



Supporting Sustainable Management of Private Woodlands

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Getting Started with Small-Scale Maple Syrup Production

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I have maple trees on my property and would like to try making maple syrup. What do I do? (Ed, SFL; Stacey, CDC)

Making maple syrup is a time-honored tradition for woodlot owners, and anyone who has even a few maple trees. The process is as simple as boiling sap, but attention to a few details will make for a more pleasant, productive, and safe experience. A warning first, many people who start with just a few tapped trees quickly catch the maple bug; what starts as a handful of tapped trees can expand into hundreds of tapped trees.

What will you tap?

All of the native species of maple can be used for maple production, and some people have even tried the non-native Norway maple with varied success. The maples you most likely will find and that will be useful are sugar, black and red maple. Silver maple is also suitable and may be found in stream bottoms in your locations. Trees may be located in yards, hedgerows or the woods.

The maples have opposing leaves, buds and branches (Figure 1). Other “opposite” trees include white, green and black ash. The maples all have more slender twigs than ash. The native maple have bark that is described as having “plates” of bark that peel from the sides (sugar maple) or top and bottom (red and silver maple).

Several educational resources are available to assist with tree identification. You can request a visit from a Cornell Master Forest Owner volunteer who can help you identify maples.



Figure 1. All maple trees have opposing buds. The buds produce leaves and twigs, which of course would also be opposing. Sugar maple (A) has sharp pointed buds. Red maple (B) has blunt or rounded buds. Other “opposite” species include the ashes, dogwoods, viburnums and horse chestnuts.

Request a visit at www.CornellMFO.info. There are also tree identification videos at www.youtube.com/Forest-Connect. Finally, search Google for “Cornell Know Your Trees” for an online bulletin. Hardcopy available for sale by contacting cce-nat-res@cornell.edu.

Sap Collection

The basic process is to collect sap from the tree and boil the sap until the sugar concentration increases to about 67% sugar, the defining point of syrup. This process can be broken down into collecting, boiling, and storage.

Sap runs when the trees experience a freeze:thaw cycle that creates a negative pressure inside the tree (suction) that draws water into the stem. As the tree thaws, the internal pressure increases and allows the sap to run out through the hole you've drilled. Your buckets or containers need to be checked and collected every time there is a freeze:thaw cycle. Sap spoils easily if it gets too warm.

Collection systems for a few trees usually include a spile that is inserted into the tree and a container to hold the sap. Spiles can be either plastic or stainless steel. Spiles must be removed each year. A hole appropriate for the diameter of the spile, usually $3/16"$ or $5/16"$ is drilled about 1.5 inches deep at a slight angle to allow sap to run out. The hole must be into clean white wood (watch the shavings). Avoid any wiggle while drilling so the hole will be circular not elliptical. The hole should be about 2 inches laterally and 4 inches vertically away from last year's hole (Figure 2).

The type of spile needs to match the container. One common option is to use maple tubing to connect the spile to a clean plastic bucket with a lid (Figure 3). The tubing connects from the spile through a small hole in the lid of the bucket. The sealed lid prevents rain or melted snow from diluting the sap, and excludes other debris. Be sure to situate the buckets so they don't blow over or tip as they fill with sap. The traditional method of collecting, at least in recent decades, is the use of a metal bucket that hangs from the spile (Figure 4). This system offers a traditional aesthetic that many people find attractive, and the simplicity of just the spile and bucket. Also, the bucket is attached to the spile and doesn't require a flat and level location. The buckets, however, usually lack a handle for transport.

After the season ends, remove all spiles from trees. Boil metal spiles and discard plastic spiles unless they are impregnated with silver. Buckets should be thoroughly rinsed, and stored to prevent dust and debris from accumulating. Typically avoid soap on maple equipment which may not be easily rinsed.



Figure 2. Tap holes need to be separated to allow access to wood that hasn't been stained following the previous tapping. At least “two fingers laterally and 2 to 4 inches vertically.



Figure 3. Clean buckets with a lid provide a convenient way to collect sap using tubing from the spile. A fresh bucket is swapped with the bucket containing the sap, and the handle allows for easy transport.



Figure 4. Metal buckets with lids that hang from the spile are the traditional method of collection. Historic spiles were $7/16"$ diameter, as pictured. Modern stainless steel spiles, such as from Next Generation Maple (www.nextgenmaple.com/spouts), insert into a $5/16"$ diameter hole.



Figure 5. In-door woodstoves or cook stoves are an economical way to boil sap into syrup. Electric stoves and outdoor propane boilers, such as turkey fryers, are the least economical method to boil sap.



Figure 6. Refractometers are an accurate way to test the concentration of solids (sugars) in the sap to determine when it becomes syrup.

