CDL's Way

Sugaring Guide - Third edition | 2023

Shift towards renewable energies and sustainable development

CDL SUGARING EQUIPMENT

Today, we are pleased to present the third issue of our magazine, CDL's Way.

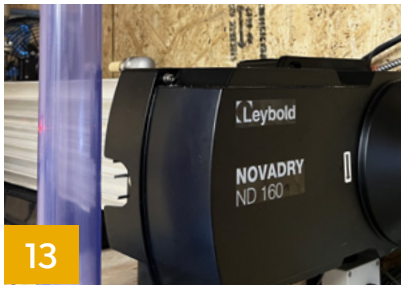
The transition to renewable energies is going to play a major role in the maple industry, and we believe that it's important to our image and the future of maple sugaring. CDL has developed a range of evaporators (electric, wood, chips, pellets) and concentrators so that all producers looking to convert to less-polluting or carbon-neutral technologies can do so with a very quick return on investment.

Times are tough for many industries; production costs are soaring and the labour pool is shrinking. Our industry certainly hasn't been spared. We sincerely believe that most maple producers, and the industry as a whole, can at least partly face these challenges by deploying efficient, automated technologies and welcoming foreign workers.

In this third issue of the magazine, CDL hopes to provide food for thought and equip you with a tool that will help you make the right choices in this new era of maple sugaring.

Enjoy your reading!

Martin Chabot
Co-Owner and
General Manager of CDL USA



Editor in Chief
Anne-Sophie Couture-Goulet and Annik Perron

Revision/Correction
Sematos and Cindy Moore

Project Manager
Tommy Chabot

Graphics
Eric Langlois and Hugues Skene

By Vallier Chabot
Co-Owner and
General Manager of CDL

MAPLE NECTAR: ON THE VERGE OF LARGE-SCALE COMMERCIALIZATION!

Over the past few years, I've been keeping you updated on our project for a new sweetener that holds great promise for the maple syrup industry: maple nectar. Here are the latest developments from the collaboration between CDL and its partners.

Good for consumers, the industry, and the environment!

The maple nectar produced during the 2023 season will be used in part to help Centre ACER—CDL's scientific partner—confirm its nutritional profile. Maple nectar comes from a process that preserves the integrity of the nutrients in the raw sap. In our opinion, the nutritional value of maple nectar gives it a considerable advantage over other liquid sugars used by food processing companies.

Another advantage: this new sweetener is produced with equipment running on 100% renewable or carbon-neutral energy! And since maple nectar can be stored unrefrigerated, at room temperature, it is an eco-friendly and financially attractive ingredient for the food processing industry.

This is why at CDL we strongly believe that this new sweetener will be beneficial for the entire maple syrup industry and will offer new opportunities to maple syrup producers. Let's not forget that since 2022, maple nectar has been recognized as an innovative maple product by the Producteurs et productrices acéricoles du Québec (PPAQ) and the Conseil de l'industrie de l'érable (CIE), proof that the industry shares our vision. Maple nectar was also recently added to the Convention de mise en marché de l'eau d'érable (Quebec's maple sap commercialization agreement) in order to standardize its purchase and sale as a new sweetener derived from maple sugaring.

WHAT IS MAPLE NECTAR?

- It's a new, 100% natural maple sweetener, with a final Brix of over 60. It can be certified organic and carbon-neutral.
- Maple nectar comes from a process that preserves the nutritional integrity of the sap and eliminates the bacteria and yeast that could appear after the sap runs through the tanks and tubing.
- It is concentrated by mechanical filtration and then evaporated at low temperature to prevent mineral precipitation.

On the left, Jean-Marie Chabot, co-founder of CDL, Vallier Chabot in the middle, and Steve O'Farrell, R&D project manager putting maple nectar into barrels and containers.

Improvements and tests for large-scale production!

The 2023 season has allowed CDL to make the final adjustments to the process and equipment. A batch of approximately 75 barrels had been estimated and promised to distilleries and partners in the beverage industry so that they could integrate and test this new sweetener in their recipes. So far, the feedback has been extremely positive.

For the 2024 season, our goal will be to increase the scale of our production, both at the CDL Technology Centre and with a few maple sugaring clients!

By Serge Tanguay
Sales Manager, Canada

A LOOK BACK AT THE FIRST YEAR OF THE MASTER-E WITH OUR CUSTOMERS!

The 2023 maple sugaring season is the first on the market for our brand-new 100% electric and automated Master-E evaporator. At the time of writing, the first Master-E evaporators have not only been produced, delivered, and installed by our team, but have also been operated by their owners! This is a source of pride for both CDL and its customers!

Among the first customers of the 2023 season, each made the decision to change their main evaporator to the Master-E for various reasons. Some aimed for a better alternative for the environment, others were convinced by the automation of the evaporator while several changed for the high energy efficiency performance. We asked them to share with you the different reasons behind this technological change.

Thank you to the Côté family, Pascal Charette, Annie Ricard, the Blais family and all our 2023 Master-E clients for your trust:

you are pioneers!

CDL is now taking Master-E orders for the 2024 sugaring season—yours awaits!

SUBSIDIES AVAILABLE IN QUEBEC

- EcoPerformance
- Three-phase network access program

Our team has the expertise to help you build your case.

Some of our customers have received or will receive support from the above.

Our team in front of the first Master-E manufactured

Érablière Côté et fils inc.
Roxton Pond, Estrie region

Sébastien Côté of Érablière Côté et Fils Inc. was among the first customers to install the Master-E. Their sugar shack is located in Roxton Pond in the Estrie region. With nearly 100,000 taps, he had been readying their sugar shack for the new evaporator for nearly two years.

Production costs and ease of operation were the main reasons for the change. Sébastien estimates it now costs them $4 to $5 in electrical power to produce a barrel instead of $50 to $60 with their old oil evaporator.

The Master-E's ease of operation makes it almost impossible to ruin a batch of syrup. Operators only need to program the desired Brix, and everything else is taken care of. So much so that Sébastien now delegates the boiling step to team members who had never operated an evaporator before the Master-E arrived at their sugar shack!

> "This business is too big for just one Master-E. This year I'm keeping my oil evaporator to boil the extra sap, but next year I can tell you there'll be another Master-E on its way to our sugar shack!"
>
> — **Sébastien Côté**,
> Érablière Côté et fils inc.

From left to right: Mikael Ruest, Michel Côté and Sébastien Côté

From left to right: Marco Lacasse, William Lamontagne, Pascal Charette and Annie Ricard

Pascal Charette and Annie Ricard
Saint-Magloire, Chaudière-Appalaches region

Pascal Charette and Annie Ricard installed a Master-E for their sugar bush in Saint-Magloire, in the Chaudière-Appalaches region, right before the 2023 maple sugaring season. Their facilities filter, concentrate, and evaporate the sap from more than 46,000 taps, 15,000 of which are right next to the sugar shack.

Mr. Charette says they chose to transition to electricity because they wanted to control production costs and reduce the business's greenhouse gas (GHG) emissions.

> "To keep the business profitable, I needed to control production costs. The Master-E lets us do this, unlike our old oil evaporator, because the price of electricity is far more stable and is lower than the price of fossil fuels." — **Pascal Charette**

The labour shortage was also a decisive factor in the transition: the Master-E is much easier to operate because it's automated.

From left to right: Rémy Blais, Andrée-Anne Grenier , Eliot Blais, Alain Blais, Evelyne Lacroix and Jean-Luc Blais

ABEL Érable inc.
Lambton, Estrie region

Jean-Luc Blais along with Alain Blais and his spouse Évelyne Lacroix of ABEL Érable Inc. in the municipality of Lambton in the Estrie region are among those who made the switch to Master-E for the 2023 maple sugaring season. Although their main sugar bush has 21,000 taps, their new electric evaporator was used to boil the sap from a total of 30,000 taps by adding those from the sugar bush belonging to their son, Rémy Blais, and his spouse, Andrée-Anne Grenier.

Until last season, ABEL Érable Inc. had been using a 4" x 15" oil evaporator. What convinced them to make the switch was the Master-E's energy efficiency and its automated cleaning.

> "The evaporator's automated cleaning was the reason why we chose the Master-E (...) No need to remove the coils, no need to scrub them either. We just press the 'wash' button on the screen, and that's it!"
>
> — **Rémy Blais**,
> ABEL Érable inc.

By Maurice Beauchamp, P.Eng,
Director of Operational Effectiveness

IT PAYS TO BE MORE EFFICIENT!

Aiming for efficient maple syrup production brings its fair deal of challenges! Because we share this quest with all maple syrup producers, our Research and Development Department is always looking to innovate. Our team is constantly challenging existing processes to develop highly energy-efficient equipment. In maple syrup production, the most energy-intensive step is evaporation. That's why it's critical to optimize this stage or the one just before it: concentration, or reverse osmosis. Here we present some interesting facts to help you consider changes that may be beneficial for your business.

If you'd like to keep your current evaporator, you'll need to be careful in choosing your reverse osmosis system (RO). By increasing your concentrate's final Brix, you remove a significant amount of unsweetened water, which directly reduces the boil time. If you look at the charts opposite, you can see that regardless of fuel type, the Brix of your concentrate will have a significant impact on the energy required—and thus on the cost per barrel.

