Maple Syrup Digest

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New tap design

Marketing study yields new ideas

Two simple things to help the maple industry

The Newsletter of the North American Maple Syrup Council

MAPLE SYRUP DIGEST

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NAMSC's Mission is to be a leading advocate and resource for maple associations and their members, working to ensure that sugarmakers have the tools and support needed to sustainably produce high quality products.

NAMSC's Vision is for all sugarmakers to consistently and sustainably produce high quality maple products.

Subscription rates

United States: $10.00
Canada: $15.00 (*US funds*)

President's Note

Greetings, maple folks.

As November caves in on us we realize that the next season is getting closer by the day! The leaves on the ground will soon be replaced by blowing snow.

Hats off to Wisconsin for serving up a well-executed conference in La Crosse. This is especially noteworthy, as it was actually in person, and the first in recent history without the participation of the IMSI. We do miss sharing the conference with them, but also realize that travel to different parts of the maple world is costly.

We at NAMSC see the annual meeting as one of our strengths, as we meet different local producers at each conference location. The technical sessions were interesting and informative, and the trade show was well represented by industry leading manufacturers as well as local dealers and extension professionals. I always leave these conferences a better maple producer - you can't help but pick up something new, or be reminded of something you have forgotten. And then there's the other producers that you meet, and get to see and hear about how they do things.

Please plan to join us in Massachusetts next October. October is also a wonderful time to get away for a few days before gearing up for the holidays. We have hosts scheduled for the next several years but welcome any member associations to jump in line and get on the list for hosting future conferences.

As far as what the 2023 season will look like: Ask me in April!

Don't forget to order your print copy of the newly released *Maple Syrup Producers Manual* to have on hand in the sugarhouse, or just for some recliner reading. It is packed with new information for all size producers, and costs less than a gallon of syrup!

Remember: make maple a staple!

Respectfully,

Howard Boyden
President, NAMSC

2022 Photo Contest Winners

Sugar House Scene

Stephanie Lessard, QC

Sugar Bush Scene

Don Somers, MN

Product Ready for Market

Jo-Ann Merrifield, ME

Maple People on the Job

Karl Zander, WI

Maple products contest winners on page 35.

In this issue...

US Producers:

Make sure you are counted!

The USDA has begun the 2022 Census of Agriculture. Every five years this census counts US farms and gathers data about their production and practices.

The data helps the federal government determine how to best support farmers, and at what levels. When sugarmakers don't respond to the census, that means our industry is shortchanged and we don't get resources for needed extension researchers and educators or the grants that many of us rely on.

All information gathered is completely anonymous and private, and is never shared with any other government agency. If you have not received a census form in the mail, sign up at:

https://www.agcounts.usda.gov/static/get-counted.html

Cover: Zander Maple Acres, Two Rivers, WI. Taken March 3, 2011, by Karl Zander.

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You can!

Send an email to:
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Seeking Photos and Articles

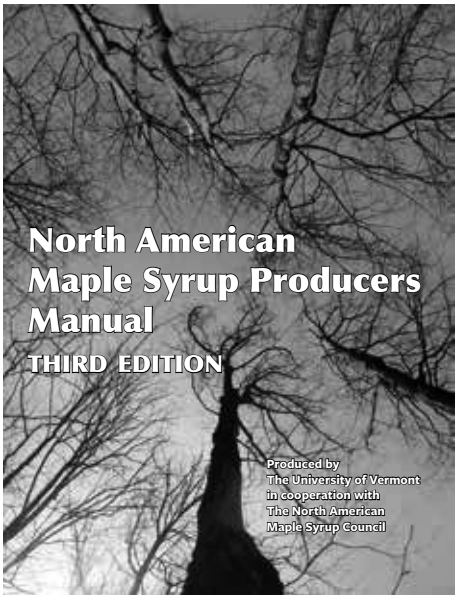
We're alwats looking for good maple photos and articles for the *Digest*. Send to: mapledigest@gmail.com.

Digest Online

The online archives of the *Maple Syrup Digest* at www.maplesyrupdigest.org are now accessable on your smartphone and tablet devices, as well as on your computers.

North American Maple Syrup Producers Manual
Print copies now for sale!
https://www.mapleresearch.org/ordermanual

Print copies of the third edition of the *North American Maple Syrup Producers Manual* are now available for sale online! This fully revised edition has a new chapter on food safety, as well as updated chapters on sap, syrup, and value-added product production based on the most current research. The remaining chapters have had modest updates. Along with chapters on sugarbush management, economics of maple businesses, marketing, and more, the *Manual* is the most comprehensive, accurate resource for sugarmakers of all sizes. The *Manual* is a joint project of the University of Vermont, the North American Maple Syrup Council, and dozens of the industry's researchers, scientists, and educators.



Since 1958 the *North American Maple Syrup Producers Manual* has served as a basic reference source for the production of pure maple products. This 2022 edition provides up-to-date, science-based information and recommendations relating to all aspects of the industry. The guidelines presented will help users ranging from the hobby and beginning producer level to those well-established in the industry. In addition, the information herein will benefit foresters, land managers, Extension and outreach personnel, and others aiming to provide assistance to those in the maple industry. Numerous photographs, tables, a glossary and hyperlinks to selected source materials are included.

Coil-bound, full color copies of the 434-page manual can be ordered online at:

www.mapleresearch.org/ordermanual

The manual can also be downloaded as a .pdf at mapleresearch.org/pub/manual/.

