by Winton Pitcoff

A New Take on Sap Collection

It's not often that the maple syrup industry gets significant coverage in the news media, particularly outside of the sugaring season, but that's just what happened last winter. Researchers at the University of Vermont's Proctor Maple Research Center released a report on a project they had been conducting for four years that tested an entirely new way of harvesting sap from maple trees. What began with a piece written for the center's website turned into a burst of coverage ranging from USA Today to popular online blogs.

"How we get maple syrup may change in a huge way," read one headline. "Could maple syrup plantations be a way of the future?" asked another. "Maple Syrup Revolution: A New Discovery Could Change the Business Forever" proclaimed a third.

The research conducted by Drs. Tim Perkins and Abby van den Berg started out as a look at how to improve vacuum systems, but when they found that sap flow from the cut top of a young sapling yielded significant amounts of sap, they changed their focus. They developed a fitting to collect sap from the cut trunks and rigged a vacuum system to collect the sap from a stand of 30 to 50 saplings over the course of three sugaring seasons.

What they found was that each stem yielded enough sap to produce about 0.073 gallon of syrup, and Perkins suggests that there's room for improvement, since that data included one of the worst years ever for sugaring and also represented just the first three years of using and improving brand-new technology. That's still quite a low number when compared to per-tap yields for traditional tapping methods, but what compensates for that is the greater potential density of saplings. An acre of 80 mature trees is considered a good sugar bush, yielding 40 gallons of syrup, but an acre of planted saplings could have room for thousands of taps and nearly 10 times as much syrup.

As for the trees, Perkins says that as long as they're growing out in the open, as opposed to under the forest canopy, they grow back well after being topped, though very differently from a maple that is allowed to grow naturally. New branches form below the cut each year, and the crown that forms is bushy and compact. The roots of the tree aren't impacted by being topped, he says, and the tree can be cut this way for harvest each year for a few years before needing to rest and grow taller again. More preferable is a coppiced tree with multiple stems, allowing a sugar maker to harvest from just one stem each year. It takes about five to 10 years for a sapling to grow to the 1.5 to 2 inches in diameter required for it to function well in this system—smaller trees won't yield much sap, and larger ones begin to lose the ability to resprout branches as well.

Photos by Sally McCay, University of Vermont.

Dr. Abby van den Berg, left, and Dr. Tim Perkins of the University of Vermont's Proctor Maple Research Center.

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The fitting on the tree is very different from a traditional tap. It resembles a plastic bag and is held away from the cut top of the stem by a mesh dome and secured around the tree with something similar to a hose clamp. A plastic fitting allows a traditional tubing system to be connected to the bag to draw the sap into the pipeline, aided by the type of vacuum system commonly used by sugar makers.

Perkins says the production economics for this new method are similar to those of traditional sugaring methods, with higher equipment and labor costs, but also higher yields. The potential for reducing costs in the sapling method is significant, though, as researchers continue to try to identify and make available seedlings with the genetics to produce sap with higher sugar concentration.

If a field of saplings is grown from stock known to produce sap with 3 percent sugar content, rather than 2 percent, that's an immediate 50 percent increase in syrup yield. In a traditional sugar bush, sugar makers can thin trees and select for the best producers, but still make only fractional changes in their overall sugar content each season.

According to Perkins, the media attention given to this project prompted a fair amount of criticism, and some misunderstandings. "The biggest misconception is that we're trying to tell people to cut down their forests and start planting trees," he says. However, this is not meant to be a replacement for traditional sugaring. Instead, he sees this method of sap collection as a

way for producers who don't have access to a good sugar bush to increase their production, or for those who lose their trees in a natural disaster to quickly get back into production again.

Since the Asian long-horned beetle—a huge threat to the maple industry—feeds on mature trees and leaves young ones alone, this method could also be a hedge against that potential problem. The smaller trees also freeze and thaw faster than larger trees, meaning more sap flow during increasingly unpredictable spring weather patterns.

Of course there are people who simply say that this doesn't seem like the "right way" to treat trees or to make maple syrup. Perkins points out that growing plantations of Christmas trees to be cut and replanted each year wasn't all that common until fairly recently. He adds that each new type of technology introduced to the sugaring industry—tubing, vacuum systems, reverse osmosis machines and more—has been met with skepticism and criticism, but has ultimately helped improve yields, economics and sustainability for sugar makers. The idea of planting fields of maple trees and tapping young stock is in its infancy, and more research will take place before this production method is ready for commercial use, but it may well become a viable method of production as demand for maple products grows and producers work to meet that demand. F

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