For example, using the same oil evaporator, if you boil at 15 Brix, you will need 0.43 gallons of oil to produce 1 gallon of syrup. In contrast, if you boil at 30 Brix, you will only need 0.17 gallons of oil for the same amount of syrup. In the end, you'll save more than 60% of oil for each barrel produced!

One point to consider is how much electricity an RO uses. For example, the largest model of the Fendeuse line currently sold by CDL, the one with 4 posts, consumes about 14.2 kW per hour of operation, which represents $1.42 CAD per hour in electricity (≈$2.13 USD). This is much less than the energy you would use for the same hour of boiling with an evaporator!

Note that our calculations exclude the labour costs associated with operating the evaporator. In some cases, you may choose to upgrade to a more efficient evaporator with a higher barrel-per-hour capacity than your old model, but which runs on the same fuel, even if the energy is more expensive. This is up to the customer. Better production performance would certainly reduce the amount of fuel, but more importantly, it would reduce the required boil time.

If, instead, you would prefer to change the evaporator entirely, the choice of fuel becomes a primary concern. As you can see in the last table, with the same concentrate, the electric evaporator delivers the most affordable cost per barrel, followed closely by the wood chips evaporator. Third place is held by the conventional wood evaporator. Note that our calculations consider that a cord of wood (24" x 4" x 8") costs $100 CAD ($150 USD).

Good to know! Our Master oil evaporators can be modified to burn biomass (chips or pellets). With the soaring cost of oil, this is an option worth considering! Ask our team about how you can make this change. Converting an oil evaporator to one fuelled by biomass is simple: just change the evaporator's frame, including the feed system. Plan suitable storage for the new fuel: a silo for pellets or a weatherproof location for wood chips.

Oil Evaporators	Brix of concentrate			
	15	20	25	30
Ratio Gal / Imp. Gal.	0.43	0.30	0.22	0.17
Cost $ / Imp. Gal.	$3.12 CAD	$2.18 CAD	$1.60 CAD	$1.23 CAD
Cost $ / US Gal.	$2.60 USD	$1.81 USD	$1.33 USD	$1.03 USD
Cost $ / Barrel (34 imp. Gal, 40 US Gal.)	$106.20 CAD $68.92 USD	$74.09 CAD $48.04 USD	$54.33 CAD $35.26 USD	$41.99 CAD $27.25 USD

Based on a price of $1.60 CAD ($1.06 USD) / liter of oil
N .B. : The economy does not consider the saving of labor costs

Wood chips Evaporators	Brix of concentrate			
	15	20	25	30
Ratio Pi^3 / Imp. Gal.	0.71	0.51	0.35	0.27
Cost $ / Imp. Gal.	$0.35 CAD	$0.26 CAD	$0.18 CAD	$0.14 CAD
Cost $ / US Gal.	$0.18 USD	$0.13 USD	$0.09 USD	$0.07 USD
Cost $ / Barrel (34 imp. Gal, 40 US Gal.)	$12.05 CAD $7.09 USD	$8.67 CAD $5.10 USD	$6.03 CAD $3.55 USD	$4.65 CAD $2.73 USD

Based on a price of $0.50 CAD ($0.30 USD) / pi^3 of wood chips app.
N .B. : The economy does not consider the saving of labor costs

Pellet Evaporators	Brix of concentrate			
	15	20	25	30
Ratio Lbs / Gal. US	7.00	5.00	3.50	2.70
Cost $ / Imp. Gal.	$1.34 CAD	$0.96 CAD	$0.67 CAD	$0.52 CAD
Cost $ / US Gal.	$0.84 USD	$0.60 USD	$0.42 USD	$0.32 USD
Cost $ / Barrel (34 imp. Gal, 40 US Gal.)	$45.70 CAD $33.60 USD	$32.64 CAD $24.00 USD	$22.85 CAD $16.80 USD	$17.63 CAD $12.96 USD

Based on a price of $0.16 CAD ($0.12 USD) / lbs of pellet
N .B. : The economy does not consider the saving of labor costs

In summary	With a 30 Brix Concentrate...					
	Oil	Propane	Pellet	Wood	Wood chips	Electricity
Cost $ / Barrel (34 imp. Gal, 40 US Gal.)	$41.99 CAD[1] $27.25 USD[1]	$27.01 CAD[2] $28.96 USD[2]	$17.63 CAD[3] $12.96 USD[3]	$8.48 CAD[4] $12.47 USD[4]	$4.65 CAD[5] $2.73 USD[5]	$2.75 CAD[6] $4.12 USD[6]

1. Based on a price of $1.60 CAD ($1.06 USD) / liter of oil
2. Based on a price of $0.70 CAD ($0.77 USD) / litre
3. Based on a price of $0.16 CAD ($0.12 USD) / lbs of pellet
4. Based on a price of $100 CAD ($150 USD) / wood cord (24" x 4' x 8')
5. Based on a price of $0.50 CAD ($0.37 USD) / pi^3 of wood chips app.
6. Based on $0.10 CAD ($0.15 USD) / kW energy cost

Remember to consider the labour you'll need to feed your evaporator and manage your fuel! Our chip and pellet evaporators allow for 100% automated feeding so you can spend your time on other key stages of production. These evaporators also deliver improved boiling stability, another aspect that shouldn't be overlooked!

You may be wondering about your return on investment. According to our experts' calculations, the annual savings from changing an RO or an evaporator yield a positive return on your investment. Our team can do this calculation with you!

By Annik Perron
Editor for CDL's Way

PORTRAIT OF A PASSIONATE MAPLE SYRUP PRODUCER

CHRISTINE CÔTÉ

This series is dedicated to CDL's celebration of inspiring women who live and breathe maple syrup production. In this article, we introduce you to Christine Côté of the Érablière Côté Sucré in Coin-du-Banc, in the Gaspé Peninsula.

Christine Côté's background is anything but ordinary. Like Obelix, she fell under the spell of agriculture as a child. But how did a little girl from L'Ange-Gardien in the Montérégie region, born to poultry farmers, end up creating the easternmost sugar bush in Quebec, overlooking the sea in the mountains of Val-d'Espoir in Coin-du-Banc near Percé?

"As a child, I was quiet and would follow my parents around on the poultry farm where we produced broilers and hatching eggs. The 80-person company was very close-knit, like a family. I was involved in everything, even as a child. My parents wanted us to get an education, so I did a degree in psychology. But I've always stayed involved in the company, even while I was in school."

"I didn't think I'd carry on the tradition at that point, but after I graduated my father suddenly found himself without a hatchery manager. He asked me to help out temporarily, and I said yes. That 'temporary' help lasted 21 years!" Not only has Christine learned a lot during her career, but she's also had a second full-time job as a mother of three. On top of that, she's involved in several different agricultural committees, making her a seasoned agricultural producer. "There aren't many women on agricultural committees, and it's a shame. Their vision would be an asset! I encourage all women in agriculture to get involved in places of power."

So how did her maple sugaring journey begin? In 2013, Christine's mother passed away and it was a huge blow. The year after, Christine needed some time to recharge her batteries and decided to take a year off. She left for the Gaspé Peninsula for the year, with husband Dominique Barabé (a longtime supporter) and their three children in tow. As the end of the sabbatical drew near, the family found that it had fallen in love with the region and decided to stay.

With that decision, the idea to start a sugar bush was born. "I saw this wonderful forest by the sea. It was untapped, but had huge potential. A friend told me about getting a start-up quota for public lands through the PPAQ quota system, and we were intrigued. I set up the project and it worked! In the summer of 2017, our project took shape. Oh, but Dominique and I had such a long way to go! Looking back, I'd say that we were pretty naive! Our piece of land didn't have anything—no roads, no bridges, no shack—and I had never made maple syrup in my life. So it took a lot of hard work to make it to our first sugar season in 2018, with 10,000 taps! Of course, I have to thank Claude Fecteau, a CDL expert who helped us with so much good advice throughout our project. He's been a true mentor. Without Claude, we would never have made it! From the beginning, all of our equipment has come from CDL. The closest branch is in Saint-Quentin, four hours away, so we keep a lot of parts in stock just in case! Claude Fecteau has since retired, and now Michaël Boucher is our CDL representative. It's important to have good support."

Christine and Dominique have reached their goal of 20,000 taps. In fact, this year they have 20,820 taps in total! Their son, Thomas-Louis, works with them in the family business; their daughter, Béatrice, also helps out part-time, although she's

Christine and her partner, Dominique Barabé

now an adult and has a full-time job outside the family business. Marie-Lili, who's now in university, was behind the success of the production side of things during the pre-pandemic tourist seasons. She knows all the ins and outs of their stand along the side of Highway 132! For the past six years, the sugar bush has hired two full-time employees during sugaring season. If the first year was difficult, it was nothing compared to 2018, a disastrous season for all maple syrup producers in the Gaspé region. But the following years have been more successful, and Christine is confident that the future is bright.

In 2019, before the pandemic, the sugar bush was open to visitors and Christine loved meeting tourists from Europe who wanted to learn all about maple artisans and their products. Once travel from Europe picks up, the sugar bush will open its doors to visitors once again. In the meantime, they have several projects in the works. Christine is awaiting quotas for two projects totalling 16,000 taps and has plans to develop a sap loading station. By 2025, she expects that they'll be carrying concentrate, not sap!