Innovations in Maple Sap Collection Systems: Spouts

Timothy D. Perkins and Wade T. Bosley, University of Vermont, Proctor Maple Research Center

Maple sap tubing collection systems have undergone continuous evolution since being introduced. Over the past several decades, spouts in particular have changed considerably, with a marked shift towards smaller (1/4", 19/64", or 5/16") spouts, developed and introduced by CDL. Other modifications such as Bioseal Spouts (H2O), Check-Valve Spouts (Leader Evaporator), thin-walled spouts (DSD), and Max-Flow and Signature Spouts (CDL) have been introduced into the industry, among countless other variants. Over the same time period, the composition of spouts changed somewhat from a softer, more malleable "plastic" nylon to a more rigid nylon or polycarbonate material that is very hard and does not deform in the taphole. Some spouts are meant to be sanitized and reused over several seasons, while some types are meant to be seasonal and replaced each year.

Regardless of the style, all modern spouts tend to have fairly straight, minimally-tapered barrels compared to older (especially 7/16" spouts), which had a pronounced taper. This design feature facilitates a higher amount of contact of the spout barrel with the taphole, reducing heaving and minimizing vacuum leaks. Unfortunately, the extended contact of the spout barrel with wood tissue creates a new problem because a higher amount of wood tissue is blocked off by the spout barrel in the taphole.

Sap flows into tapholes from severed vessels in the wood xylem. Due to the physiology of maple trees, the outermost rings of xylem tend to be the most highly conductive of sap and also contain the highest concentration of stored sugar. Hydraulic conductivity, sap flow amount, and sap flow velocity, as well as sap sugar content all normally drop off with the age of the annual ring as we go deeper into the tree. Although it varies from tree to tree, sap flow at about 1.5" deep averages only about half that found at 0.5" deep and falls further to about 25% or less beyond 2" deep. This explains why drilling tapholes deeper than 2" deep results in little appreciable gain in sap yield (https://mapleresearch.org/pub/depth0321/).

Inserting a spout into tapholes changes the flow dynamics. Any vessel that is in direct contact with the spout cannot flow sap freely into the taphole and out of the spout. This phenomenon was not unrecognized before tubing, leading to various approaches being made to reduce contact of the spout with the surface of the taphole. These included flat knifelike projections of the spout inside the taphole in a single plane and various other means. This can be seen quite well in the books on spouts by Hale Mattoon (*Maple Spouts, Spiles and Taps* 2013 and *Maple Spouts Spiles Taps & Tools* 2017). Such spout

adaptations could be helpful, but any amount of such projections within the taphole that contact wood are likely to negatively impact sap flow from affected wood vessels, and thus this style of approach was not deemed to be fruitful.

The reduction in sap flow due to recent spout design and geometry (small spouts, low-taper spouts with long barrels) has been largely masked by the increasing use of vacuum. Sap flows out of tapholes due to differences in pressure, with sap moving from areas of high pressure to areas of low pressure (much as water flows downhill or air flows out of a puncture in a tire). On gravity, this pressure is mostly due to head (the height of the sap column above the taphole) and stem pressure (due to expansion of air bubbles in wood fiber tissue upon thawing/warming). Vacuum will pull sap from a much larger part of the tree over time due to the higher pressure gradient it creates (the "outside" pressure the taphole experiences on the tubing system is artificially lowered by the vacuum pumps). The resulting higher pressure gradient on tubing systems with vacuum produces a higher sap volume flowing out of a taphole in any given sap run, but also generates a higher sap flow rate from the taphole during the time period of a sap run (the higher the difference in pressure between the inside of the tree and the tubing system, the higher the sap flow rate).

In other words, a taphole on vacuum will flow faster than a taphole on gravity. Thus, within a given amount of time in a sap run, more sap will be collected on a tubing system on vacuum than on one without. However, due to the design of current spouts, some vessel elements closest to the outer portion of the tree are blocked. This slows sap flow from the taphole to some degree due to the need for sap to be pulled around the obstruction to reach open vessels and flow out of the taphole. This sideways movement of sap can readily occur but is about ten times slower than flow from an unimpeded vessel. While over a long period of time all the sap will eventually make its way out, during short to moderate length flows - which are common during the early season (when thaws are often brief and limited to the outer unthawed portions of the stem) - sap movement out of the taphole can be slowed down considerably, resulting in lower yield.

The problem of vessel blockage is exacerbated by drilling tapholes too shallow (under 1.5") or by seating spouts too deeply (https://mapleresearch.org/pub/overdrive2020/). In either case, more wood vessels are blocked off by the spout, and less sap will be collected.

The solution to this problem is to not only get MORE sap out of tapholes, but to also get the sap out of a taphole FASTER. By getting sap out of the taphole more quickly, higher sap yields are generated, especially during brief or incomplete thaw periods, but also to a reduced amount during longer flows.

Over the past five years we have examined several different approaches to reducing this restriction in sap flow from shallow tree rings in an attempt to increase sap yield and sugar content of collected sap. After exploratory research in 2018 and 2019, we settled

upon a basic design starting in 2020 that in continued testing has proved successful. The two main features of this new spout include a shorter barrel and barbs.

Shortening the barrel of the spout reduces the amount of wood vessels that are blocked off by contact of the spout with the taphole and reduces the distance sap must be pulled to get around the obstruction. However, shortening the barrel reduces the stability of the spout in the taphole and could lead to problem of heaving. A series of graduated barbs is used to prevent this. The spout is designed so that the first set of barbs engages in the xylem (wood) itself, close to, but inside of the cambium. The second set of barbs engages in the bark. The third set of barbs engages if the bark is thick, and is also intended to provide a positive "stop" for spout seating, thereby limiting overdriving of spouts. Use of the barb spout does require somewhat more force be used while tapping spouts in than standard spouts. Scraping is recommended for trees that have very thick bark.

