	(gallons) 0.224	(gallons) 0.233	(1,000 gallons) 19	(1,000 gallons) 19	(1,000 gallons) 20
Indiana ¹	(NA)	60	62	(NA)	0.200	0.194	(NA)	12	12
Maine	1,850	1,860	1,890	0.299	0.363	0.375	553	675	709
Massachusetts	310	315	320	0.242	0.244	0.263	75	77	84
Michigan	470	400	440	0.270	0.225	0.250	127	90	110
Minnesota ¹	(NA)	76	77	(NA)	0.184	0.182	(NA)	14	14
New Hampshire	560	545	550	0.275	0.310	0.280	154	169	154
New York	2,310	2,515	2,650	0.260	0.281	0.287	601	707	760
Ohio	440	370	400	0.261	0.189	0.200	115	70	80
Pennsylvania	620	660	660	0.266	0.217	0.211	165	143	139
Vermont	4,550	4,850	5,410	0.310	0.410	0.366	1,410	1,990	1,980
West Virginia ¹	(NA)	51	61	(NA)	0.118	0.148	(NA)	6	9
Wisconsin	760	765	735	0.283	0.307	0.272	215	235	200
United States	11,955	12,552	13,341	0.287	0.335	0.320	3,434	4,207	4,271

(NA) Not available.
¹ Estimates began in 2016.

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