Christine is very grateful for all the help she's received from some of the retirees in her area. "They're incredibly dedicated and their help is invaluable! For example, I'm always amazed that when we're up late boiling, one retired neighbour is kind enough to make us supper! And I think a business like ours in the region is more than just a simple sugar bush. It's a social project that brings our little village closer together. I am very proud of the work we've accomplished in the last few years, all the more since we brought home the bronze at the Commanderie de l'Érable's Grande Sève competition this year. It's the fruit of a truly massive amount of work, and the medal belongs to everyone who helped us win it."

Christine loves sharing her passion for maple, too: "If you think about it, maple trees are producing a type of water when water's becoming scarcer across the globe. The polyphenols found in maple syrup are recognized as important nutrients and we're discovering more and more benefits every day. We're starting to replace refined sugar with natural sweeteners like maple syrup. Quebec really needs to recognize the value of this incredible resource—which is like no other in the world—promote it, and above all, PROTECT it."

CDL is incredibly proud to have a passionate maple syrup producer like Christine Côté as a client. You're amazing, Christine! CDL will gladly remain at your side as your projects continue to grow.

Exterior view of the sugar bush

By Sylvain Côté
Manufacturing engineering

FOUR LINES OF REVERSE OSMOSIS SYSTEMS, INFINITE POSSIBILITIES!

With maple sugaring, one of the keys to boosting profitability is to have a powerful reverse osmosis system (RO) that suits your needs and can effectively increase the Brix of your sap. This cuts down boiling time significantly, which saves you not only time, but also money since you use less fuel. At CDL, we offer four lines of ROs: heRO, Fendeuse, Hobby, and Nano. With such a range of possibilities, you're sure to find the one for you. We hope this helps you make your decision!

New heRO line

One of CDL's major new products for 2023 is the entirely modular heRO line of ROs. What makes them entirely modular? Imagine the heRO is a new RV you're shopping for: you get to choose a truck (heRO main unit), a fifth wheel (CDL 2.0 post and membrane cart), and then all the options that go along with them. That means you can:

- **Buy a new heRO main unit and a new 2.0 post cart;**
- **Keep your current main unit and change your post cart for the 2.0 version; or**
- **Change your main unit for a new heRO and keep your current post cart.**

But which new heRO should you choose? First, ask yourself if you want a standard (manual) or an Intelligent (automated) system. With the Intelligent model, you can manage all the features of your RO entirely remotely, following defined parameters. Once it's been programmed, your Intelligent RO will operate independently and automatically. It will allow you to remotely monitor your operations through the CDL Intelligence system and gather key performance data in real time—ideal for maple syrup producers who are facing labour shortages, have another job outside of sugaring, or are simply looking for peace of mind.

Note that manual heROs can be upgraded to an automated model at any time. Not ready to go 100% automated? A nice, affordable compromise is to add remote-control modules. However, this does not make your RO automated RO, so you'll have to perform the actions one after the other through the interface. In other words, you'll need to use YOUR intelligence instead of letting CDL Intelligence do the work for you! The remote-control modules can be added to all of our RO lines, and even to ROs sold by our competitors!

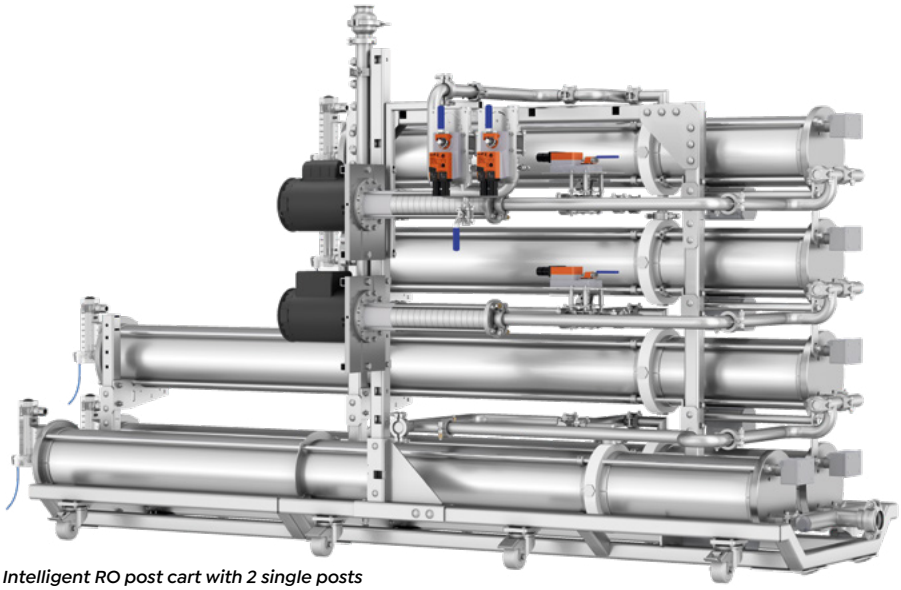
heRO-4T Intelligent Model

The second step is to decide what performance you're looking for. You'll need to choose from three main units: heRO 2T, heRO 3T, and heRO 4T. The "T" represents the number of pressure pumps (turbines) that the main unit can accommodate, and therefore, its maximum capacity (in gallons). This means the heRO 2T can accommodate up to two pressure pumps (choice of 5 HP-Eco, 5 HP, or 7.5 HP), allowing performances between 720 and 3,600 GPH. Similarly, the heRO 3T units can accommodate up to three 7.5 HP pressure pumps, for performances between 1,800 and 5,400 GPH; 4T units can accommodate up to four 7.5 HP pressure pumps, for performances between 1,800 and 7,200 GPH.

These high-efficiency ROs offer great flexibility when it comes to configuration, so you'll be covered not only for now, but also for the future. For example, you could order a heRO 3T main unit with two pressure pumps today, then add a third pump in a few years to increase your maximum capacity. If you have expansion plans, don't hesitate to mention them to our experts while they're preparing your quote so they can take them into account.

Last but not least: the options! For automated heROs, those might include a touch screen; readings on sap and concentrate Brix; concentrate/filtrate flow and conductivity; pH control during washing; and wastewater neutralization.

Before choosing your CDL 2.0 post and membrane cart, you'll first need to know the maximum Brix you want to achieve in one pass, as you can concentrate to 15, 20, 25, or even 30 Brix by using either single or double membranes and adding booster pumps. In all, there are 24 possible configurations of the CDL 2.0 post and membrane cart, whether or not it's automated, so you'll be sure to find the perfect system for your needs and budget. And don't forget, our experts are here to guide you in your selection.



Intelligent RO post cart with 2 single posts and 3 double posts

At CDL, we offer a unique patented system to extend the life of your membranes: a positive recirculation system, which lets you run the system for several hours without any efficiency loss and without premature clogging.

You have the same flexibility with the cart. You could purchase a larger CDL 2.0 cart, then add the extra posts and membranes over time to increase the Brix of your concentrate in one pass, since the cart's plumbing will already have everything you need. Thanks to their new design, the carts can easily accommodate booster pumps, which are very useful to reach a high Brix. Some 2.0 cart configurations are also compatible with the Fendeuse Deluxe. Ask your representative!

Fendeuse

Our Fendeuse line has proven its worth for over 20 years here at CDL. It's a must for any maple syrup project! Our patented positive recirculation system is one of the major advantages of this line.

One of the most powerful and reliable ROs on the maple syrup market, the Fendeuse Deluxe is equipped with 5 or 7.5 HP turbines, for a production capacity between 500 and 3,600 GPH. You can choose from five different combinations of pressure pumps (turbines). As for the cart, you can choose from 12 post configurations: two configurations with vertical posts, for concentrates of up to 15 Brix, and 10 configurations with the new CDL 2.0 carts for concentrates of 15, 20, 25, or even 30 Brix in one pass!

Our Fendeuse Classic is the most affordable model in this line. It's also what made CDL famous, thanks to its impressive performance—from 500 to 1,500 GPH depending on the options! This system offers excellent value and remains a favourite because of its ease of use. You can add one to three posts without a cart; they simply remain upright beside the Fendeuse Classic. This system lets your concentrate reach up to 15 Brix in one pass.

Hobby

CDL has also thought of hobbyist producers, hence the line called Hobby! The Vertical Hobby model is suitable for producers with up to 2,000 taps looking for a capacity between 125 and 250 GPH. One or two 4-inch vertical posts can be added to the RO, whether you choose the 120- or 240-volt model.

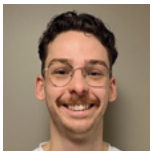
Nano RO

The Nano RO offers simplicity and efficiency to small producers! The first model in this line was the Nano RO. It has three membranes and a recirculation pump and is very popular with maple syrup producers who have between 50 and 150 taps. It is very affordable and will allow you to reach performances ranging from 10 to 13 GPH and up to 6 Brix in one pass. No more sleepless nights of boiling!