Several candidate prototype (and control) spouts were machined from polycarbonate rod for the 2020, 2021, and 2022 sap flow seasons. All of these were made as straight-through spouts simply for ease in machining. Sap yields in 2020 and 2021 were 10.8% and 23.8% respectively, reflecting the different types of sap flow seasons experienced. Trials in 2022 were inconclusive due to undetermined machining error or material stock issues that resulted in microfracturing of both control and prototype spouts. Sap sugar content tended to be slightly (5-20%) higher with prototype spouts.

The University of Vermont has submitted a patent application for this new spout design and is working with an experienced injection molding company (Middle Valley Maple) on the final design and production of a molding tool to produce test articles for the 2023 season. We are working with several maple research and Extension groups as well as selected maple producers for more extensive testing during the 2023 and will incorporate feedback into the final design for anticipated marketing for the 2024 production season.

Study Suggests Promising Ways to Market Maple

Helen Thomas, NYS Maple Producers Association

Since 2005, USDA indicates maple syrup production has increased 341% across the U.S. and 369% in New York. As production is projected to increase, consumer demand must increase as well. Increased demand for pure maple products will benefit brands and the industry overall.

A study commissioned by the Pennsylvania Maple Syrup Association found that purchase decisions for maple syrup generally occur at the store shelf with little thought for brand or product attributes. Pointedly, consumer attitudes suggest confusion regarding the identity of pure maple syrup. To evolve, there is a need to intensify research and promotion efforts around consumer awareness and attitudes.

In 2020, the New York State Maple Producers' Association, in cooperation with the NYS Department of Agriculture and Markets, applied for and was awarded a USDA *Acer* Access and Development Program grant to conduct market research on the US consumer maple target audience. The project was designed to expand research, education, and extension efforts involving market sizing, audience research, and message testing, development, and planning to: 1) identify market opportunities, 2) optimize messaging, and 3) develop a market promotion and evaluation plan.

As a result of this work, the industry will be equipped with education, marketing tools, and methods to grow the awareness and relevance of pure maple syrup among audiences representing the greatest opportunity. The purpose of this work is to develop marketing tools and methods to increase the awareness of, and a rationale for, choosing pure maple syrup among audiences representing the greatest market opportunity. The program will achieve this goal through the development of research-driven messaging, market promotion strategies, and communications planning.

The pandemic caused delays in starting the project. An RFP to hire a market research firm was developed with input from several maple industry stakeholders from across the US and issued in summer 2021. The firm chosen to carry out the project is Golin (https://golin.com).

The work started with in-depth interviews with ten maple industry stakeholders. These interviews were conducted to determine what the maple industry itself felt were strengths about maple to message (market) and what challenges the marketing of maple confronts. Findings included:

- Producers are so knowledgeable about maple that they have a hard time knowing what to talk about with the average consumer.

- Having table syrups and pure maple syrup on the same grocery shelf confuses consumers.

- Consumers not from maple producing regions don't know how to tell what is pure maple syrup.

- Producers love the time spent outdoors and would like to see that as part of messaging.

- The association of maple with autumn could be a factor in making maple viewed as "seasonal."

- There is acknowledgement that the cost of maple syrup is a deterrent to some buyers.

Golin next conducted a survey of 1,684 Americans in a nationally representative sample. The objective of this survey was to better understand perceptions of the differences between pure and imitation (table) syrup, what kind of messaging around pure maple is attractive to consumers, and what differentiates prospective buyers.

Some key results of this nationwide survey:

- Only about 15% of consumers are able to identify pure maple syrup. About 26% of consumers admit not knowing what pure maple syrup is. The remaining 59% of consumers say they know what maple syrup is, but when presented with brands of both table syrup and pure maple syrup cannot tell the difference.

- Those consumers who know maple syrup tend to be Gen-X or older (40+), live in the Northeast (Maine to Pennsylvania) and have a household income greater than $100K. They also use maple syrup in a variety of ways, not just as a topping.

- Consumers tend to be creatures of habit. 78% report that when grocery shopping they tend to buy the same brands and foods each trip. An important corollary to this is that people tend to continue to buy what they were served as children, so if they grew up with table syrup, they have learned to like the taste and texture of that over pure maple syrup.

- 77% of consumers are interested in foods that can be used in a variety of ways, so when presented with the idea that maple is more than just a topping, they were interested.

- When asked what statements were the most persuasive about maple syrup, consumers were most interested in the fact that maple is a single-ingredient, all-natural food, followed closely by the statement that maple is a versatile sweetener that can be used in a variety of ways.

The next step of the research was to conduct live focus group interviews. 12 interviews were held in April 2022, two each in Boston, Atlanta, Dallas, Los Angeles, Seattle, and Minneapolis. Additional criteria were applied to be sure all age groups of consumers were covered, and that all had bought some

form of syrup in the last 12 months. Key findings included:

- Brand loyalty varies but is built over time. Growing up with a product is the biggest reason to use it, with taste and quality being the next biggest reasons.

- It is associated with warm memories, but because people are not passionate about syrup, serious messaging and hyperbole don't work well.

- Neutral statements, such as the basic descriptor of "pure maple" and "table syrup", come off strongest. They make respondents feel informed and empowered with new information. They also receive the least pushback.

- Versatility is a strong proof point. It encourages people to try new things, interesting them. For those already using pure maple in various ways, it validates their experience.

