



Tapping Maples for Sap

John Ball, Professor, SDSU Extension Forestry Specialist & South Dakota Department of Agriculture and Natural Resources Forest Health Specialist

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Hankui Zhang, Assistant Professor, Geography and Geospatial Sciences, South Dakota State University

Sidonia Trio, Education Coordinator & SDSU Extension Horticulture Assistant

Curtis Braun, SDSU Extension Food Safety Field Specialist

Tapping maples for their sap is a North American tradition. It began with the Native Americans who first learned how to collect the sweet spring sap. The tradition has continued with modern techniques. Sugarbushes – forests of trees used for collecting the sap – dotting the landscape from Maine to South Dakota.

The ideal conditions for the spring sap flow are cold nights (25-30°F), sunny, warm days (above 40°F) and the soils cool and moist. These conditions may last anywhere from a few days to a month. They also can be interrupted with freezing weather when the sap flow stops until warm days return. The season ends when the days and nights stay above freezing. The trees will begin to produce leaves at this time.

The best trees for tapping are sugar maples (*Acer saccharum*). Sugar maple, as the name implies, produces the sweetest sap. The average sugar concentration in sugar maple sap is about 4.5% and ranges from a low of 3% to as high as 7% in some sweet trees. Sugar maples have gray bark broken into long, vertical plates (Figure 1). The shoot buds are long, slender, and sharply pointed (Figure 2). Unfortunately, they are not common trees in our South Dakota forests or communities.



Figure 1. Sugar maple bark



Figure 2. Sugar maple bud

Silver maple (*Acer saccharinum*), a more common maple in towns and windbreaks, also produces a sweet sap. These trees have gray, platy bark (Figure 3) and plump, oval, reddish buds on the shoots (Figure 4). Silver maple sap sugar content averages a little above 3% with a range between 2% and 4%. There are some silver maples that are sweeter than sugar maples.



Figure 3. Silver maple bark



Figure 4. Silver maple bud

Even our native boxelder (*Acer negundo*) can be an acceptable sugar tree. Boxelder sap averages between 2% and 3% but once again there are some trees that can be closer to 5% so even some boxelders can produce a sweet sap. Boxelder bark is light brown with shallow, blocky, fissures (Figure 5). The shoot buds are plump and bluish white (Figure 6). The shoots have a bluish bloom that can be rubbed off.



Figure 5. Boxelder bark



Figure 6. Boxelder bud

The best trees to tap are large, healthy, open-grown ones (Figure 7). They must be at least 10 to 12 inches in diameter (measured at 4.5 feet above the ground). The tree should be in a sunny location so that it had the opportunity to make plenty of sugar the previous season. The tree must also be free of large dead limbs and trunk decay. Trees with large dead limbs attached to the trunk and other signs of rot such as cavities and hollow branch stubs should not be tapped as drilling holes in these trees may increase decay.



Figure 7. Sugar maple tree to tap.

Spiles are tapped into holes drilled into the trunk (Figure 8). A ship auger bit on a carpenter brace is the best drill to use as these bits pull the chips out of the hole. An electric drill with a wood bit will also work but might require using a small screwdriver to sweep the chips out of the hole. Drill a hole slightly smaller than the tapped spile for a snug fit. The hole should be slanted slightly upward ($\sim 5^\circ$) for better flow and prevent pooling but not so much that the spile cannot support the bucket.



Figure 8. Spile for tapping.

The hole should be drilled about 1.5 to 2 inches deep into the tree. The wood coming out of the hole should be cream or white indicating it is in the sapwood where the sweet sap is flowing (Figure 9). Dark coloring means the hole went too deep and entered discolored interior wood or the tree has decay. Trees with decay should not be tapped.



Figure 9. White chips from sapwood.

The holes should be drilled around the trunk, about three to four feet above the ground. The number of tapholes that can be placed around the trunk is based upon its diameter. A 10- to 14-inch diameter tree can have a single taphole; a 15-to 20-inch diameter tree two tapholes. The easiest way to find the diameter is to place a tape around the trunk to measure the circumference in inches then divide the number by 3.14 for the diameter (Figure 10).



Figure 10. A tape can be used to measure the circumference.

Do not drill tapholes closer than about 8-10 inches apart. If the tree was tapped in the previous season, do not drill within six inches of where a hole was drilled the previous year. Drilling holes too close to the previous year's or above or below may lead to tree decay.

Tap the spile into the drilled hole until it is snug (Figure 11). Next, hang the bucket on the hook at the base of the spile (Figure 12). Place the plastic cover over the bucket to prevent debris from getting in the sap. Install the cover on the bucket by pulling out the rod at the base of the lid (Figure 13), aligning the slot in the lid base to the top of the spile (Figure 14), then threading the rod back through the lid and the hole through the top of the spile (Figures 15-16).



Figure 11. Placing the spile in the tap hole.



Figure 12. Bucket attached to hook on spile.



Figure 13. The lid rod.



Figure 14. Removing lid rod from center slot.



Figure 15. The lid rod attached to the spile.



Figure 16. The complete set up for tapping.

The sap flow may occur over several hours during a day, usually in the morning, the sap should be removed daily or more frequently as sap can spoil if left in the warm sun. Once the sap begins to flow it may continue anywhere from a few days to a month. The early season's sap is light and mild. As the season progresses the sap becomes darker and stronger flavored. The season ends when the buds are beginning to expand, the sap become cloudy and develops a "butterscotch" off-flavor.

This seems to happen sooner with silver maples and boxelders as they leaf out before sugar maples. Once the season is finished, remove the spile from the tree. Do not place anything into the hole and do not use the same hole or drill one directly above or below it the following year.

A single spile may produce anywhere from a pint to gallon of sap per day, though on cool days none may run and on a sunny day the run might be more than a gallon! A single taphole may produce five to twenty

gallons of sap during the season. Most trees are not going to produce enough sap to make maple syrup. It may take anywhere from 20 to 40 gallons of sap to make a single gallon of syrup.

The best use for the sap from a single tree may be for coffee or cooking. Leave a bucket of raw sap out overnight in freezing temperatures. The next morning carefully discard the ice crust – that is mostly water – so removing this crust will concentrate the sap (Figure 17). Next run the raw sap through a coffee filter to clear it of any debris.



Figure 17. Remove the ice from the bucket in the morning. It is mostly water.

Sap can become contaminated with bacteria from the tapping process. The sap can be pasteurized on the stove by bringing it up to near boiling – 185°F – and holding that temperature for three minutes. This temperature and time are sufficient to kill harmful pathogens but not affect the flavor of the sap. Heating the sap to higher temperatures or for a longer period will result in excess caramelization during the heating process (Figure 18).



Figure 18. The sap can be pasteurized on the stove.

The hot sap is poured into the clean containers for storage. The temperature must be at or slightly above 185°F when poured into the containers and sealed. The clear sap is stored in the refrigerator. The sap should be used within a few days. It is perfect for soups, smoothies or water for coffee.



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