COMING SOON:

NANO RO MAX

Watch for it at our 2023 Open House



By Frédéric Dostie Eng.
Engineering Director

CDL'S NEW 20" PRESS

CDL's new 20" press has a simple, streamlined design that offers the same benefits as the rest of the CDLWESFAB press line. With its ease of operation and capacity, the press will no doubt appeal to maple syrup producers. Much lighter than its predecessor, it is easier to handle. Its efficiency can be attributed to up to 400 square inches of additional filtration area (depending on plate configuration). Paper filters are easy to assemble.

The 20" press is now equipped with a hydraulic cylinder that can be operated either manually or with compressed air. Air inlets and outlets can be added for drainage to make the equipment easier to clean—a popular feature.

True to the CDL tradition, our new products are synonymous with evolution, and our new 20" press is no exception to the rule!

By Nick Norton
CDL Southern Vermont Service Technician
and owner of a 4,000 taps sugarbush

A DRY SCREW PUMP THAT COMBINES SIMPLICITY, CLEANLINESS, AND PERFORMANCE

If you were only looking for a quiet pump, you'll be pleased to discover that our new dry screw pump delivers far more qualities than quietness. With its efficient and stable design, it meets regulatory hygiene requirements for food safety. The vacuum leads to self-lubrication, reducing the risk of low-vacuum damage and eliminating the need for oil. As a result, the pump requires very little maintenance. It is consistently efficient because the lack of friction minimizes the required amperage and, thus, power usage.

The dry screw principle is highly moisture resistant. It can even be operated without a moisture trap. If sap finds its way in, the pump can be cleaned with hot water alone.

One of the pump's interesting qualities is that it starts up better when cold. This dry screw pump can certainly be described as turnkey!

Nick Norton's 4 HP dry screw pump

> Being a sugarmaker on top of having a full-time job is tough. I needed equipment that was dependable. My biggest concern was getting a vacuum pump that would be reliable, capable of high vacuum, and be cost effective to run. I did not want to deal with oil cooled pumps because of high maintenance and moisture contaminating the oil.
>
> This led me to the new dry screw pump and wow did this exceed my expectations. It is truly a game changer for the maple industry! It's so quiet you can have a conversation right next to it, achieving over 29" HG while being more power efficient than any other pump on the market. There is no water or oil required for lubrication.
>
> It can withstand high moisture intake and the best part, there is very little maintenance. Simply change the drive belt every couple of years! No more oil and filters to change. If you're looking for a new vacuum pump look no further the dry screw pump is the answer."
>
> — **Nick Norton**,
> CDL Southern Vermont Service Technician
> and owner of a 4,000 taps sugarbush

By Martin Chabot
Co-owner and general manager of CDL USA and head of international business development – CDL Sap Division

HUGE POTENTIAL FOR CDL'S SAP DIVISION IN BALTIC AND NORDIC COUNTRIES

CDL has been developing its European market for several years now by selling equipment designed to harvest sap from a range of trees. This market will continue to grow thanks to partners like Ervins Labanovskis, whom you'll hear about today.

In Latvia, birch sap is generally produced on a small scale, with families and individual producers collecting and processing the sap themselves. The sap is often sold directly to consumers or used to make traditional fermented birch sap beverages.

Ervins Labanovskis, an entrepreneur at heart, is driven by innovation. With a degree in political science and communications, Ervins started his career by working as a civil servant for a few years. His actions in the community have always been driven by the sustainable development of green projects and his political and social involvement. A few years ago, he was inspired to start a birch sap production business on land that had been in his family since he was a child. Ervins' parents, like many Latvians, harvested birch sap on a small scale for the healthful virtues it had been attributed for generations.

With his innate leadership, Ervins soon envisioned how his sap production and the products derived from that sap could be diversified. Working with his sister Nora in their business, BIRZI, he started planting birch trees, then maple trees, to develop a range of innovative products from their sap, such as a sparkling water and a kombucha-like fermented drink—as well as syrups, of course! All the birch and maple syrup they produce is organic. His wife is also part of the adventure, and their three young ones love keeping up with them in the forest!

With the dream of growing the business, he sought out partners who shared his values. In CDL, he found a partner with family values and an innovative spirit that would enable him to buy the equipment he needed to set up production. Spurred on by his entrepreneurial nature, Ervins began to dream of expanding this type of agroforestry more broadly throughout the Baltic and Nordic countries, where

Tapped birches in the forest of Ervins Labanovskis

Ervins Labanovskis and Martin Chabot during a delivery to a customer in Latvia

the tradition of sap harvesting is well established but still underdeveloped. In doing so, he became a CDL customer as well as a CDL representative for the Baltic and Nordic countries. He sees a great deal of potential for growth in these regions.

"Although birch syrup production in Europe is relatively new, it's growing by leaps and bounds thanks to rising demand for natural, organic sweetened products. My vision for the next few years is to increase production and develop all the potential in the Baltic and Nordic countries."

In addition to advancing CDL's market, Ervins aims to develop more products under the BIRZI brand. His intention is to get the region's other producers to ship their sap to his business so that more innovative BIRZI products can be created.

And you can certainly say that Ervins has a great instinct when it comes to sniffing out worthwhile potential for green and sustainable projects! As a forerunner, and with the support of Latvia's Ministry of Forestry, in 2018 he inaugurated the world's first park of sap-producing trees covering over 32 hectares in Smiltene, the small municipality he calls home. "More than 3,000 visitors have come to the park, where we intend to plant more than 100 varieties of birch, maple, and walnut trees. In the future, visitors will also be able to taste the different types of sap. For now, they can only taste products at our processing plant, which is open to the public. We love sharing our knowledge about sap-producing trees with everyone. Visitors are thrilled with their experience."

Visit the CDL Sap Division website at https:/www.birchsapcdl.com/ and the BIRZI website at https:/birzi.lv/en.

According to Latvia's Ministry of Agriculture, in 2018, the country's total birch sap production was estimated at 500 to 600 tonnes. Since 40% of Latvia is forested, the potential for birch sap production is currently under-exploited.

Special collaboration of Mrs. Suzie Plourde
UQROP Project Manager

OWLS HELP CONTROL UNWANTED RODENTS

Many maple syrup producers find themselves dealing with rodents, who are attracted by maple sap and can cause damage to tubing systems. But there's a natural solution to this problem! Did you know that a single barred owl eats three mice, or nearly one squirrel, a day? By eating rodents, these owls can help reduce the damage to your tubing system!

Barred owls are found year-round in mature sugar bushes across the north of America with dead or hollow trees. Because they need tree hollows for nesting, they can't always find a home. If there is little to no natural shelter available, you can install nesting boxes that imitate these hollows.

A barred owl can have anywhere from one to five chicks, which then stay with their parents for four months. Imagine how many rodents a family can eat! To avoid disturbing breeding pairs, trees should be cut from September to January. An owl's nest should be given 50 m of clearance.

To attract barred owls, cohabitate with them harmoniously, and keep everyone safe, 10 dead or hollow trees should be kept per hectare and be located away from facilities. It's also important that 15% of the forest consist of companion species (e.g. American beech, hemlock, yellow birch) and that at least 70% of the forest cover be maintained.

Never use rodent poison. A mouse or squirrel weakened by poison contains enough poison to kill an owl.

To find out how you can attract and keep barred owls in your sugar bush, email UQROP for reference documents, including nesting box designs, at soutien@uqrop.qc.ca.

CHOUETTE ! À VOIR
UQROP
UNION QUÉBÉCOISE DE RÉHABILITATION DES OISEAUX DE PROIE

Special contribution of Jack Bauer, Ph.D.
Technology Transfer Coordinator
Of Centre Acer

DETECT OFF-FLAVOURS IN YOUR MAPLE SYRUP WITH THE COLORI TEST

For Centre ACER, the beginning of 2023 marked the launch of the COLORI Test. This new tool lets maple syrup producers test for certain aspects of maple sap that can affect the quality of their maple syrup. The COLORI Test can tell you if the maple sap contains factors associated with natural off-flavours, such as bud (VR5) or sap (VR12). With this test, you can detect off-flavours even before maple syrup production begins!

This colorimetric test was developed by Jean-François Masson's laboratory at Université de Montréal in conjunction with the Producteurs et productrices acéricoles du Québec (PPAQ). The technology used in the COLORI Test is based partly on measuring the concentration of amino acids in maple sap. The test's reagent changes colour when the maple sap contains a high concentration of amino acids. Measurement of this parameter is essential because it correlates directly with maple sap quality. The higher the concentration of amino acids in the maple sap, the more likely the maple syrup is to develop an off-flavour.

As the harvest season progresses, the concentration of amino acids in the sap rises, and this higher concentration is generally associated with a lesser quality syrup. Testing your sap with the COLORI Test is a way to better control your maple syrup production and make better informed economic decisions. If you can tell when the maple syrup you produce will have an off-flavour, you can decide whether to halt production. Also, testing the quality of sap from different collection lines helps you better manage your collection system and anticipate the mix of higher quality sap with sap containing factors associated with off-flavours.

Because it can be used to assess maple sap quality, the COLORI Test is a vital ally for maple syrup producers. Using this new tool will positively impact the quality of maple syrup in Quebec—and across the entire industry. Following this successful pilot year, Centre ACER plans to expand the availability of the COLORI Test to more producers next season. Stay tuned!