- Consumer knowledge of pure maple syrup is limited and muddy. These conversations confirmed that many consumers do not know the differences between the various table syrups and pure maple syrup on the grocery store shelf.

- Messaging about health benefits invited skepticism. Some people find the messaging hard to believe, while others emphasize that syrup is just sugar.

- Experiences and coupons would lead people to try pure maple syrup. People who have not tried the product want to taste and see it after hearing more. They can see themselves buying syrup if they like it after they taste it, but also want to eliminate risk by buying during a sale or with coupons.

The data from the work to this point strongly suggested that market messaging would be most effective if it emphasized the single-ingredient, nothing added, all-natural attribute of maple. Another positive message might be to emphasize versatility as an ingredient that adds interesting flavor as well as sweetening to foods. Since the consumer is not able to easily distinguish pure maple syrup apart from other syrups on the grocery store shelf, Golin suggests a visual "mark" that identifies maple syrup that could be used by all maple stakeholders on their label. The next study was structured to test variations of these messages and also the consumer appeal of different designs of a mark.

Golin conducted a survey among 3,123 Americans, ages 16+, in a nationally representative sample during August 2022. About 32% of the public don't care about what is in the food they eat, and do not present an opportunity as a target population for the sale of maple syrup. The other 68% are reachable to differing degrees – those most interested in cooking and with higher incomes are the most reachable, but all were open to trying maple syrup.

From this survey, it was found that two messages in combination stimulate interest in 92% of the potential consumers. The messages:

- The only ingredient in each bottle is

pure maple syrup.

- Pure maple syrup is a delicious alternative to refined sugars, simple syrups, dressings and other typical sweeteners (like honey).

The "mark" image that was the most popular was the image in the center of this page.

A strong reason for starting to use an industry-wide label mark for maple is that people relate to things visually, and the mark would allow quick identification of pure maple products. We propose that the maple community consider working together to incorporate this mark on retail packaging in the future. The mark would of course be available to any US packer of pure maple for sale in the US as it has been developed using federal funding.

The project to date has accomplished the following two goals: 1) identify market opportunities; and 2) optimize messaging. We are beginning work on goal 3, to develop a market promotion and evaluation plan. To meet that goal, we have begun to explore what market channels are the most effective for reaching consumers about food. Initial research done during this last survey indicates nearly one-half of people use the internet to learn about using new ingredients, particularly food websites. Word of mouth and tv/streaming content are also popular ways to find out how to use new ingredients. A surprising finding is that consumers would trust hearing the messaging from someone in the maple industry more than from a chef or celebrity. In the next few months of the project, we will be developing some sample ads and also proposing methods of evaluating their effectiveness.

The key takeaways about marketing from the study to date indicates that, when advertising, the maple industry should:

- Focus on consumers that place value on food quality and the experience of food.

- Lean into the single-ingredient message first to increase awareness, and then into the message of versatility to increase consideration and purchase.

- Meet consumers where they go for information to introduce the "why" and then couple it with key spokespeople to show the "how."

- Use a voice that is directly from the industry to establish authority and credibility for the message.

Invasive Insects of Eastern North American Sugarbushes

Jenny Liu, MSc – Maple, Tree Nut, and Agroforestry Specialist, Ontario Ministry of Agriculture, Food, and Rural Affairs

Invasive pests have been identified as one of the major threats to biodiversity worldwide. Many bodies, including the United Nations, recognize invasive species for the long-term detrimental impacts that they could have on our ecosystems. We see this playing out in our woodlots as garlic mustard forms carpets in the undergrowth and spongy moth defoliation causes showers of green frass from stripped hardwoods at the height of summer.

Non-native species that become invasive (i.e. negatively impacting the ecological and economic health of a new area) are often excellent hitchhikers and very strong reproducers. The most cost- and effort-saving way of dealing with invasive species is to prevent their initial spread into an area. This guide provides a brief summary of invasive insect pests threatening maple-producing regions of eastern Canada and the United States. Established invasives such as the spongy moth are not covered.

Asian Longhorn Beetle (*Anoplophora glabripennis*)

The Asian Longhorn Beetle (ALB) originates from China and other areas of Asia. Of its many potential tree host species, this beetle particularly favors maple trees.

ALB adults have a shiny black body, 1-1.5 inches long, with distinct white spots. They have black and white banded antennae that are longer than the length of the body. Legs may be blue. *Diamond Mowers*

It was first discovered in the US in New York in 1996 and has since spread to several other states. The beetle's Canadian journey highlights the importance of citizen awareness and diligent reporting: in 2003, the

A dime-sized black exit-hole made by a departing adult. It is deep enough to insert a pencil into. Above it is a shallow egg-laying site that the adult females scraped into the bark with their jaws. *Massachusetts Introduced Pests Outreach Blog*

beetle was spotted just north of Toronto near a pile of wood pallets. After an aggressive eradication campaign which included tree removal, quarantine zones, and public education, the beetle was declared eradicated in 2013. However, another Toronto population was discovered soon after when a citizen walking to their car spotted the beetle on a windshield. Again, a combination of strong policy and citizen education initiatives combined eradicated the beetle for a second time from Canada.

Identification, Infestation and Damage

Symptoms include sawdust-like material (insect feces and wood dust) around the tree or on branches, dead branches, yellowing leaves, premature leafdrop on a healthy-looking tree, increased woodpecker activity, and deep holes in the trunk and branches.

After eggs hatch, the larvae tunnel under the bark and through the phloem (the cells responsible for nutrient transport). The majority of their feeding takes place in the xylem or sapwood (cells that transport water). Extensive damage to the xylem structurally weakens the tree, resulting in branches breaking and the tree's eventual death.

