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Great Places Green Spaces

Volume 2 / Issue 3 Fall 2023

Key topics: Maple Syrup Production

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The Basics of Maple Syrup

You may know maple syrup as the topping that turns your baked batter into delicious pancakes, or maybe it is the delightful glaze on your honey ham during the Easter season. This tasty syrup comes from the extraction of sap from, you guessed it, a maple tree. The sugar maple (Acer saccharum) is the most common type of maple used for maple syrup production, and for good reason. Sugar maple trees contain roughly 2% sugar in their sap, whereas other maple trees such as silver, red, and boxelder contain only 1% sugar concentration. This is why the first step of making maple syrup is identification.

Tree identification is a large and diverse subject. For the purposes of this newsletter, we will only be covering the most relevant maple trees to South Dakotan's. The identification will also largely be simplistic and visual. This is in no way something to be treated similar to a dichotomous key.

To be clear, if you are not 100% sure and confident in what you are doing, please consult a local expert. Follow a rule similar to mushroom picking: if you are not certain you know what you are eating, do NOT eat it. Some trees contain toxic or poisonous compounds that are not safe for consumption in humans or pets. Exercise caution and safety in this practice.

"I took a walk in the woods and came out taller than the trees" - Henry David Thoreau

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Tree Identification

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Types of Maple trees

Silver maple: 5 lobes with deep sinuses make the leaves look narrower than other maple trees. Leaves are known for their silvery white underside. The bark on older trees looks flaky or scaly, unlike the smooth bark on young trees.

Boxelder: One of the trickier maples to identify because of its pinnately compound leaves. This tree is commonly confused with green ash. There are 3-7 leaflets that are slightly serrated. The tree can grow anywhere from 35-80 feet tall

Norway maple: Norway maples have the largest and broadest leaves of the maple family. An easy way to tell the difference between a Norway maple and other maples is to cut the petiole (the stalk that joins a leaf to a stem). If a milky-like substance oozes out then you have a Norway maple.

Tatarian maple: These trees may have 2 lobes and are ovate. They will only grow 15-20 feet tall at maturity and are known more as a lawn tree because of spring flowers and autumn colors.

Types of Maple Trees Cont.

Red maple: These trees have 3 lobes and are orbicular. Compared to maples such as Silver and Norway, the Red maple is not as common in South Dakota because of the temperature fluctuations. It is also not uncommon to see yellow leaves instead of the red foliage due to chlorosis (a form of nutrient deficiency).

Sugar maple: This maple has 5 lobes. Unlike the Norway maple which also has 5 lobes, the petiole releases clear sap when cut. This is one easy way to distinguish the difference between the two. Sugar maples also require well-drained and undisturbed soil for optimal growth which can be uncommon in urban settings. They can be negatively affected by the unpredictable weather patterns in South Dakota.

2) Narrowing it Down

When choosing a maple tree to tap, there are two main factors to consider: the health of the tree and the diameter. If the tree has suckers, is experiencing chlorosis, or shows any other signs of damage or pests, consider choosing another tree. Furthermore, the amount of spiles to use is determined based on the diameter of the tree:

- 10 inch DBH (31 inch circumference) = 1 tap
- 20 inch DBH (63 inch circumference) = 2 taps equidistant from each other
- 25+ inch DBH (79 inch or greater circumference) = 3 taps equidistant from each other

3) Making the tap

Pick a spot on the tree that is 3 or 4 feet off the ground. You will have greater success if you tap beneath a tree branch and drill the hole upwards so the sap is directed into the spile. Drill the hole into the maple tree with either a 7/16 or 5/16 inch drill bit and stop once the hole is 2 inches deep.

4) Put in the spile

You can use either a plastic or traditional metal spile/spout to collect the sap. Gently tap in the spile. Do not go too far into the tree, you do not want to harm the tree.

"Forests are the lungs of our land, purifying the air and giving fresh strength to our people " - FDR

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Preparation and Storage

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Maple Syrup Production

5) Set up
When picking out a container for the maple syrup, pick a safe one. Do not use old laundry detergent bottles or other bottles that previously held toxic substances. Because sap is absorptive, you may not want to use a bottle that previously held other food, otherwise you would end up with pickle flavored or jelly flavored maple syrup. Depending on what type of spile you own, there may or may not be a hook for a bucket. You can either place the container onto the hook or buy tubing that runs from the spile to the bucket.

6) Do steps 1-5 over again
Sugar maple trees have a 40:1 ratio, meaning 40 gallons of sap would yield 1 gallon of maple syrup. Healthy trees usually produce 10-15 gallons of sap per tree. Depending on how much syrup you need, consider tapping into multiple trees. It is better to tap into multiple trees than to push the limits on one tree.

7) Storing sap
Once you have collected the sap, try to use it right away. If you must wait a few days, store it in a cold environment.

8) Preparation for maple syrup
Once you have the sap, it is time to boil it to the perfect concentrate. You will need a pot , an accurate thermometer, some cheesecloth, and a lot of patience.

Maple Syrup Production Cont.

9) Boiling it down
The best way to boil it down is to put it on top of a wood fire. Of course, it would be warmer for you in the kitchen during the spring months, but you run the risk of the walls inside your house becoming sticky.
Depending on how much maple syrup you want to produce and the surface area of the pot, boiling the sap could take 1-2 days. You may also filter out the ice from the sap before putting the sap into the pot.

10) Watching and monitoring
There is no need to stir the sap, but you will need to periodically filter out the impurities and add sap once the layer is thin.

11) Finishing the product
Monitor the sap closely with thermometers. For this step, you may want to consider moving the sap to a grill or an indoor stovetop to closely monitor the temperature. Once it reaches a little over boiling point at 219 degrees Fahrenheit you will need to take it off so it does not burn. Then filter the substance 3 -4 more times through cheesecloth.
If you can, measure the density of the syrup with a hydrometer. The syrup should be 67 degrees Brix.

12) Storage
Remember to store your syrup while it is still hot. You may store it in a dry area or freeze it for safekeeping.

Methods and Tips

Other tips and notes about syrup.

There are three types of processes of collecting sap.

1. The traditional way requires no tubing. The sap goes directly into the bucket (via gravity) that hangs from the spile.
2. The second is natural vacuuming, meaning a tube is connected to the spile and acts as a siphon. This method still uses gravity.
3. The third method is mechanical vacuuming, which larger sugar making companies use to get the most out of trees. Although mechanical vacuuming is efficient and collects twice as much sap, it raises ethical questions about how much a tree can handle.

Remember, other types of maples have different concentrations of sugar. Although sugar maples have a 40:1 ratio, that does not mean all trees will. If you were to tap silver maples, you could still produce maple syrup, but you would need to tap more trees than a sugar maple.

Trees that have to be inoculated for organisms and bacteria are more likely to produce less. Similarly, trees that have not properly healed from tapping from previous years tend to produce less. Trees that heal tend to have a greater sap

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Epilogue

Are you wondering when to tap your maple tree? The sap runs the best when the temperatures are above freezing during the day, but not at night. This is usually mid-March, but it varies from year to year. The maple tapping season is over when the buds come out on trees and the temperatures are consistently above freezing.

Sources:

Ball, J. (2013). *Trees! . South Dakota State University.*

Roberge, S. (2013, January). *Maple Sugaring: Tips for Beginners and Backyard Maple Sugar Producers. University of New Hampshire Cooperative Extension https://extension.unh.edu/sites/default/files/migrated_unmanaged_files/Resource002012_Rep2976.pdf*

"In nature, nothing is perfect and everything is perfect. Trees can be contorted in weird ways, and they're still beautiful" - Alice Walker