ACER
Centre de recherche, de développement et de transfert technologique acéricole inc

By Jonathan Côté
Marketing Project Manager - Product and Customer Service

A 3/16" TUBING SYSTEM: A SIMPLE, ECONOMICAL, AND EFFICIENT SOLUTION!

Personal interests and hobbies that bring people closer to nature continue to grow in popularity. Anyone who owns a few dozen maple trees can become an amateur maple syrup producer and develop a real passion for it. The same is true for anyone with a stand of birch. If you're in a position to take advantage of these resources, why not make your life easier and reduce your investment at the same time? So many still think it takes expensive equipment and a lot of grunt work to haul buckets when it can actually be done so much more easily! Have you ever heard of gravity? In a maple or birch stand, this natural law is a real opportunity—one that ought to be used.

3/16" tubing system

Setting up sap collection with a 3/16" tubing system means you'll bypass the work that comes with buckets and the investment you would need to make for a vacuum pump system.

In fact, provided there is a slope, 3/16" tubing uses gravity to carry maple sap all the way to your tank. The steeper the slope, the greater the natural vacuum resulting from gravity and the bigger your harvest.

With this system, there are no buckets to install and no need to run and empty them, then take them down and store them when the season ends. Not bad! Also, if you compare the cost of buying a new set-up, the tubing system is almost half the cost of buckets ($5 per tap versus $8 to $9 per tap for a set-up with 25 to 50 taps, excluding installation).

CDL has developed an entire range of products for hobbyists. If you're looking for advice or are interested in equipment, visit the CDL store nearest you to discuss your project.

SCAN TO SEE THE VIDEO
bit.ly/cdlvideos

Testimonial

Paul Partridge
Coldwater, Ontario

"We have been using 3/16" tubing in our bush for 8 years.

What attracted me to it was its ability to create its own vacuum, this made it a cheap investment to increase our yield in a bush where we had no power to run a vacuum system.

This bush had a good slope from the top of the bush to the bottom, so it allowed us to run long lines done to our main line and then to our tanks.

We have 1,250 taps on this system and was very easy to install. The trees produced an average 40% more after switching from the traditional buckets and eliminated hours of collection.

I believe anyone who has a slope in their bush and want a vacuum system that is inexpensive for a smaller operation this is the way to go."

To make your dream a reality:

1. Walk your land and determine its potential.
2. Clean up your forest by removing nuisance trees but keeping the companion species in your sugar bush.
3. Install your tubing system so that sap flows to a storage tank. (Make sure you read the guide that comes with your 3/16" tubing at time of purchase.)
4. Harvest!
5. Remember, CDL advisors are here to help you!

By Anne-Sophie Couture-Goulet
Director, Marketing and Communications

INAUGURATION OF THE NEW CDL TECHNOLOGY CENTRE

For some time now, CDL has dreamed of having a single location where it could test its prototypes, continuously improve its equipment, train its employees, and showcase new products for customers year round. This has become a reality thanks to the brand new CDL Technology Centre in Saint-Henri, in the RCM of Bellechasse, on the site of a 2,800-tap sugar bush.

You've probably already heard our mantra: "For maple syrup producers, by maple syrup producers." Although it's not a prerequisite, many of our employees are maple syrup producers themselves. They're always trying to optimize and reinvent processes and equipment, both on and off the job, because at CDL, maple syrup production—and especially innovation—is in our blood! Since the best ideas often come to life when you're "up to your elbows in it," the Centre will give CDL employees an opportunity to test equipment in a real-life setting, on site, all year long! Before the Centre was created, the prototyping and testing phases were conducted either at our production plants, at the Chabot family sugar bush, or at the sugar shack of a number of customers. The Centre, which is close to our main production and distribution facilities in the Bellechasse and Beauce regions, is now among our preferred locations for prototyping and testing.

Prototyping and testing a new piece of equipment involves testing not only its performance multiple times, but also its full range of operation, from start-up to maintenance. Once a prototype's design is considered optimal, it's added to our production line so the first units can be manufactured.

The CDL Technology Centre will also serve as a training facility for our internal sales and technical service teams. Our representatives and technicians will be able to learn how the new products work so they can answer customer questions and master product installation and repair in order to deliver top-notch service on site!

Want to visit our new Technology Centre? You'll get the chance to visit this high-tech site as part of Open House 2023, the world's biggest maple syrup event. So come one, come all, on Friday, May 19, and Saturday, May 20, 2023, to visit us in Bellechasse!

Depuis 1776
Bellechasse
Berceau Mondial
de la technologie acéricole

This logo was created to proudly show the maple sugaring innovative identity of the RCM of Bellechasse

By Christian Gosselin
Product Manager - Forest Division

TO EACH MAPLE PRODUCER THEIR OWN SPOUT!

Right from the start, CDL has invested in innovation to meet the expectations of an increasingly experienced, detail-oriented clientele. That's why we regularly improve our range of spouts in response to specific requests from our clients.

Two new versions of our spout have been added to the CDL collection: Maxflow PLUS and SMART 2.0. Maxflow PLUS is a permanent spout, while SMART 2.0 is designed for seasonal use based on the producer's preference.

Maxflow PLUS

The Maxflow PLUS spout is made of the same plastic material that our current Maxflow is known for: what's different is the angle of the stem where the tubing is inserted. It's now at a 15° angle, giving the new spout clearance between the drop line and the tree—a feature several producers have requested. Mission accomplished!

Also, the opening at the tip of the spout lets the sap flow into the spout more easily, optimizing the yield of your drawoff. For optimal installation, use a 19/64" drill bit.

MAXFLOW PLUS

Also available in blue and black

SCAN TO SEE THE VIDEO
bit.ly/cdlvideos

SMART 2.0 spout

This new spout is also made of the same plastic material as our Signature spouts. However, its 15° angle is the ideal compromise for those who like the tightness of the 30° spout but find its angle too sharp.

The first barb without a mold line means optimal tightness. It's best to use a 17/64" drill bit for this new spout.

These two new products have joined our comprehensive range. Want to know more about our other spouts? Check out this video by scanning the QR code above.

SMART 2.0 Spouts

By Jocelyn Pelletier
Product Manager - CDL Intelligence

NEW: NANO CDL CELLULAR SURVEILLANCE SYSTEM

CDL Intelligence now has a remote management solution for small and medium-sized producers! The Nano CDL cellular surveillance system lets you use your smartphone to start and stop your vacuum pump remotely, in manual mode or automatic mode depending on the temperature. It can read the pump in real time, detect if the tank is full, send notifications to the phone, and even stop the pump if the sap levels are too high.

The system also collects data and sends it to your smartphone, where you can see it on the user-friendly interface of the dedicated CDL Nano app. That means you and your team can access crucial information anytime, anywhere.

The Nano CDL cellular surveillance system is the best way to bring remote management to your sugar bush without getting a full CDL Intelligence system. It will save you time, money, and stress by constantly looking out for vacuum loss, overflow, and even freezing!

By Marie-Myriam Dumais Synnott
Director of the Créneau Acéricole in Quebec

4.0 MAPLE SUGARING NETWORK : A PROJECT BY AND FOR BUSINESSES

In the fall of 2020, a number of businesses gathered with the support of Créneau Acéricole to receive the training they needed to develop their 4.0 strategic plans. This was the birth of 4.0 Maple Sugaring Network.

The project helped 18 businesses receive the necessary support to create their strategic plans and, in so doing, access several funding programs to help them integrate new technologies.

What's 4.0?

Industry 4.0, or the fourth industrial revolution, refers to the transformation that industry is undergoing as digital technologies become part of industrial processes.

In the maple syrup industry, using end-of-line sensors, for example, gives producers key data that helps them detect leaks in the system. This is just one of the many ways technology can help maple syrup producers significantly increase their yield. Sensors can collect data on several pieces of equipment: the reverse osmosis system, the evaporator, and the vacuum pumps. It's easy to see how that data can improve maple sugaring operations, work organization, and even preventive maintenance for sugaring equipment.

The fourth industrial revolution, commonly referred to as 4.0, is expected to optimize yields, increase harvest quality, and reduce work time. Integrating digital technologies is clearly the key to moving the maple syrup industry forward.

For maple sugaring, which remains a traditional practice, industrial development is still in its infancy. Integrating digital technology significantly improves production techniques and methods, not to mention the management and optimization of maple syrup businesses.

4.0 Maple Sugaring Network aims to:

- Introduce and accelerate computer-integrated manufacturing (CIM) processes among maple syrup producers
- Help businesses take action and access the right support
- Train strategic personnel and impact the business's organizational culture
- Make operations more profitable by integrating innovative tools and methods
- Inform businesses of the variety of solutions and equipment available to them
- Enhance the industry

Want to find out more about the 4.0 Maple Sugatring Network? Contact us and stay tuned for the upcoming information session slated for June 5, 2023, which will cover the implementation process and available funding.

Sign up or learn more about the information session: www.creneauacericole.com

We can also answer your questions one-on-one.

Be a trailblazer! Take part in the fourth industrial revolution by ushering in the Maple Syrup Industry 4.0!

Special collaboration of Amélie Richer, RCIC
Regulated Canadian Immigration Consultant - Arimé Inc.

NEED EMPLOYEES? CONSIDER TEMPORARY FOREIGN WORKERS!

