

Boiling it Down

by Winton Pitcoff

Improve Yield and Profits

Replace and clean taps and drops

Sugar makers have an array of tools at their disposal to help improve yield, from tubing to vacuum systems to check valve spouts. However, each of these tools comes at a cost, and that cost needs to be weighed against sap yield to determine if the improved yield actually means increased profits.

At the annual New York State Maple Producers Winter Conference in January, Dr. Tim Perkins, director of the Proctor Maple Research Center at the University of Vermont, offered a workshop on how replacing and cleaning tubing system parts affects sap yield and profit. It's easy to improve yield, he pointed out, but harder to improve profits. Recent research is starting to result in tools and information to help producers figure out efficiencies in tubing replacement, and upcoming research—for which sugar maker input is being solicited now—is aimed at determining the most effective methods of cleaning tubing systems.

A taphole produces sap as long as it remains fresh. When the tree's natural processes begin to heal the wound caused by drilling the tap, the sap flow is reduced. Those healing processes are promoted by the introduction of naturally occurring microorganisms. Tubing closes off the hole to the elements, which helps keep holes fresher than those with buckets.

Tubing is designed to extract sap from trees, but when the trees refreeze during the sugaring season, the natural vacuum created can actually suck sap from the tubing back into the taphole, facilitating the healing process. The pulsing of a vacuum pump can also result in a small amount of back-flow, enough to start tapholes closing up earlier than is desired.

Even the freshest sap will promote that healing, but sap that picks up bacteria harbored in the tubing will speed up taphole closure even more. Used tubing and spouts have scuffs and scratches that are perfect homes for microorganisms, and adding sugary sap creates a perfect atmosphere for them to multiply.

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So it's no surprise that the best sap yield in a sugar bush comes from a brand-new tubing system. Production can drop by as much as 25 percent over three years in a tubing system where none of the components are replaced, largely because of tapholes closing up prematurely.

It's a small amount of sap that gets pulled back into the tree, so what matters most is the cleanliness of the part of the tubing system closest to the hole: the spout and the dropline. Replacing spouts and drops each year goes a long way toward improving yield, but can be expensive and time-consuming, often to the point of negating the profits from any increase in production. For systems not using check valves, replacing droplines every three years is the sweet spot that balances increased yield with increased profit in most cases.

The check valve spouts, developed by Perkins and Leader Evaporator, are essentially a one-way valve, allowing sap to flow freely out of the taphole but never back in. Perkins' experiments have found that in systems using check valves, the age of droplines has little effect on how quickly tapholes heal. A comparison of sugar bushes with four different systems—8-year-old spouts and drops cleaned with water; new spouts and drops; just new spouts; and new check valve spouts—showed improved net profit over the 8-year-old cleaned system for each of the other three, with the check valve system showing by far the greatest gain.

To help producers figure out the best practices given their unique situations, the Proctor Maple Research Center developed an Excel spreadsheet titled "Effects of

Spout and Drop Sanitation Strategy on Sap Yield and Net Profit." Users can input the costs of labor and materials and see the potential impact on yield and profits, given the scenario they choose. It is available for download at <http://alturl.com/a7r2f>.

Research is continuing on the impact of replacing various parts of tubing systems, and Perkins' work is also turning toward a large, multiyear research and education project with the Cornell University Maple Program on tubing sanitation.

There is little agreement on the best way to clean tubing systems, says Perkins, as evidenced by a recent survey that found one-third of producers don't clean their systems, one-third use air and water to do so, and the remaining third use a range of chemical treatments.

Air and water can be effective, but they don't sanitize or kill bacteria. Dilutions of Clorox bleach are commonly used, but squirrels have developed a fondness for the taste, which has caused problems in the form of damage to tubing.

This project will provide significant insight into current practices and ultimately lead to a greater understanding of the efficacy of each method. To that end, Perkins is seeking input from producers on their sanitation practices and the results they experience. An online survey is available at <http://alturl.com/5birp>, and all producers are asked to participate. **F**

Winton Pitcoff is a freelance writer and coordinator of the Massachusetts Maple Producers Association.

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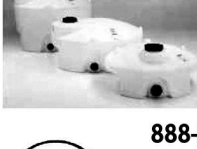
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