For most hobby producers, the next step is simply to pour the syrup into containers. Containers must be clean. Mason or Ball jars work well (Figure 7), but pre-heat them with hot water to reduce the likelihood they crack from hot syrup. When syrup is heated above about 180 degrees, minerals called "sugar sand" precipitate out. These will accumulate in the bottom of the container, but are fully harmless. Filtering the syrup is possible, but requires special filtering cloth.

Store the jars of syrup in secondary containers to collect spills if the jars break. Syrup at the correct sugar concentration will keep for many months on a shelf, and for a year or more in the freezer.

Equipment

In almost every area, or the next town over, there is a hardware store or maple supply company that can help with your sap collection needs. Meet the vendors and learn what they have to offer. Vendors of maple equipment can provide the items you need, and instruction on how to use it. If you need to search for a vendor, use the list of manufacturing companies on the Cornell Maple webpage, and

Other collection systems, such as sap bags, are available. Look for examples of sap collection systems on the ForestConnect youtube channel, here <https://youtu.be/2jx-yLenq2g> or search for "maple sap collection".

Boiling Sap to Syrup

Making syrup is as easy as boiling the sap. The quicker and hotter the boil the faster the water evaporates. As a general rule of thumb, each quart of syrup will need to boil away about 10 gallons of water. What boils away is pure water as steam. The steam should not be sticky, but may loosen wall paper. The most economical way to boil sap is on a wood stove already in use for heating your home (Figure 5). Boiling on electric or gas stoves, or propane burners will produce expensive syrup.

Sap obtains the characteristic maple aroma and flavor by heat. The heating process also caramelizes the sap. The longer the sap heats, the darker it becomes. The color doesn't affect the flavor, but darker colors usually have more robust flavor.

Sap becomes syrup when the temperature is 7 degrees above the boiling point of water. All maple syrup is approximately 67% sugar, or what's known as brix. The actual boiling point of water changes daily with barometric pressure, plus most thermometers are not accurate. It is best to boil water each day to determine the boiling point and then add 7 to determine the point the sap becomes syrup. Use caution, as sap approaches syrup, it can bubble up and over the edge of the pan causing quite a mess. It is also possible to burn syrup on the pan. Probably it is best to not use your best cooking pan to make syrup.

Once the syrup reaches temperature it is done. If you own a hydrometer or refractometer (Figure 6), you can confirm the temperature threshold by testing the syrup to see if it is approximately 67% brix.

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search for their dealers <http://blogs.cornell.edu/cornellmaple/links/>

Sap collection equipment for a few trees will include a spile, a bucket, and perhaps some tubing. The spile can be either metal or plastic. Spiles need to be removed from the tree at the end of sap season. Metal spiles can be boiled. Plastic spiles, except those with silver, should be discarded each year and replaced.

Most metal spiles are designed to hold the bucket, but most plastic spiles are designed to be connected to tubing which drains into a bucket. There are several types of spiles available, and you should consider the full collection system to be sure you obtain all the parts that you need. You might also find a local maple producer who can talk you through the process, and perhaps sell you a few items or a few feet of tubing and spiles. Plastic buckets, usually the 5-gallon buckets with a lid, can be purchased through many local retail outlets, but make sure it is stamped HDPE (high density polyethylene) as a food grade container. Don't use a large trash can which is difficult to rinse clean and often has an unpleasant odor. Test plastic buckets for any odor which might be absorbed into the sap, and then concentrated into the syrup.

If you use tubing, you may need to soak the end of the tubing in hot water for a few seconds to soften it and allow easier insertion of the spile. The tools used for this process are too expensive for most hobby producers.

Safety

Making maple syrup is a great family project, but boiling sap includes flames, hot surfaces and hot liquids. Use caution to avoid spills. You may also be walking or driving tractors or ATVs on snow and ice. Use caution on slippery surfaces and especially with equipment on slopes.

Tapping trees does not hurt the health of the tree. Sap is removed, but not of a sufficient quantity to impair the tree's ability to grow. As an illustration of sustainability, some families have been tapping the same maple trees for many generations.

For More Information

If you find yourself getting drawn into maple production, Cornell offers a breadth of opportunities to learn about and expand your production. Visit the Cornell Maple Program website at www.CornellMaple.com. Also, we work closely with the NY State Maple Producers Association which also hosts educational events www.NYSmaple.com. A humorous parting resource is a youtube link from a community theater comedy skit describing one person's effort to make maple syrup. Don't let this skit scare you away, but do recognize that with maple production if something can go wrong, it may go wrong.

https://youtu.be/EqreE_O6mBU



Figure 7. Mason and Ball jars make good syrup storage containers because the glass minimizes oxygen movement, and the jars can be easily inspected to ensure they are clean.

For additional information on woodland management go to:

www.ForestConnect.com & www.CornellForestConnect.ning.com



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