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Are you having trouble hiring employees for your sugar bushes? Unfortunately, that's hardly surprising. Statistics Canada estimates that by 2026, more than 1.4 million positions will need to be filled in Quebec businesses[1]. The current labour shortage is having serious repercussions for all industries. For that reason, hiring temporary foreign workers is becoming a smart and even profitable choice. But what does the process look like? And what do you need to consider?

How do you hire foreign workers, exactly?

Hiring temporary foreign workers (TFWs) is a lengthy administrative process. Before a foreign employee arrives in the country, several different governmental bodies, both federal and provincial, must have given their approval.

More specifically, your company will need to receive a positive labour market impact assessment (LMIA) and each of the candidates you want to hire will have to obtain a Quebec acceptance certificate (QAC). After that, the candidates can receive their work permits and start working in your sugar bush.

There are plenty of programs that allow businesses to hire TFWs, but since maple syrup production is considered an agricultural industry, most producers choose the Agricultural Stream. This program allows employers to hire foreign candidates for contracts of up to 24 consecutive months. Many maple syrup producers opt for 8- to 12-month contracts, but it really depends on your needs.

What are the constraints to consider?

Time is an issue for most employers. The process of hiring a foreign worker can take up to 12 months in total for some industries. For maple syrup producers, it usually takes 6 to 8 months from start to finish. That means planning is key to successful TFW hiring!

Once on the job, foreign workers will need support for certain aspects of their stay in Canada. For instance, with the Agricultural Stream, the employer needs to provide compliant, properly equipped accommodation. This means that at Service Canada's request, the accommodation must have been inspected by a building inspector who is a member of the Association des inspecteurs en bâtiments du Québec (AIBQ) at the very beginning of the process. In addition, the employer will have to provide transportation between the applicants' country (or countries) of origin and the work site at the start and end of the contract. They also need to transport the TFWs between their accommodation and the work site. Finally, the workers will need help with administrative procedures so they can get their social insurance numbers (SIN) and Régie d'assurance maladie du Québec (RAMQ) cards.

It's also important to consider that the foreign worker program doesn't allow for as much flexibility in employment as hiring a local employee. The job description will need to be followed closely, workers will only be able to work on the sites described in the application, and the pay will be determined by the provincial government. What's more, TFWs enjoy the same labour standards as Canadian workers.

The process and the constraints may seem like a headache, but rest assured: with the right guidance, it's actually a breeze. At Arimé, we are proud to be part of the international hiring and travel process for more than 5,000 temporary foreign workers each year and, above all, to participate in the economic growth of many companies in Quebec, New Brunswick, and Ontario.

We know the process like the backs of our hands and we have the internal resources to support you from start to finish. We work with an AIBQ member for accommodation inspections, our team is very experienced in putting together applications, and we have partners in Mexico, Guatemala, and Peru. We even have our own travel agency to help companies bring their candidates to Canada and deal with all the hurdles this brings.

So if your business's growth or operations are hindered by a lack of reliable, diligent employees, consider temporary foreign workers as a sustainable solution. Dare to learn more. Get in touch with our team today!

Nelson and Eric, originally from Guatemala, working in the sugar bush

[1] https://www.mtess.gouv.qc.ca/grands-dossiers/action_maindoeuvre/marche/index.asp

Abby van den Berg[1], Timothy Perkins[1], Mark Isselhardt[2], Joël Boutin[3], Wade Bosley[1], and Brendan Haynes[1]*
[1]University of Vermont Proctor Maple Research Center, [2]University of Vermont Extension
[3]Club d'Encadrement Technique Acéricole des Appalaches

TAPPING PRACTICES TO MAXIMIZE YIELDS OVER THE LONG-TERM

In addition to location and the timing, frequency and duration of weather conditions for sap flow, there are four main factors which influence the total yields achievable from individual trees: the level of vacuum at the taphole, the sanitation of the spout and dropline, tapping practices such as taphole depth and diameter, and tree characteristics like size and genetics (sap sugar concentration, etc.). The choice of tapping practices like taphole depth and diameter is one of the most important decisions we make each year because it not only strongly influences the yields we might obtain in the current season, but will also impact the yields achievable in future seasons. Because of this, over the past several years experiments at the UVM Proctor Maple Research Center have been aimed at quantifying the impacts of various tapping practices on yields using current collection practices (vacuum, spout and dropline sanitation, etc.) to provide data to help guide choices of tapping practices that will maximize yields not only in the current season, but also over the long-term.

Taphole Depth. We conducted a 3-year study to quantify the impact of taphole depth on total syrup yields under vacuum. On average, 1"-deep tapholes produced about 63% of the 1.5"-deep tapholes, while 2"-deep tapholes produced about 25% more than 1.5"-deep tapholes (Fig. 1). Drilling deeper than 2" actually didn't result in additional gains over 2" tapholes.

Taphole Diameter. We also conducted several studies to determine the impact of taphole diameter on yields. With all factors equal – the same spout material, level of vacuum, etc. – on average, yields were lower with smaller taphole diameters (Fig. 2). For example, 1/4"-tapholes produced about 10% less than 5/16"-tapholes. Notably, this is almost identical to the results of a similar study at 28" Hg by Centre Acer.

Number of Taps per Tree. We're conducting ongoing research to determine the additional yield from adding a second taphole under vacuum conditions. Average total syrup yields from the first two years of the study were used to calculate the estimated gain derived from the second taphole by tree diameter (Fig. 3). With these data, the estimated percentage gain from the second tap ranged from about 46% for an 18" tree, to about 48% for a 28" tree. This is slightly lower than the gains observed in previous studies, possibly due to the smaller tree diameters included in the present study. We're currently conducting this study in trees of larger diameters (average = 24.7") and will update these results as needed after the 2023 and 2024 seasons.

So we know that the depth, diameter, and number of tapholes influence the yields we can obtain, but of course they also impact the amount of nonconductive wood generated each year. The tree's response to each taphole wound generates a column of wood above and below the wound that is permanently nonconductive to sap or water flow for the tree. The amount of nonconductive wood (NCW) generated is generally proportional to the size of the wound, so wider, deeper tapholes, and more tapholes per tree result in greater amounts of NCW (https:/youtu.be/LbUqFKVAUI0?t=1870). And this is an important factor in choosing tapping practices to maximize yields over the long-term, because tapholes drilled into NCW produce significantly less sap than those drilled into clean wood – in a study conducted by UVM Extension at PMRC, tapholes drilled into stained wood produced an average of 75% less sap, with greater reductions observed the more NCW that was intercepted by the taphole. (https:/mapleresearch.org/pub/reduced-sap-yields-when-tapping-into-non-conductive-wood/). So the greater the amount of NCW that accumulates in the tree's tapping zone, the greater the chances of hitting it and obtaining reduced sap yields during subsequent tapping. This is how the choice of tapping practices in the current season can affect the yields of the future.

So what are optimal tapping practices to maximize yields not just in the current season, but over the long-term as well? In reality, they'll vary depending on tree growth rates and health status, tapping history (i.e. how much NCW is already present), site characteristics, tree size, and other factors including the level of vacuum and other operation features and tapping practices (dropline length, etc.). But by far the most important factor is the tree's radial growth rate – this is what determines how much new, conductive wood is added to the tapping zone each year. The greater the growth rate, the more NCW can be supported because new conductive wood is being "replenished" at a faster rate. So healthy trees with good radial growth rates (and no history of over-tapping) can support less conservative tapping practices – deeper taphole depths, larger taphole diameters, and smaller diameters for the first and second tapholes. This is why practices to encourage vigorous growth and health of crop trees – including appropriate thinning and other forest management

best practices, and soil amendments if tests indicate they're needed – are the foundation for maximizing yields. For trees with lower growth rates, and/or when other "suboptimal" conditions exist – trees whose crowns are in a suppressed position in the forest canopy, trees that have been recently stressed or are exhibiting signs of stress (branch dieback, fine twig mortality, slow wound healing, etc.), trees that have a history of over-tapping, or if NCW is hit frequently when tapping – more conservative practices like shallower tapping depths, smaller spout diameters, and larger minimum diameters for the first and second tapholes are more appropriate.

Other factors will also impact the choice of tapping practices. For example, any practice which effectively increases the size of the tapping zone – longer dropline lengths, moving the lateral line system vertically, and tapping below the lateral line – increases the amount of conductive wood available for tapping and can help support the sustainability of less conservative tapping practices. Tree size is also an important factor to consider. In general, smaller trees produce lower yields than larger trees (https:/mapleresearch.org/pub/m0218treesize/). The volume of NCW from a single taphole comprises a larger proportion of the tapping zone in smaller trees than it does in larger trees. Because of this, NCW can accumulate more rapidly in smaller trees, particularly those with lower growth rates. For this reason, the tradeoff between yields and NCW accumulation is important to consider when choosing the minimum diameter for a single or second tap in smaller-diameter trees.

Our current recommendations are outlined in Table 6.1 of the 3rd Edition of the North American Maple Syrup Producers Manual (www.mapleresearch.org/manual). The choice of tapping practices should be an ongoing, continuous process, and be frequently assessed and adjusted in response to conditions as they change over time – as growth rates improve or decline, NCW wood is hit less or more frequently, less or more conservative practices can be implemented as appropriate. In all situations, the basic principle is always to aim for practices that will result in the maximum yields possible in the current season that also support the availability of sufficient future conductive wood, and thus maximum potential future yields, given the conditions of the trees and site.