Where It's Found

USA: IL, MA, NJ, NY, OH, SC. Report new sightings immediately to the US Department of Agriculture Animal and Plant Health Inspection Service (USDA APHIS): 1-866-702-9938

Canada: Previously found and eradicated from ON. Report sightings immediately to the Canadian Food Inspection Agency (CFIA): 1-800-442-2342, EDDMaps or iNaturalist

Larval feeding tunnels in the sapwood of infested trees. *J. Boggs, Ohio State University.*

Management Tips

Do not move firewood outside of where you plan to burn it. In the US, quarantine zones have been established in areas where ALB was found; do not move any living or dead trees out of these areas. Monitor your sugarbush carefully for ALB signs and symptoms, and report anything suspicious.

Spotted Lanternfly (*Lycorma delicatula*)

A colorful insect native to Asia, spotted lanternfly (SLF) can use over 70 different plant species as a host, including maple trees. SLF are a major destructive pest in areas where they have been introduced. Nymphs and adults pierce tree bark to feed on the sap. Adults

Adult female SLF covering their freshly-laid eggs with a messy white "paint". This paint will dry to brown. *New York State IPM*

also produce honeydew, which attracts other insects and which encourages the growth of sooty mold fungus.

Where It's Found

USA: CT, DE, IN, MA, MD, NJ, NY, OH, PA, VA, WV. Report new sightings immediately to USDA APHIS: 1-866-702-9938

Canada: Not yet found. Report sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist

Management Tips

Spotted lanternfly strongly prefers tree of heaven (Ailanthus altissima) as a host, but are also fond of maples. Landowners can remove this tree or treat it with a federally registered systemic insecticide to protect it against SLF. Ovicides and oils may be effective for targeting egg masses; follow federal or state/provincial recommendations. SLF are excellent hitchhikers on vehicles, outdoor gear, and even clothing. Make it a habit to quickly check your entire vehicle (including wheel wells, under the vehicle, and the roof) before traveling from a SLF quarantine area. Destroy any SLF you find.

Jumping worms (*Amynthas* spp.)

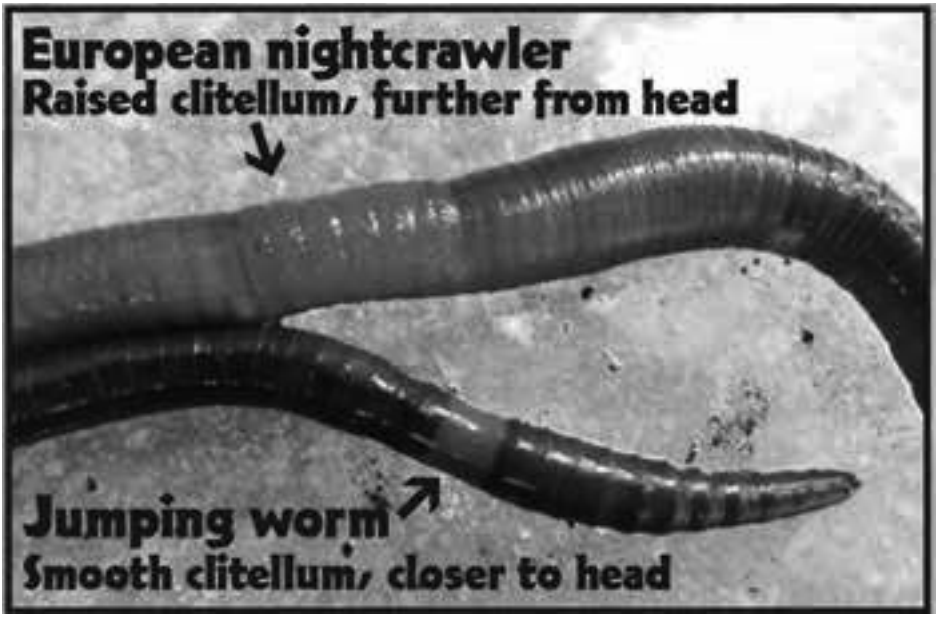
Pheretimoids are neither insects (which have 3 body segments and 6 legs) nor do they specifically target maple trees. However, they are highlighted here as they are an important pest that can have devastating long-term ef-

fects on the health of our forests.

The last ice age wiped out most earthworms in North America, which means our forests have evolved for millenia without them. The slow, friendly earthworms (European nightcrawler (Lumbricus terrestris) and the red wiggler (Eisenis fetida)) that we were taught to love as children are actually invasive introductions from Europe. While they are beneficial for our agricultural fields and our gardens, they have transformed our forests for the worse by decomposing the layer of leaf litter and detritus (the duff layer) that is habitat for many understory animals and insects. This also has negative implications for native plants, including maple tree seedlings that rely on a healthy duff layer to grow.

Jumping worms (Amynthas spp.) are a more recent introduction from eastern Asia, and they consume the duff layer much more quickly than the existing European earthworms. Jumping worms are distinctive from the European nightcrawler that we see in our agricultural fields and gardens.

Jumping worms are voracious consumers and quickly eat their way through the duff layer. Their castings, which resemble coffee grounds, greatly reduce the soil's ability to retain nutrients and moisture. The worms also disturb beneficial relationships between mycorrhizae and native plant seedlings. Ecosystem changes could include reduced native plant diversity and health, and a shift toward certain plant communities (including invasives) that perform well in the new soil type. The regeneration of native trees, such as maples, will be impacted.