We'll continue our studies of tapping practices and yields as equipment and practices change and improve, and update findings as needed. In addition, it's important to note that these recommendations could change if we find that sap collection itself impacts the radial growth rates of trees – however to date, after 10 years of an ongoing long-term experiment at PMRC, we've found no significant impact on growth rates from either gravity or high-vacuum sap collection (https:/youtu.be/LbUqFKVAUI0?t=744).

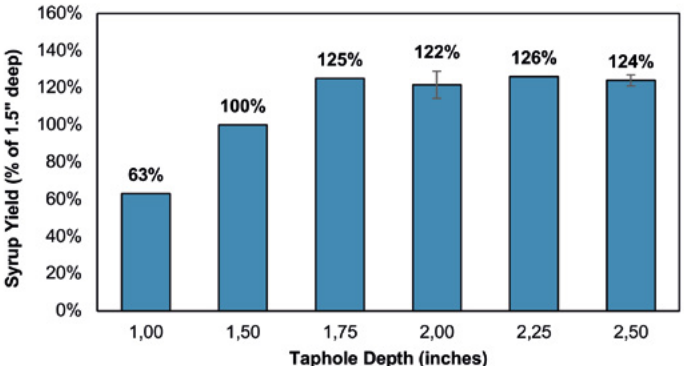


Figure 1. Average syrup yields from 5/16"-diameter tapholes drilled to depths from 1" to 2 ½" (including bark) in sugar maple stems expressed as a percentage of the tapholes at 1 ½" deep from studies in 2018, 2019, and 2020. Vacuum level 25" Hg. Full article: https:/mapleresearch.org/pub/depth0321/

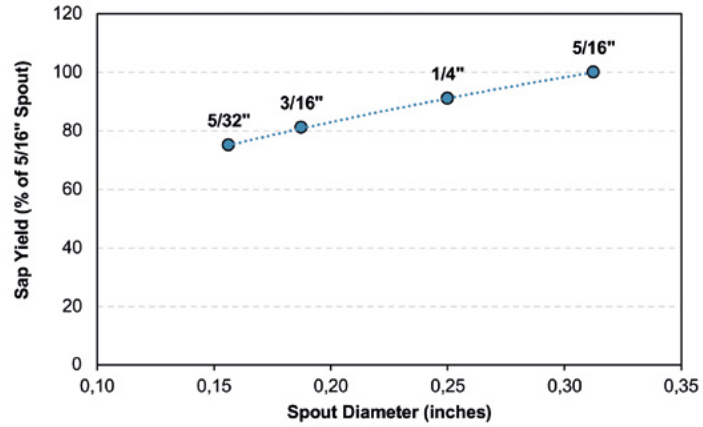


Figure 2. Average sap yields from tapholes of different diameters as a percentage of yields from 5/16"-diameter tapholes. Data are summarized from several studies conducted at UVM PMRC. Vacuum level 25" Hg.

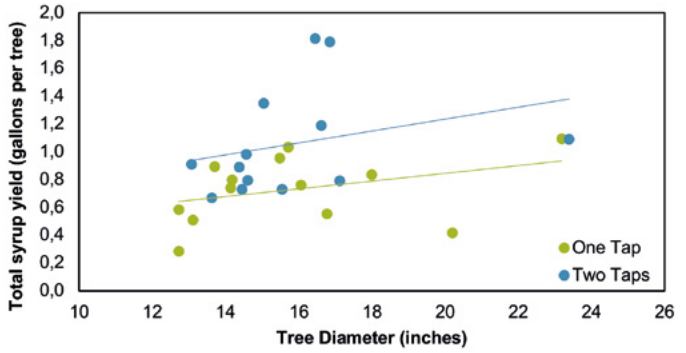


Figure 3. Average total syrup yields by tree diameter of sugar maple trees tapped with a single or two taps in 2021 and 2022, and linear regressions of diameter versus yield (solid lines). Vacuum level 25" Hg, n = 13 trees for each treatment group.

More detailed descriptions of some of the data from these studies and tapping practices to maximize yields over the long-term are available in this presentation on the PMRC YouTube channel: https:/youtu.be/LbUqFKVAUI0.

By Marc-André Chabot
Co-owner of CDL and
Vice President of Research and Development

AUTOMATING YOUR SUGAR BUSH, FROM FOREST TO BARRELS

As in so many other fields, smart systems are part of the trends and solutions to many issues in maple syrup production because they help us make better decisions.

When maple sap is flowing almost continuously during the short sugaring season, every minute counts in harvesting every last drop.

For some, the four to six weeks of sugaring account for their entire annual income. A lower yield due to equipment leaks, failure, or malfunction can have a serious impact on business operations or the operator's livelihood. That's why it's critical to have a smart system that lets you keep track of every detail.

Not only does this intelligent technology give you 24-hour access to vital data for your sugar bush, it also gives you the latitude to automate certain actions and processes.

CDL's 4.0 vision is to create a 100% automated, remote-controllable sugar bush, establish an encompassing synergy, and interconnect all the automated steps of maple syrup production, from the sap that drips in the forest to the syrup that drips into the barrel.

Photo taken at the Érablière de la Coulée Creuse of Mr. Sylvain Patry

CDL has been working towards this 4.0 vision for several years now. Step by step, Industry 4.0 in the field of maple syrup production has followed the journey of maple sap from forest to pumping station, by way of tanks to the reverse osmosis system (RO) and, now, to the evaporation stage with the introduction of the Master-E.

Thanks to the CDL Intelligence system, you can now use automation to manage your sugar bush.

What, exactly, can CDL Intelligence do for you?

First of all, the premise is that you can access your data in real time, all the time, from anywhere. Not only does the CDL Intelligence system gather the key data from your sugar bush via a single comprehensive and ergonomic platform, it gives you remote control over vacuum pumps, transfer pumps, various valves, the RO, and the electric evaporator. With this information in hand, you can determine whether your equipment is working properly and even control it.

Some processes are still hard to automate. One example is repairing leaks in the forest. Even here, CDL Intelligence is your ally. The system will give you the information you need to take immediate action at specific locations using a colour-coded virtual map of your sugar bush. Can you imagine the savings in labour and yield?

Automating a sugar bush is a process that takes time. As the saying goes, the only way to eat an elephant is one bite at a time. CDL decided to tackle the sugar bush section by section. In recent years, technology has arrived in forests with vacuum sensors, in pumping stations with remote pump control and vacuum modulation, in tanks with level monitoring, in ROs with remote control and automation, and—most recently—in evaporation with the Master-E, which can produce up to 2.5 barrels of syrup per hour at the touch of a button.

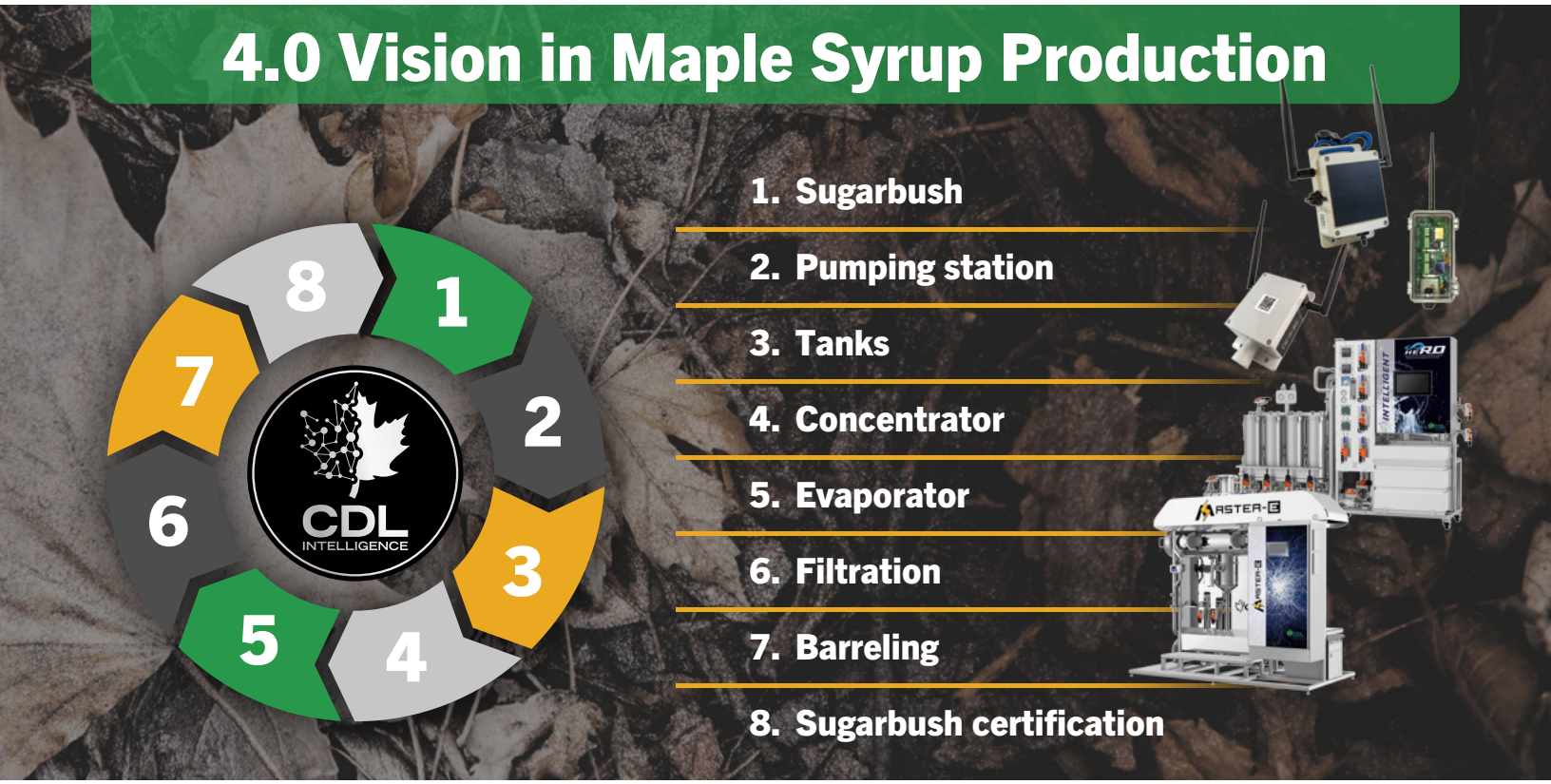
What's next for you at CDL?

CDL has accomplished a lot, but there is still work ahead of us. The next steps in achieving Maple Syrup Production 4.0 are syrup filtration and barrelling. Both stages are rife with challenges. Filtration is a complex step that requires a lot of work and a combination of factors for the syrup to pass through the press: filters, powder, syrup temperature, vacuum, etc. Anyone who has tried their hand at pressing syrup knows this step is a challenge, even for humans. How can an automated system manage and interconnect all these factors? These are the questions our R&D team is asking.

The same is true of barrelling. Bulky and heavy, syrup barrels require strength to handle. What's the best way to move them? A conveyor belt? A carousel? And what about filling them? With a sensor and robotic arm, an integrated flowmeter?

For now, these are some of the issues the CDL team will be working on in the coming months and, perhaps, years. These next steps will take Maple Syrup Production 4.0 full circle.

CDL INTELLIGENCE
MAPLE SUGARING MANAGEMENT SYSTEM



Special collaboration of Jean-Étienne Poirier
Anthropologist and maple syrup producer

A BURNING PASSION FOR MAPLE SYRUP

Maple syrup production may seem to straddle two worlds: on the one hand, tradition and the little log shack, and on the other, cutting-edge technology and large boiling centres.

The two poles may appear at odds. Some believe the maple syrup industry is becoming so industrialized that it's forgotten its roots. They fear that the flavour only buckets can provide will disappear and that family celebrations and the hours spent together in front of a wood-fired boiler—whose sounds and smells are so characteristic of the traditional process—will become relics of the past.

At the 2019 Journées acéricoles (maple syrup days) held by the MAPAQ, a fellow sugarmaker admitted his fear about this opposition between tradition and modernity: "It won't be long before it's the same as for milk: a truck will pick up the sap or concentrate from producers, and everything will be boiled at a big centre. And that'll be the last of our traditional sugar shacks..." My colleague found it hard to imagine that we might only harvest sap, without boiling it, without going through the entire process that he himself has enjoyed so much since he was a kid, when he was taught maple sugaring by his father.

A world that keeps changing

Four years later, I realize—as I'm talking to people in the industry—that we've never sold so many small evaporators as we do now. Is this the result of the pandemic, or are people reconnecting with tradition? A combination of factors must have led us here. Micro-sugar bushes of 30, 50, or 100 taps are growing in numbers, making it a strong trend. It's a trend that lets a growing number of people get in touch or reconnect with the tradition of maple sugaring, its gatherings, its chores, and its springtime pleasures. On the one hand, it's true that tradition seems to be fading in the commercial production sector. On the other hand, there's no doubt that tradition is seriously re-emerging from a recreational perspective and is showing up in family life more and more. This may not be a story that's moving in a single direction!

Despite the significant interest in small sugaring facilities, the idea of large centres expanding and increasingly taking over has stayed with me, and I've started thinking we might indeed lose something in the transition.

Embodying both tradition and modernity

Life often gives us food for thought when we look around and pay attention. Last spring, I got the chance to help my son, a producer, make a documentary film on the passion of Jean-Marie Chabot, CDL's patriarch. The project gave me the opportunity to visit a real boiling centre in operation—80,000 taps—

Mr. Jean-Marie Chabot and his wife Mrs. Marthe Fradette

and to see its atmosphere and the kind of syrup it produces.

We had an initial meeting with Jean-Marie before the sap started running. He shared his background and passions and, of course, we discussed his close ties with maple syrup production. He's been sugaring off since he was a young boy, when he was given permission to tap a few maple trees on his way home from school. His mother would then let him cook the syrup in the kitchen. This would fill the house with maple steam, forcing everyone to throw open the windows, but would also produce the family's supply of maple syrup for the year.

We left Mr. Chabot and promised a second shoot with his three sons, this time while his massive Master pellet evaporator would be operating. As I left, I told myself I would soon get to taste this syrup, produced with cutting-edge technology and remarkable efficiency.

Visiting a boiling centre

One Sunday, while still in bed, I received a call from Jean-Marie: "We're boiling, the guys are on their way—it's now or never!" A shiver travelled through my body, as if I were a child and Santa Claus himself had just invited me to come on up and visit his toy factory! My son and I headed down the Tewkesbury mountains to Bellechasse. When we entered Mr. Chabot's building, we discovered the same happy, excited atmosphere as in our own sugar shack, where we boil the sap of 300 maple trees. Everyone there was hard at work, in an ambiance where the focused attention required by sugaring combined with smiles and good humour.

Of course, everything was bigger: the 1,000-litre syrup containers and the steady flow of precious liquid from the evaporator and press line—everything oversized. For one of the year's first flows, the taste of the syrup was rich, without any of the flaws typical of some early batches. "There's a science to counteracting the woody taste of the first flows," Mr. Chabot told me. That's when I realized that tradition and technology need not be opposed. Our evolving maple sugaring practices are a series of choices. Science can very well be at the service of the flavours we've always sought in maple syrup. And while the advent of high Brix reverse osmosis systems has forced us to reflect on flavour development and cooking techniques, people often make syrup because it's a passion. And passion is a key ingredient that elicits effort and quality alike—an ingredient that can connect us with the spirit of tradition.

A must-see documentary

Mr. Chabot's documentary will premiere at the Open House event in St-Lazare on May 19th and 20th.

It will then be available on CDL's YouTube channel. You will discover his universe, carried by the entrepreneurial culture he inherited from his mother and that he has developed in a large-scale company still rooted in the passion of maple syrup. Have a good viewing!

The three sons of Mr. Jean-Marie at the boiling centre

By Eric Labrecque
Sales Manager – Packaging Division

BOTTLE YOUR MAPLE SYRUP: GET IT RIGHT!

Your maple syrup is precious. It deserves to be stored properly so it retains its healthful properties—if it doesn't make it to the table right away, of course!

Several packaging options are available to stave off syrup's two worst enemies: light and oxygen.

You need only follow a few basic rules to keep your high-quality syrup stable until it's opened. The details of the process are important.

1. Make sure the inside of the container is clean. The syrup's temperature must reach 85 °C (185 °F). It can be hard to handle boiling and putting in bottle at the same time. One alternative is to boil the syrup first and deal with bottle later. Just reheat the syrup to 85 °C (185 °F) again, but don't exceed that temperature as it could alter the syrup's colour and taste and may precipitate its minerals, which means you'll have to filter the syrup again.
2. The syrup must reach at least 66° Brix to prevent fermentation. However, it's best not to exceed 67° Brix, or the sugar may crystallize.
3. Once the container is sealed, it must be turned upside down or on its side for a few minutes to sterilize inside the lid. Turning it upside down also allows you to check the container's seal.
4. The next step is to cool your syrup. Leaving a space between the containers or placing them in a cold water bath will do the trick. The idea is to prevent the temperature from rising and to let it fall as quickly as possible instead.
5. To make sure your syrup is at its best, the container must be impeccably clean. Dunking them in a water bath helps remove any syrup residue from the outsides of the container. Even if you don't immerse them in water, you still need to make sure the outside is clean.

DID YOU KNOW?

...a new image for the cans available in Canada has recently been launched? Wanting to offer not one, but two distinctive and current designs, we worked with two Canadian artists to create the visuals for the regular and organic cans. After much research, our choice fell on Christine Genest and Annie Carbonneau for their colorful and unique style.

We wanted the artists to draw on their memories and echo those of the maple syrup producers, but above all, those of the syrup consumers! We are convinced that the values conveyed by these visuals, their bright colors and their characters will stand out on the shelves!

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CDL SUGARING EQUIPMENT

CDL SUGARING EQUIPMENT - USA HEAD OFFICE
3 Lemnah Drive, St. Albans, VT 05478

cdlusa.com