Note the difference in smoothness, color, and positioning of the clitellum between the European nightcrawler and the jumping worm. The jumping worm also has a smooth, brownish body that is uncoated in slime. Most characteristically, they jump and thrash wildly when disturbed. *Maine Department of Agriculture, Conservation & Forestry, Wisconsin DNR*

There are currently no methods of eradicating the worms once they have been introduced. Preventing its spread is therefore critical. Actions to take include not purchasing nursery stock, compost, mulch, or potting mix from areas with established jumping worm infestations; only purchasing compost/mulch that has been heated to 104°F (40°C), the temperature at which the worm's egg casings are killed; not purchasing jumping worms for fishing bait ("Alabama jumpers", "snake worms", "crazy worms"), gardening, or compost; not moving soil, leaves, or plants from your garden into natural areas; cleaning shoes and your pet's paws after hiking before leaving the site.

Where It's Found

USA: DE, IL, IN, MN, NH, NJ, OH, VT, WI. Report new sightings immediately to USDA APHIS: 1-866-702-9938

Canada: ON. Report new sightings immediately to the CFIA: 1-800-442-2342 or to EDDMaps or iNaturalist

Important Pests of Non-Maple Trees

While a number of maple producers have firsthand experience with insects like the emerald ash borer, there are a few lesser-known invasives that could threaten the health of other trees in your woodlot, resulting in a loss of the mixed-species habitats where maples thrive.

Hemlock Woolly Adelgid

The hemlock woolly adelgid (HWA) is native to Asia and attacks North American hemlock trees. HWA feed on cells storing nutrients and water at the base of hemlock needles, causing the needles to die. There are two reproductive forms of HWA in North America, each of which can lay several dozen to several hundred eggs per year. This can result in exponential population growth due to the absence of natural enemies.

In the US, HWA has caused widespread death and decline of hemlock trees, which in turn negatively impacts the types of organisms living in the ecosystem. Eastern hemlock in the southern Appalachian Mountains may be virtually eliminated in the coming years.

In its native range, HWA has a third, winged form. This winged form is believed to be unsuccessful in North America, so HWA rely on wind, humans, or animals for dispersal. Some tips for limiting spread: don't move firewood; do not place birdfeeders near hemlock trees; from fall to spring, check your hemlock trees for the cottony insects; in Canada, cut down infested trees and burn them on-site (after reporting); in the United States, use federally registered insecticides; contact your local extension specialist for more information.

Where It's Found

USA: AL, CT, DC, DE, GA, KY, ME, MD, MA, NH, NJ, NY, NC, OH, PA, RI, SC, TN, VT, VA, WV. Report new sight-

HWA nymphs and adults clustered at the base of hemlock needles. They are most easily spotted in spring. *Connecticut Agricultural Experiment Station Archive, Connecticut Agricultural Experiment Station / © Bugwood.org, CC BY 3.0 us, https://commons.wikimedia.org/w/index.php?curid=8339006*

ings immediately to USDA APHIS: 1-866-702-9938

Canada: NS, ON. Report new sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist

Beech Scale Insect (*Cryptococcus fagisuga*)

Beech scale is an insect of European origin. It punctures holes into beech bark, through which the native Neonectria fungi can enter and gradually kill the tree. Together, these pests are known as the beech bark disease complex.

The beech bark disease complex reduces the number of large, healthy beech trees in the forest. Beech trees are an important habitat component to a number of native insects and animals, and influence the microclimate within forests. Beech tree die-off can also trigger increased suckering and regenerating beech in the understory, which can outcompete other trees such as sugar maple.

Other tree symptoms include small, wilting, usually yellow leaves and thinned crowns. Large beech trees typically die first, as the beech scale appears to prefer rough, craggy bark.

It is difficult to eradicate beech scale once it has established in a forest. If you wish to address a beech bark disease outbreak in your woodlot, speak to a forester to create a holistic plan. They may recommend selective cutting to remove infested individuals in order to gradually select for trees that are resistant to beech scale. A professional will also be able to identify and retain trees that demonstrate resistance characteristics.

Prevent spread by avoiding transporting beech wood with intact bark.

Where It's Found

USA: CT, MA, MD, MI, MN, NJ, NH, NY, OH, RI, WI, WV. Report new sightings immediately to USDA APHIS: 1-866-702-9938

The orange-red fruiting bodies produced by the fungi, which spread their spores by rain and wind. *Government of Ontario*

Canada: NB, NFL, NS, ON, PEI, QC. Report new sightings immediately to the CFIA: 1-800-442-2342, EDDMaps or iNaturalist

New Maple Research Project Seeks Producers as Collaborators

Life Cycle Carbon Footprint Analysis and Improvement Strategies for US Maple Syrup Production

The University of Michigan Center for Sustainable Systems, in partnership with the NAMSC and Dr. Michael Farrell, is undertaking this research project to support producers as they seek to improve energy efficiency and reduce emissions associated with producing maple syrup. While most producers strive to be as efficient as possible to keep their costs low, knowledge is limited on which production practices have the greatest impact on greenhouse gas emissions (GHGs). This project will develop a web-based calculator based on real-world process data that producers can use to estimate their own energy and GHG emissions per gallon of syrup produced, as well as providing recommendations on how they can reduce these impacts.

To assist us in building this calculator, **we are seeking producers who are interested in being research collaborators by providing data on their sugaring operations over the next two seasons (spring 2023 and 2024)**. The calculator will be directly based on the data shared with us by producers, and while your data won't be provided to us anonymously, we will not be sharing or publishing your operational data with anyone. We are looking for producers of all sizes, locations, and production practices (including sap collection method, whether vacuum and RO are used, evaporator fuel type and efficiency features, etc.). In addition to data on processing sap into syrup, including pre-season prep and post-season clean-up, we are interested in your off-season sugarbush activities (road and sap collection infrastructure maintenance, brush clearing, liming/fertilizing, etc.). These data will be assembled into a life-cycle inventory of syrup production that will be the heart of the calculator, and will allow us to provide feedback on other impacts, such as water use and waste generated.

To help producers who are interested in a more complete carbon accounting of their operations, we will also explore the carbon storage and sequestration potential in maple forests, and how producers' forest management practices might provide opportunities to increase this potential. This aspect of the project will be based on academic and government literature and not on producer data.

We will be holding several online sessions in December to discuss the data collection process with interested producers and processors and to answer your questions about the project. These sessions will be scheduled on several dates at different times to provide more options to attend. Producers or processors who attend one of these sessions and then provide data on their operations will be entered into a raffle for a cash prize for each year they provide data. If you'd like to join the producers who responded to our initial survey about this project in March 2022, please email Geoffrey Lewis at glewis@umich.edu. We're looking forward to working with you on this project!

PMRC: 75 years of Research and Education

Allison Hope, Vermont Maple Sugar Makers' Association

On October 4, UVM's Proctor Maple Research Center (PMRC) hosted speakers and guests to appreciate 75 years of important maple research and look forward to the next 75. The team at Proctor and their research impacts and informs the entire maple industry and the speakers paid homage to that legacy. Guests heard from representatives from UVM, UVM Extension, the maple industry, and state and federal officials' offices.

PMRC Director Dr. Tim Perkins reminded folks that not only is the Center a research facility, it also makes syrup. About half of its crop is served in the UVM dining halls and sold in the UVM bookstore

Dave Marvin, founder of Butternut Mountain Farm and son of PMRC founder James Marvin, shared his years of memories at Proctor, from childhood and into his adult years. Sam Cutting IV, owner of Dakin Farm, dedicated a plaque to his late father Sam Cutting III with a remembrance of the many ways in which he was a champion of Proctor. And Dr. Abby van den Berg, Research Associate Professor and Assistant Director of PMRC, shared how humbling it is to think about what our predecessors created and how it has been sustained and built upon at Proctor.

Watch PMRC's 75th Anniversary video at: https://www.youtube.com/watch?v=Q913hdfvXRM

Highlights of NAMSC 2022 Annual Meeting and International Maple Conference

The 2022 annual meeting of the North American Maple Syrup Council was held on October 27 as part of the annual International Maple Conference in La Crosse, Wisconsin. Meeting in person for the first time since 2019, delegates reviewed the past year's activities and planned for the next.

Highlights of activities for the Council in 2022 included the publication of the 3rd edition of the *North American Maple Syrup Producers Manual*, and an extensive review and updating of the organization's bylaws and job and committee descriptions. The Council continues to maintain mapleresearch.org, and has been hosting online webinars for producers and discussions for association leaders. Executive Director Winton Pitcoff noted that his first year on the job also included the return of Vermont as a member of the Council, and significant increases in donations to the Research and Education Fund.

During the report on the Research Fund Dr. Abby van den Berg reported on two ongoing studies at Proctor Maple Research Center funded by NAMSC: Long-term Impacts of Tapping and Sap Collection on Tree Growth and Health, and Characterizing Profiles of Maple Syrup Flavors and Off-flavors. Detailed reports on the two projects will be published in upcoming issues of the *Maple Syrup Digest*.

Delegates approved funding for three grants recommended for support by the research and education committee:

- The Role of Lignin in Wound Healing of Maple Trees, Yaseen Mottiar.
- Developing the Maple Climate Network, Adam Wild and Aaron Wightman.
- Long-term Impacts of Tapping and Sap Collection on Tree Growth and Health, Abby van den Berg.

The Council also allocated an additional $5,000 for a project to develop a curriculum for beginning sugarmakers for use by NAMSC members.

Finances for the Council remain sound, though it was noted that demand for research grants continues to outstrip available resources. Four new Research Alliance Partners joined to support the Fund in 2022, and two longtime Partners significantly increased their contributions, but more participants in the Alliance Partnership program are always wel-

come. Contact mapledigest@gmail.com for more information.

Stu Peterson received the Special Recognition Award for years of volunteer work for the maple industry and specifically for his work for NAMSC. Proctor Maple Research Center received the Richard G Haas Distinguished Service Award for 75 years of exemplary research in support of the maple industry. Maple Hall of Fame Committee chair Richard Norman announced that Simon Trepanier and Pam Green will be inducted into the Hall in May 2023.

Full minutes of the meeting are available upon request. Contact NAMSC secretary Joe Polak at joe.maplehollow@frontier.com.

Along with the business meeting, one of the highlights of the conference was a roundtable discussion with representatives from Wisconsin Native American tribes about the history of sugaring in their communities. Daniel Cornelius, Bruce Savage, Paul DeMain and Gary Besaw talked about the history of family sugarbushes, as well as tribal maple history. Records show significant production by the tribes more than 100 years ago, with the Menominee people producing 65,000 pounds of maple sugar in one year in the early 1900's, and a group of Chippewa villages selling 248,000 pounds of sugar to the east coast in 1880. The discussion touched on the goals of developing maple as a natural resource to strengthen family ties and increase income, and encourag-

ing more cooperation between tribal organizations and maple producer organizations.

Historian and author Dr. Matthew Thomas offered an evening presentation on the history of maple syrup in Wisconsin, with a focus on Native American history as well as some of the maple families represented in the Maple Hall of Fame.

Rounding out the week's events were more than 25 workshops organized by the Wisconsin Maple Syrup Producers Association. Topics ranged from chainsaw safety to marketing to cooking with maple. A day of tours offered attendees an opportunity to visit nearby sugarhouses and other attractions. And an expansive trade show offered participants an opportunity to see the latest equipment from all of the major manufacturers, and to talk with representatives from dozens of vendors about their products and services.

The 2023 conference will be held in Sturbridge, MA, October 25-28. Watch for details in upcoming issues of the *Maple Syrup Digest*.

2022 NAMSC Maple Contest Winners

Best in Show

Dark Robust Syrup, Mountain Maple, Dave Bisbee, MA

Golden Delicate Syrup

1. Boyden Bros. Maple, Howard & Jeanne Boyden, MA
2. Woods Maple Orchard, Steven Wood, WI
3. Klebenow's Sugarbush, Brian Klebenow, WI

Amber Rich Syrup

1. Medina Maple, Rachel Larson, MN
2. Jack & Jill's Maple Hill Farm, MI
3. Trainor's Sugarbush, Jerry Trainor, WI

Dark Robust Syrup

1. Mountain Maple, Dave Bisbee, MA
2. Green River Maple Creek, Ron & Kenna Rhynard, MI
3. In the Woods Sugarbush, Jesse & Margo Wagner, WI

Very Dark Strong Syrup

1. Timber Sweet Maple Syrup, Ralph & Amy Fideldy, WI
2. Timber Range Farm, Tony & Deb Zenner, IA
3. Woods Maple Orchard, Steven Wood, WI

Maple Candy

1. Boyden Bros. Maple, Howard & Jeanne Boyden, MA

Maple Cream

1. Timber Sweet Maple, Syrup Ralph & Amy Fideldy, WI
2. Boyden Bros. Maple, Howard & Jeanne Boyden, MA

Maple Sugar

1. Woods Maple Orchard, Steven Wood, WI
2. Boyden Bros. Maple, Howard & Jeanne Boyden, MA

Two Simple Things You Can do to Help the Maple Industry

We're all in this together. From the backyard sugarmaker with just a few taps to the largest commercial producer, the maple industry's fortunes are dependent upon market forces, climate change, and all of our collective efforts to produce high-quality products. Each of these forces impacts each of our operations, and none of us can address them alone.

Sugarmakers are known for supporting each other. Whether it's loaning your spare hydrometer to your neighbor who just shattered theirs, asking for help running tubing, or showing off your new equipment and how it works, maple producers are collegial, open, and encouraging of each other. We understand that we all share in the joy of the products we make and the practices we follow, and we each know that our personal success is closely entwined with the success of the whole industry.

So, here's two important things you can do to help the maple industry thrive.

Make the best syrup.

Whether you're making just enough for your family and some friends, or putting syrup in drums to sell for blending or as an ingredient for processing, every drop of syrup you make carries with it the responsibility of representing the entire industry. The flavor of pure maple is still unfamiliar to many people, and their first experience matters. And, of course, all of your food products must be produced and handled to ensure they are safe for consumption.

Take advantage of the many resources available to you – the *North American Maple Syrup Producers Manual*, the hundreds or articles and tools on mapleresearch.org, your local extension educators, or your local producers association. Which brings us to the second thing you can do to help the industry…

Support your local producers association.

State and provincial trade associations are the unsung heroes of the maple industry. Often led by volunteers operating on a shoestring (or less!), these groups are proof that collective effort can have significant impact, even with meager resources.

Membership in these associations is affordable, in most cases less than the prices of a gallon of syrup. The benefits you get in return – connections with other sugarmakers, access to educational events and resources, opportunities to participate in shared sales – can be a huge boost to your skills as a sugarmaker, and to your production efficiency and profits.

If you're already a member of an association, encourage a neighbor producer to join or buy them a gift membership. If you're not, please join!

Support the Maple Research that Supports you!

Every time you set a tap, fire your evaporator, or put syrup into bottles, you are benefitting from research that helped us all learn how to do these things better. Much of that research has been supported by the North American Maple Syrup Council's Research and Education Fund. The Fund has given out more than $1 million in grants in the last 35 years, catalyzing the research that has helped the maple industry grow and thrive.

The fund gets its resources from industry stakeholders – equipment manufacturers, producer associations, dealers, and individual producers. Alliance Partners commit to making annual contributions that help assure the long-term sustainability of the Fund.

If you're interested in becoming an Alliance Partner, or in making a one-time donation to the fund, contact NAMSC Executive Director Winton Pitcoff at mapledigest@gmail.com, or Treasurer Joe Polak at joe.maplehollow@frontier.com.

Thank you to our current Alliance Partners!

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CDL

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Sugarhill Containers

Lateral Line: $2,500-$4,999

Sugar Bush Supplies

Dropline: $1,000-$2,499

Farm Credit East

The Forest Farmers

Lapierre

New Hampshire Maple Producers Association

Ontario Maple Syrup Producers Association

Technologie Inovaweld

Bucket: up to $999

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Indiana Maple Syrup Association

Maple Hollow

Massachusetts Maple Producers Association

OESCO

Randall's Heritage Maple

Vermont Maple Sugar Makers Association

Wisconsin Maple Syrup Producers Association

MAPLE RESEARCH.ORG

NORTH AMERICAN MAPLE SYRUP COUNCIL

Visit mapleresearch.org, a curated collection of research papers, articles, videos, and tools, representing the most current and scientifically accurate information for maple production, to help all producers make the best products possible using the most current and most sustainable practices.

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